

Effect of Instructional Guidelines on Knowledge, Practice, and Fatigue Level among Post Cardiac Surgery Patients

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Abstract

Educating the patient is the responsibility of the nursing, which is one of the most important aspects of patient post cardiac surgery. Fatigue is recognized as one of the most common and distressing complications post cardiac surgery. Educational guidelines are providing general information about fatigue and introduce new concepts regarding cardiac surgery, self-care, and confrontation techniques. **The aim was to** determine the effect of instructional guidelines on knowledge, practice, and fatigue level among post-cardiac surgery patients. **Subjects and method: Design:** A quasi-experimental research design was utilized to fulfill the aim of this study. **Setting:** the research was applied in the Cardiothoracic Surgery Department at the Fayoum University Hospital. **Subjects:** A purposive sample of 60 adult patients who are undergoing cardiac surgery was included. **Four tools were used:** Tool (I) a structured interview questionnaire, Tool (II) patients' knowledge regarding cardiac surgery, Tool (III) patients' practice regarding cardiac surgery (pre/post), and Tool (IV) Fatigue assessment scale. **Results:** The results revealed that there was a positive significant correlation ($P=0.001$) between patients' knowledge scores and their practice post-two months of instructional guidelines implementation. There were highly significant improvements in patients' knowledge and practice regarding cardiac surgery post instructional guidelines implementation ($P=0.005$). Statistical highly significant differences and reduction were detected between fatigue mean scores post-one-month of instructional guidelines implementation. **Conclusion:** The instructional guidelines implementation had a highly significant positive effect on reducing fatigue levels among patients undergoing cardiac surgery. **Recommendations:** The instructional guidelines regarding cardiac surgery should be conducted, discussed, integrated into the rehabilitation programs, and taught to the patients using the booklet and illustrated pamphlets for each one to improve their information and reduce their fatigue level and replication of the current study with a larger sample of patients undergoing cardiac surgery in different settings is required for generalizing the results.

Keywords: Adult patients, Cardiac surgery, Fatigue level, Instructional guidelines, Knowledge, and practice.

Introduction:

Open heart surgery is a vital technique that can treat a variety of cardiac conditions. The most common procedures include coronary artery bypass graft, valve repair or replacement, structural anomalies of congenital or acquired heart illnesses, mechanical assistive device implantation, and heart transplantation. For heart surgery patients, the post-surgical stage is the most crucial. Many consequences are present, including pneumonia, cardiovascular illness, neurological and kidney problems, all of which lengthen hospitalization, increase costs, and have a direct impact on

survival (Ahmed, Ibrahim, Soussi, & El Said, 2016).

Cardiac procedures assist patients in returning to their normal lives and improving their quality of life. Despite the favorable therapeutic results of open-heart surgery, it can cause certain issues for patients, including physical, mental, and social problems for several months afterward. One of the most typical nursing approaches is to provide information on discharge after surgery. Discharge training after open-heart surgery should be provided to patients to lower or

eliminate physical and emotional issues (**Ozcan, Yildiz, Findik, & Sut, 2018**).

The goal of hospital education is to provide patients with the essential knowledge. There are several guidelines or standards for training patients with cardiovascular surgery to prepare for discharge, and there are specific parts of information and criteria for cardiac patient education. Typically, cardiac surgery clinics develop educational content for patients focused on postoperative care, food, exercise, and rest, which is then delivered by nurses who play a critical role in patient education in hospitals (**Yildiz, Gurkan, Gur, Unsal, Goktas, & Ozen, 2014**).

Although recent advancements have increased the success rate of coronary artery bypass graft surgeries, this does not alleviate all of the psychological, physical, and social issues that patients face after discharge. Several body systems, including the circulatory system, respiratory system, surgical site, nutrition, drug use, exercises, self-care, and pain control, can experience issues during the early post-discharge period, including shoulder, back, chest, or leg pain, excretion, insomnia, nightmares, palpitations, weakness, fatigue, mood swings, depression, and loss of appetite (**Dal, Bulut, & Guler, 2017**).

Fatigue is one of the most common and debilitating side effects of cancer diagnosis and treatment. Generalized weakness, poor mental concentration, insomnia or hypersomnia, and emotional changes are among clinical symptoms of fatigue that significantly reduce cancer patients' overall quality of life during and after treatment. Although the etiology of the link between cancer and fatigue has yet to be determined, physiological, biochemical, and psychological abnormalities appear to play a role. Several strategies in the therapy of cancer-related fatigue have been examined due to its complex character (**Armstrong & Gilbert, 2018**).

