Instruction Guidelines Regarding Self -Care Practices among Patients with Heart Valve Replacement

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ABSTRACT

Background: Instruction guidelines considers as a method that contributes to increasing knowledge which enhances self-care practices post- surgical valve replacement.
Aim: This study aimed to assess the effect of educational program on patients' self- care practices post-surgical heart valve replacement. **Subjects and methods:** A quasi-experimental research was used. The study was conducted at Inpatient Clinic in Cardio Thoracic Unit and Outpatient Clinic at Beni-Suef University Hospital. A purposive sample of 80 adult patients admitted to Cardio Thoracic Department leveraging a structure interview questionnaire that included three parts demographic characteristics, clinical history and knowledge and patients' self-care practices questionnaire post-surgical heart valve replacement surgery. **Results:** A highly significant difference were found among the studied patients regarding their total self- care practice post and follow-up/3 months of program compared to preprogram with (P value ≥ 0.001).
Conclusion: Implementation of the instruction guidelines has highly significant positive effect on total self-care practices for the patients undergoing heart valve replacement surgery, which support the study hypotheses.
Keywords: Instruction guidelines, Heart valve replacement, Self-care practices, Patient' education.

INTRODUCTION

Heart valve disease is increasingly recognized as a significant public health concern, a trend attributable to both increasing life expectancy and the evolution of novel treatment modalities. While cardiac surgery, particularly valve procedures, can represent a profoundly challenging and stressful life event for patients, the subjective experiences of individuals undergoing heart valve surgery remain inadequately documented within the existing literature [1]. Heart valve surgery constitutes a medical intervention designed to address pathological conditions affecting the cardiac valves. Heart valve disease specifically involves the dysfunction of at least one of the four crucial heart valves, which are responsible for maintaining unidirectional blood flow through the cardiac chambers. These four valves include the mitral, tricuspid, pulmonary, and aortic valves. Each valve comprises specialized anatomical structures—leaflets for the mitral and tricuspid valves, and cusps for the aortic and pulmonary valves—which are designed to open and close synchronously with each cardiac cycle [2].

Various etiological factors contribute to cardiac valve damage. These encompass congenital heart abnormalities, such as a bicuspid aortic valve, inflammatory or immunological disorders, exemplified by rheumatic fever, bacterial infections, viral infections and localized inflammation of the valves (e.g., infective endocarditis). Furthermore, other contributing causes include chronic renal failure, the physiological processes of aging, calcific aortic stenosis and mitral annular calcification [3].

The fundamental manifestations of cardiac valve disease typically present as either stenosis, characterized by an obstruction to blood flow, or regurgitation, involving the retrograde flow of blood. While valve disease can affect all four cardiac valves, it is most frequently identified in the mitral and aortic valves, followed by conditions affecting the bicuspid aortic valve [4]. As heart valve disease progresses, patients commonly develop symptoms such as dyspnea, fatigue, syncope, and palpitations. When these symptoms become severe enough to significantly restrict the performance of daily living activities, heart valve surgery often becomes an inevitable intervention. Historically, surgical valve replacement via open-heart surgery represented the sole effective therapeutic option. Consequently, this invasive procedure is associated with a higher incidence of morbidity and mortality in elderly patients compared to younger individuals [5].

Over recent decades, heart valve replacement surgery has profoundly improved patient survival rates and enhanced health-related quality of life, leading to a noticeable increase in surgical volumes. Mechanical prostheses, while exhibiting superior long-term durability, necessitate lifelong anticoagulation with vitamin K antagonists. Anticoagulation therapy, however, remains a critical concern for patients with valvular prostheses, carrying an annual bleeding risk of 1–2%. Moreover, anticoagulation-related complications are responsible for 60–75% of mortality specifically associated with mechanical valves. Consequently, there is an increasing clinical trend toward the utilization of bioprosthetic valves to mitigate the inconveniences and inherent risks linked with long-term anticoagulation, thereby aiming to improve overall patient quality of life [6].

Irrespective of the specific surgical technique employed, various post-surgical comorbidities can significantly impact a patient's quality of life. Patients

undergoing cardiac surgery are at considerable risk of developing depression, anxiety, or post-traumatic stress disorder. The experience of illness can fundamentally alter a patient's self-perception, potentially leading to a lifelong sense of fragility. Furthermore, upon hospital discharge and returning home, feelings of vulnerability and anxieties regarding the transition phase often emerge, and a pervasive fear of an information gap can become dominant. To optimize the planning of appropriate post-discharge care, it is critically important to thoroughly describe and understand patients' perceptions of their recovery trajectory following heart valve replacement [7].