Fatigue is a common problem among cardiac patients. It peaks between 2 and 4 weeks after surgery. Fatigue is linked to a lack of independence, a high level of mental distress, depression, and poor heart function. Preventive sleep and fatigue management should be implemented, especially in the first

six months after discharge. Fatigue and poor sleep quality contribute to a variety of issues, including somatic complaints and psychiatric illnesses (**Kruahong, 2013**).

Educational therapy has proven considerable advantages to patients among the psychosocial interventions, which include education, counseling, and support groups. General information about weariness is provided in educational guidelines, as well as new concepts such as energy conservation, self-care, and confrontation strategies are introduced. Energy conservation is described as tailored planning aimed at minimizing a drop in a patient's required energy level to complete a task while also boosting his ability to manage fatigue throughout the day (**Pachman, Price, & Carey, 2018**).

Nurses are essential members of the healthcare team, and they are regarded as a critical component in the overall patient outcome based on expert surgical assessment. They are involved in the treatment of adult cardiac surgery patients at various levels of intervention and health education. To give appropriate nursing intervention and education to patients and so enhance their health, the nurse must have a complete awareness of their requirements (**White, Duncan, & Baumle, 2017**).

Any instructional activity aimed at improving patients' health behaviors and health conditions are referred to as patient education. Its primary goal is to maintain or improve the health of patients, as well as, in some situations, to slow their decline. A well-informed and educated patient can actively participate in his or her care, enhance results, aid in the detection of errors, and shorten hospital stays. Medical information and preventive measures about health and well-being are included in the medical component of health education. Effective health education, according to research, starts with the identification of the patients' different key needs (**Pachman, Price, & Carey, 2018**).

Nursing is responsible for educating the patient, which is one of the most critical components of patient preparation. This should happen throughout the patient's stay in the hospital and not at the last minute. Every day,

patients must be educated about medications, such as pain relievers, activity level forecasts, food, Sternal precautions, and incision care, as well as indications and symptoms of infection. Patients should be as involved in their care as possible. When at all possible, families should be involved, especially those who will be caring for patients at home (Karim, 2018).

Significance of the study:

Prevalence of exhaustion among those with cardiac surgery reportedly ranges from 35% – 75% (Pedersen, 2016). Nursing is responsible for educating the patient, which is one of the most critical components of patient preparation. This should happen throughout the patient's stay in the hospital and not at the last minute. Every day, patients must be informed about medications, including pain medication, activity level, food, precautions, and incision care, as well as infection indications and symptoms (Hodge, 2015).

Patients who are about to undergo cardiac surgery often experience a great deal of fatigue because they do not know what to expect. The problem at this hospital was that many nurses were not aware how big a difference preoperative teaching could make a positive effects on patients surgical outcomes and that they should focus on providing this teaching. Once teaching helps to reduce patient fatigue, and results in improving in practice. Therefore, the researchers wanted to determine the effect of instructional guidelines on knowledge, practice, and fatigue level among post-cardiac surgery patients

Aim of the study:

To determine the effect of instructional guidelines on knowledge, practice, and fatigue level among post-cardiac surgery patients through:

- Assessing patients' knowledge regarding cardiac surgery.
- Assessing patients' reported practice regarding post-cardiac surgery care.
- Assessing fatigue level among patients diagnosed undergoing cardiac surgery.
- Evaluating patients' knowledge, practice, and fatigue level among patients undergoing

cardiac surgery after implementing instructional guidelines.

Research hypothesis:

H1: Patients' knowledge regarding cardiac surgery will be improved after implementing the instructional guideline.

H2: Patients' reported practice regarding cardiac surgery will be improved after implementing the instructional guideline.

H3: Instructional guidelines regarding cardiac surgery will have a positive effect on reducing fatigue levels among adult patients.

Subjects and Method:

Research design:

A quasi-experimental research design was utilized to fulfill the aim of this study. This design is important to the nature of the study issue, having one or more group subjects observed on pre and post manipulations (Creswell, 2012).

Setting:

The study was applied in the department of Cardiothoracic Surgery at the Fayoum University Hospital. The cardiothoracic Surgery Unit consists of 2 rooms included 12 beds on the second floor of the hospital, this setting was selected due to the high prevalence of patients in the selected setting, and also it serves the biggest region of the population.

Subjects:

Sample size calculation:

The sample size was calculated based on considering the level of significance of power analysis of 0.95 ($\beta=1-0.95=0.5$) at alpha .05 (one-sided) with a large effect size (0.5) was used as the significance, 0.001 was used as the high significance.

A purposive sample of 60 patients was included from a population who have met the inclusion criteria within six months and received care from the previously mentioned setting. The inclusion criteria were adult patients their ages ranged from 18-60 years old and who visited the previously mentioned setting, were fully oriented, and agreed to

participate in this study. Those patients were followed up before discharge in the cardiothoracic surgery department and two months. Exclusion criteria included: Disoriented adult patient, Uncooperative adult patient, and adult patients on mechanical ventilation.

Data collection tools:

Four tools were used to collect the data of the study as the following:

The tool I: A structured interview questionnaire was developed by the researchers after reviewing the related literature and research studies (**Iung & Vahanian, 2018**); it included two parts:

Part (1): It included demographic data of patients such as age, educational level, occupation, and residence.

Part (2): It included the medical history of adult patients such as medical diagnosis, having surgical history, and current surgery name.

Tool (II) patients' knowledge regarding cardiac surgery (pre/post): was developed by the researchers after reviewing the related literature and research studies (**Iung & Vahanian, 2018 and Gupta et al., 2016**): It included 14 questions (multiple choice questions). It was designed to assess adult patients' knowledge regarding post-cardiac surgery instructions such as general information about cardiac surgery (4) questions, brief anatomy of the heart, various diagnostic procedures and how to be prepared for it, benefits of surgical management, systemic complications after cardiac surgery, Information about how to reduce or prevent postoperative complications through medical therapy after surgery, follow-Up and Incisions Care (11) questions, exercise program and activities after discharge (8) questions, common health problems post-surgery (9) questions, medications post-discharge (13) questions, healthy nutrition (7) questions, risk factor (8) questions, and sources of information regarding their knowledge.

Scoring system:

The adult patient was given 1 when the answer was correct and if the answer was incorrect the score was given 0. A patient who scored from 1 to 7 was considered to have

unsatisfactory knowledge (< 60%), and those who scored between 8 to 14 were considered to have satisfactory knowledge ($\geq 60\%$).

Tool (III) patients' reported practice regarding cardiac surgery (pre/post): was developed by the researchers after reviewing the related literature and research studies (**Debra et al., 2017 and Gupta et al., 2016**): It included six questions (multiple choice questions). It was designed to assess adult patients' practice regarding post-cardiac surgery instructions related to physical activity and exercises (6), smoking cessation (4), care of wound site (12), and weight control (8). Total practice knowledge was 30.

Scoring system:

The scoring system was calculated as zero for "not done answer", and one for "done answer". The total score was categorized into adequate and inadequate practices" as follows: inadequate less than 60% and adequate for more than 60%.

Tool (IV): Fatigue assessment scale:

This tool was adopted from **Kleijn et al., (2011)**, it was a self-rating scale consisting of 10 items (which assess fatigue level of individuals during various activities in a week in terms of physical, social, psychological, and spiritual domains and their relationship with time of the day). Scores ranged from 0 (no fatigue) to 10 (worst possible) with a total score range of 0 to 100. No fatigue, very little, mild, moderate, severe, worst denotes 0, 1-9, 10-30, 31- 60, 61-80, 81-100 respectively. The reliability of the scale is considered good with Cronbach's alpha of 0.81 for the total score.

Validity of the tools:

The content validity of the tools and the instructional guideline, its clarity, comprehensiveness, appropriateness, and relevance were reviewed by five experts' professors in medical-surgical nursing. Modifications were made according to the panel judgment to ensure sentence clarity and content appropriateness.

Reliability of the tools:

Test-retest was used to determine the reliability of the knowledge tool, and Pearson correlation coefficients are used which = (0.92), Reliability of the reported practice was

determined through the use of the inter-observation method. The reliability of the coefficient was ($r= 0.832$).

Methods of data collection:

Fieldwork:

The researchers collected data from the adult patients who attended previously selected settings two days / a week from 9 Am to 2 Pm (Sunday and Monday). Data were collected within 6 months from the beginning of February 2019 until the end of July 2019. Approximately, 30-35 minutes were taken to complete each interview questionnaire.

The current research was divided into three stages: preparatory, implementation, and evaluation.

A-Preparatory phase:

The researchers met adult patients individually at waiting areas present at previously selected settings and explain the aim of the study after introducing themselves to patients.

A pilot study

A pilot study was conducted on 10% (6 adult patients) of the total sample to test the clarity and feasibility of the research process. No modifications were carried out to develop the final form of the tools. Adult patients who were in the pilot study were excluded from the research study.

B- Implementation phase:

The data collection tools were distributed to the studied adult patients twice; (1) pre-test to assess their knowledge, practices, and fatigue level before implementing instructional guidelines. (2) Post-test to assess adult patients' knowledge, practices, and fatigue level after two months of instructional guidelines implementation.

The simplified booklet was used as a supportive material and given to adult patients in the Arabic language to cover all items regarding the knowledge and practice regarding cardiac surgery after reviewing the related literature based on the assessment of the actual needs of the studied adult patients. Different teaching methods such as lectures, discussion, pictures, and posters were used.

The researchers designed and implemented the instructional guidelines regarding cardiac surgery in the form of a theoretical part and practical part. The theoretical part was included adult patients' knowledge regarding cardiac surgery. It was implemented through lectures, posters, educational films, scenarios, and role-plays. An educational booklet written in simple Arabic language and illustrative pictures were prepared by the researchers was given to the patients regarding cardiac surgery.

The subject contents have been sequenced through 6 sessions (2 sessions for the theoretical part and 4 sessions for the practical part), and each session took about 25-30 minutes. The total time for theoretical part and practical part was 2 hours. At the beginning of the first session, an introduction about the instructional guidelines regarding cardiac surgery was given and each session started with summary feedback about the previous session.

The instructional guidelines included knowledge regarding cardiac surgery as follow:

- Brief anatomy of the heart
- Various diagnostic procedures and how to be prepared for it
- Benefits of surgical management
- Risk factor
- Systemic complications after cardiac surgery
- Information about how to reduce or prevent postoperative complications through medical therapy after surgery
- Common health problems post-surgery
- Medications post-discharge
- Healthy nutrition
- Overview about fatigue

The practical part was contained information regarding cardiac surgery. It was implemented through lectures, posters, educational films.

The instructional guidelines included practices regarding brain tumors as follow:

- Weight control
- Care of wound site

- Physical activity and exercises
- Smoking cessation
- Nursing care for decrease fatigue level
- Nursing care regarding managing medication side effect
- Nursing guidelines about weight control

Evaluation phase:

Occurred after one month, each adult patient was re-interviewed to assess their knowledge, practices, and fatigue level. Re-assessment of the patient was done using the same tool (II, III, and IV).

Ethical considerations:

The researchers met both the medical and nursing directors of the selected setting to clarify the purpose of the study and take their approval. Written consent was obtained from patients to gain their cooperation. The aim of the study was explained and the expected outcomes from the implementation of the study were included in this letter to obtain permission for data collection. The objective of the study was explained to adult patients. The researchers informed the adult patients that, the study was voluntary; they were allowed to refuse to participate in the study. Adult patients had the right to withdraw from the study at any time, without giving any reason. Adult patients were assured that their information would be confidential and used for research purposes only.

Administrative design:

Administrative permission was obtained through an issued letter from the Dean of Faculty of Nursing; Fayoum University to the Director of the Department of Cardiothoracic Surgery affiliated at Fayoum University Hospital to achieve this study.

Statistical analysis:

Data entry and statistical analysis were performed using SPSS for Windows, version 20. Frequencies and percentages for qualitative variables and mean and SDs for quantitative variables were represented descriptive statistics. Differences between the two means tests (t-test) were used. Chi-square (χ^2) test was used to compare qualitative parameters. Pearson's

correlation coefficient (r) test was used. Statistical significance was considered at P -value <0.05 .

Results:

Table (1): Revealed that 67% of the studied patients were between 40 < 60 years. Male was constituted 60% of the total sample, (60%) of them had higher education, 67% were working and (62%) of them were living in rural areas.

Table (2): Showed that (80%) of the studied patients had coronary artery bypass grafting and all of them (100%) were more than 3 days after surgery.

Figure (1): Represented that (67%) of the studied patients were having surgical history.

Figure (2): Portrayed that 80% of the studied patients reported that their main source of information about knowledge regarding cardiac surgery was doctors.

Table (3): Showed that (74%, 69%, 80%, 74%, 90%, 85%, 79%, 69%, and 90%) of the studied patient their knowledge had improved regarding cardiac surgery in all items post guidelines implementation than pre guidelines implementation. There was a highly statistically significant difference detected between of the studied patients' knowledge regarding cardiac surgery pre and post-implementation of the instructional guidelines ($P < 0.001$).

Table (4): Illustrated that an improvement in the studied patients' knowledge was observed post implementing instructional guidelines as compared to pre-implementing guidelines. There was a highly statistically significant difference between total knowledge pre/post one month of instructional guidelines implementation (P -value < 0.001).

Table (5): Portrayed that (90%, 85%, 80%, 69%) of the studied patient their practice regarding cardiac surgery had improved in all items post guidelines implementation than pre guidelines implementation. Also, there was a highly statistically significant difference between adult patients' practice regarding cardiac surgery pre and post-implementation of the instructional guidelines ($P < 0.001$).

Figure (3) showed that (94%) of the studied patients had inadequate practice regarding cardiac surgery pre- instructional guidelines

implementation and decreased to become 14% one-month post- instructional guidelines implementation. On the other hand, 6% of the studied sample had adequate practice pre-instructional guidelines implementation compared to 86 % post-one-month post- instructional guidelines implementation with a highly statistically significant difference.

Table (6): Illustrated that a significant difference and improvement were detected in fatigue level among patients with decreasing in the fatigue level scores.

Table 7: Revealed a highly statistically significant (P=0.001) reduction in fatigue mean score among the studied adult patients post of instructional guidelines implementation.

Table (8): Showed that there was a significant positive correlation (P=0.001) between adult patients' knowledge scores and their practice scores post instructional guidelines implementation.

It was noticed from **figure 4** that (75%) of the studied patients were highly satisfied post instructional guidelines regarding cardiac surgery.

Table (1): Frequency and percentage distribution of the studied patients regarding their demographic characteristics (n=60)

Items	No.	%
Age in years		
21< 30 years	0	0.0
30< 40 years	40	33
40 - 60 years	20	67
Gender		
Male	36	60
Female	24	40
Education level		
Illiterate	0	0
Read and write	6	10
Secondary education	18	30
Higher education	36	60
Occupation		
Working	40	67
Not working	20	33
Residence		
- Rural	37	62
- Urban	23	38

Table (2): Distribution of the studied patients regarding their medical history (n=60)

Item	No.	%
Medical diagnosis:		
- Coronary artery bypass grafting	48	80
- Heart valve repair or replacement	3	5
- Insertion of a pacemaker	6	10
- Insertion of a ventricular assist device	3	5
Number of days after surgery		
- Less than 3 days	0	0
- More than three days	60	100

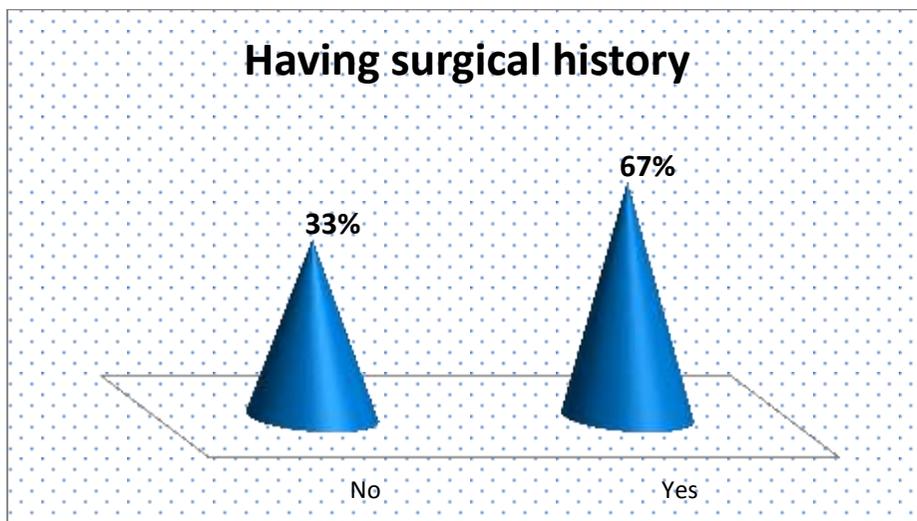


Figure (1): Percentage distribution of the studied adult patients regarding having surgical history (n=60)

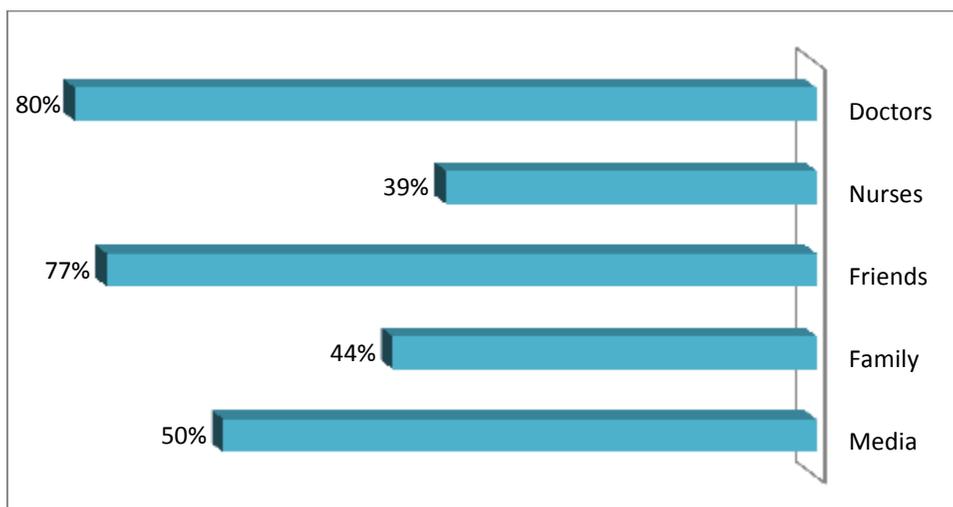


Figure (2): Percentage distribution of the studied adult patients about their source of knowledge regarding cardiac surgery.

Table (3): Distribution of adult patients' knowledge regarding cardiac surgery pre and post instructional guidelines' implementation

Adult patients' knowledge	Pre instructional guidelines' implementation (No/%)	Post instructional guidelines' implementation (No/%)	P-value
Anatomy of the heart	20 (34)	44 (74)	<0.001*
Diagnostic procedures	9(15)	41(69)	<0.001*
Benefits of surgical management	14 (23)	48(80)	<0.001*
Risk factor	9(15)	44 (74)	<0.001*
Exercise program and activities after discharge	14 (23)	54 (90)	<0.001*
Healthy nutrition	16 (27)	51 (85)	<0.001*
Systemic complications	20 (34)	51(79)	<0.001*
Postoperative complications prevention	6 (10)	41(69)	<0.001*
Medication	17(28)	54 (90)	<0.001*

*highly significance at 0.0001 levels

Table (4): Distribution of the total knowledge of the studied adult's patients pre and post-instructional guidelines implementation

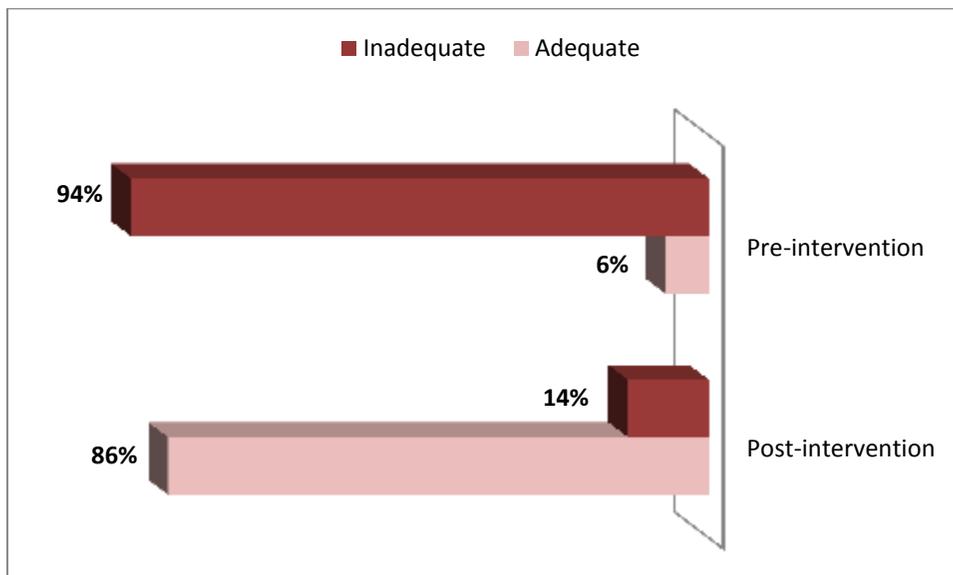
Total knowledge	Pre instructional guidelines implementation		Post instructional guidelines implementation		T	P-value
	No	%	No	%		
Satisfactory	9	15	54	90	6.073	<0.001*
Unsatisfactory	51	85	6	10		

*Statistically significant level at P < .05

Table (5): Distribution of adult patients' practice regarding cardiac surgery pre and post instructional guidelines' implementation

Adult patients' practice	Pre instructional guidelines' implementation (No/%)	Post instructional guidelines' implementation (No/%)	P-value
Physical activity and exercises	6 (10)	54 (90)	<0.001*
Smoking cessation	20 (34)	51 (85)	<0.001*
Care of wound site	3 (5)	48(80)	<0.001*
Weight control	17(28)	41(69)	<0.001*

*highly significance at 0.0001 levels



*highly Significance at 0.0001 levels

Figure (3): Differences between adult patients' total practice pre and post-three-month instructional guidelines implementation regarding cardiac surgery (n=60)

Table (6): Frequency and percentage distribution of fatigue level of the studied adult's patients pre and post-instructional guidelines implementation (n=60)

Fatigue level	Pre instructional guidelines implementation		Post instructional guidelines implementation		T	P-value
	No	%	No	%		
No fatigue (0)	0	0.0	18	30	16.027	<0.001*
Very little (1-9)	0	0.0	16	27		
Mild (10-30)	0	0.0	20	33		
Moderate (3- 60)	22	37	6	10		
Severe (61-80)	26	43	0	0.0		
Worst (81-100)	12	20	0	0.0		

Table (7): Differences between adult patients' fatigue mean scores pre and post-one-month instructional guidelines implementation regarding cardiac surgery (n=60)

Items	Pre instructional guidelines implementation	After three-month instructional guidelines implementation	P- value
Fatigue score	25.56+ 3.08	13.01+ 1.43	0.125 (0.0001*)

*highly Significance at 0.0001 levels

Table (8): Correlation coefficient between total studied adult patients' knowledge and practice mean scores pre and post of instructional guidelines implementation

Knowledge	Practice			
	Pre instructional guidelines implementation		After three-month instructional guidelines implementation	
	R	P	R	P
- Total knowledge pre-test	0.046	0.703 (N.S)	---	---
- Total knowledge post-test	---	---	0.406	0.001*

*highly Significance at 0.0001 levels

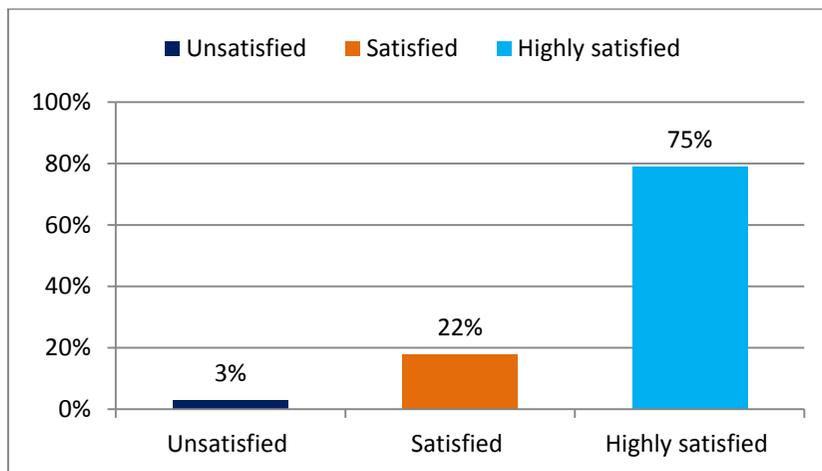


Figure (4): Frequency distribution of the studied patients regarding satisfaction post instructional guidelines regarding cardiac surgery.

Discussion:

After cardiac surgery, patients are often anxious about a possible reduction in their quality of life and their ability to continue their care confidently (Bikmoradi et al 2017, Mosleh et al 2017). Nurses should be focused on patient support and education following cardiac surgery to help patients acquire the knowledge and practice to manage their care, thus alleviating their fatigue (Kalogianni et al 2016, Rushton et al 2017).

The finding of the present study indicated that less than two-thirds of the studied adult

patients were between 40 < 60 years and males were constituted fewer than two-thirds of the total sample. From the researchers' point of view, it may relate to heart disease incidence is increased with the patients' age increase which leads to many factors: decrease metabolism rate and increase catabolic rate, This impairment leads to impaired patients physical activity and may cause deterioration in the body organs functions. Also, increasing age makes individuals at high risk for many diseases and health problems.

This result agrees with Kang et al., (2017) who studied "Correlates of Health

Behaviors in Patients" and found in their study they find that the dominant gender is male.

The finding of the present study indicated that less than two-thirds of the total sample was living in rural areas. From the researchers' point of view, it may be explained that the causes of heart disease that lead to cardiac surgery are common among males such as obesity, smoking, decrease activity. Also, it reflected the cause of knowledge deficit due to insufficient resources to receive enough information regarding their disease.

This result does not agree with **Salari et al., (2016)** who conducted a study about "Risk factor control, medication adherence and follow up visit, five years after coronary artery bypass graft surgery" their results indicate that the majority of subjects are urban residents.

The results of this study reveal that there was a highly statistically significant difference and improvement detected between adult patients' knowledge regarding cardiac surgery pre and post-implementation of the instructional guidelines. From the researchers' point of view, this result reflects the positive impact of instructional guideline implementations, which meet the adult patients' needs and provide them with enough knowledge to maintain their health and reduce fatigue. This improvement is the emphasis that most patients have a desire to learn more knowledge about their conditions and show the effect of the program.

This result is similar to the study of **Buket & Ebru, (2018)** who studied the "effect of a structured patient education intervention on the quality of life for coronary artery bypass grafting patients" and reported that structured planned patient education for cardiac surgery patients was effective in increasing their knowledge levels.

Also, this result is consistent with **Sepehri et al (2014)** studied "The impact of frailty on outcomes after cardiac surgery" and found that the educational intervention was effective in promoting physical functioning of cardiac surgery patients and improving knowledge levels through planned education that may assist them in coping better with such

difficulties in their daily activities after cardiac surgery.

Similarly, a study conducted by **Akbari and Çelik (2015)** about "The effects of discharge training and counseling on post-discharge problems in patients undergoing coronary artery bypass graft surgery" and found that educational intervention is effective in promoting cardiac self-efficacy in patients with cardiac surgery. Also, it had a positive effect on decreasing their fatigue. The same result is reported by **Rief et al (2017)** who studied "Preoperative optimization of patient expectations improves long-term outcome in heart surgery patients" found that improving heart surgery patients' knowledge helps to improve outcomes after treatment.

The present study results revealed an improvement in patients' practice and the majority of them had adequate practice post-one-month instructional guidelines implementation. From the researchers' point of view, it reflected the positive impact of the instructional guidelines on improving practices and confirmed the significant improvement in the adult patient's practice that reflected the main goals of the implementation of the instructional guidelines was achieved.

This result matched with **Buket & Ebru (2018)** who conducted a study entitled "The effect of a structured patient education intervention on the quality of life for coronary artery bypass grafting patients" and reported the same result.

The findings of the present study highlighted that a statistically significant decrease and improvement in fatigue mean score was observed among the studied adult patients post- instructional guidelines implementation regarding cardiac surgery. The researchers' point of view, reflected the success of implementing the instructional guidelines in reducing fatigue among patients with cardiac surgery. These results were supported with the aim and hypotheses of the present study.

These results are in the same line with **Fredericks & Yau, (2017)** who studied "Clinical effectiveness of individual patient education in heart surgery patients" and reported that patient education interventions for

heart surgery patients significantly reduced fatigue, anxiety, and improved the performance of health behaviors and overall perioperative outcomes

Similarly, **McCann, et al., (2018)** performed a study entitled "Cardiac rehabilitation Journal of Cardiothoracic and Vascular Anesthesia" and observed that fatigue levels reduced after the rehabilitation program.

The present study result revealed that a significant correlation was noticed between adult patients' knowledge scores and their practice post instructional guidelines implementation. From the researchers' point of view, this reflected the importance of improving adult patients' knowledge and practice to help them learn and acquire good knowledge and apply it. This association confirmed when the studied adult patients had sufficient knowledge they can do and practice well.

These results were supported by **Piper and Stewart, (2009)** who revealed that an effective health education program will cause changes that lead to increased knowledge about specific medical and health-related issues for a prolonged period, reduce risky behavior, reduce fatigue, and reduce or prevent many postoperative complications.

The present study result revealed that three-quarters of the studied patients were highly satisfied with post-instructional guidelines regarding cardiac surgery. From the researchers' point of view, this confirmed the success of the instructional guidelines and the good achievement of the current study aim.

Limitations:

The adult patients in the study sample were recruited from a single hospital, and the sample was small, which limits the generalizability of the findings.

Conclusions:

Based on the results and hypotheses of the present study, the study findings concluded that the results support the research hypothesis in which the implementation of the instructional guideline had a highly significant positive effect on improving adult patients' knowledge,

practice, and reducing fatigue levels among adult patients undergoing cardiac surgery. There was a significant positive correlation ($P=0.001$) between adult patients' knowledge scores and their practice post-one-month of instructional guidelines implementation.

Recommendations:

Based on the current study results, the following recommendations are proposed:

- The developed instructional guidelines regarding cardiac surgery should be conducted and integrated into the rehabilitation programs
- Using booklet and illustrated pamphlets for each to teach the adult patients to improve their information and reduce their fatigue level
- Replication of the current study with a larger sample of an adult patient with cardiac surgery in different settings is required for generalizing the results.

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