Knowledge regarding patient experiences after heart valve surgery remains deficient in the existing literature, particularly in studies exclusively focusing on patients' subjective perceptions and their engagement in self-care practices after these procedures. Therefore, comprehensive knowledge plays an influential and significant part in a patient's life and their recovery process. High levels of patient knowledge concerning the nature of their disease, associated risk factors, and effective self-care strategies correlate with improved medication adherence, positive lifestyle modifications, and enhanced self-care engagement. Knowledge and awareness are pivotal in enabling patients to effectively cope with their condition, manage their symptoms, comprehend and accept their prescribed treatment regimens, and recognize when medical follow-up is necessary. In essence, robust patient knowledge empowers individuals to exert greater control over their own health situation [8]. Self-care practices after heart valve surgery is a multidimensional process that includes medical, physical, emotional, and behavioral components. Empowering patients through education, support, and access to resources is essential in helping them adopt and maintain these practices. With proper guidance, patients can play an active role in their recovery and long-term heart health. Recovering from heart surgery involves more than physical healing it requires a commitment to ongoing self-care practices that promote recovery, prevent complications, and support long-term cardiovascular health. Effective self-care practices after heart valve surgery is essential for improving quality of life and minimizing the risk of rehospitalization [9].

In order to provide patients with the best treatment possible, nurses play a crucial part in their care and must be knowledgeable about the heart valve replacement surgery. In order to optimize patient outcomes, nurses must stay up to date on the most recent knowledge regarding heart valve replacement (HVR). Implementing instruction guidelines influences patients' behavior resulting in the changes in knowledge and self-care required to maintain or enhance health is known as the patient's instruction guide lines. Patients with HVR benefit from education regarding the disease process, managing symptoms, and preventing complications [10].

The foundational framework for conducting this study is based on comprehensive instruction guidelines. These guidelines entail the careful planning and systematic coordination of diverse teaching and learning activities, all designed to deliver highly effective training, impart extensive knowledge, and provide up-to-date information to patients. Such an approach, as supported by **Hasani et al.** [11], is posited to significantly enhance patient outcomes and improve overall care. Consequently, the primary objective of this investigation is to rigorously assess the effect of implementing these structured instruction guidelines on patients' self-care practices following heart valve replacement surgery.

Objectives:
1. Assessment of patient's level of self-care practices post-surgical heart valve replacement.
2. Evaluation of the effectiveness of instruction guidelines on patient's self-care practices post-surgical heart valve replacement.

Hypotheses: To fulfill the aim of the study the following hypotheses are formulated:
- **H0:** No significant statistical difference on valvular replacement patients' self-care practices after implementing instruction guidelines.
- **H1:** A significant statistical difference on valvular replacement patients' self-care practices after implementing instruction guidelines.

SUBJECTS AND METHODS
Study Design: A quasi-experimental research design of (One study group, pre/post and follow up) test was used for the study.
Study settings: The study was conducted at In-patient Clinic in Cardio-Thoracic Unit and Out-patient Clinic affiliated to the Beni-Suef University Hospitals

A total number of 80 patients with heart valve replacement surgery were selected for the study according to the below formula [12]:

$$n = \frac{N \times p(1-p)}{\left[\left[N - 1 \times \left(d^2 \div z^2\right)\right] + p(1-p)\right]}$$

N=population size   D=error proportion
Z=confidence level   P= probability
n = 100 * 0.50 (1 − 0.50) / [100 − 1 * {(0.05)2 / (1.96)2] + 0.50 (1 − 0.50)]
=100 * 0.50 * 0.50 / [99 * (0.0025 / 3.841)] + 0.50 * 0.50]
= 100*0.25 / [99 * 0.00065] + 0.25]
= 25 / 0.04485 + 0.25
= 25 / 0.295 = 84.74
With 10 - 20% attrition rate the required total sample size is 80 participants.

Tools of data collection:
Two tools were used for data collection in the current study. These tools were prepared by the researcher based on

the relevant literatures. It was translated to Arabic form to suit the nature of the study, to avoid misunderstanding and was approved.

Tool I: *Structured interview questionnaire***:** It was developed by the researcher and it consisted of three parts:

- **Part I**: *Demographic characteristics* which included seven closed ended questions about age, gender, level of education, occupational status, marital status and place of residence.

- **Part II**: *Medical history assessment*; composed of twenty- three questions asking about: current medical history(8Q), pervious surgical history (4Q), presence of comorbid diseases (2Q), health habits for heart disease (4Q) and family history (2Q).

- **Part III**: *Patient's knowledge assessment regarding* heart valve disease. It was adopted from **Hasani *et al.*** [11] and included 24 multiple choice questions (MCQ) regarding anatomy and physiology (2Q), definitions (3Q) of heart valve replacement surgery, risk factor and cause of heart valve disease (3Q), clinical picture (Sign, symptoms and diagnosis) of heart valve disease (2Q), surgical management (2Q), therapeutic drug and periodic (5Q), complication (3Q) and prevention (4Q).

Scoring system: For the knowledge items, a correct response = one and the incorrect response = zero. The total score of the knowledge was 24 marks. These scores were converted into a percent score (based on statistical analysis.

Score	Grades	Interpretation
less than 70%	≤16	unsatisfactory practices
The score equal and more 70%	≥ 17	satisfactory practices

Tool II: Patients' self-care practices questionnaire post heart valve replacement:

This tool [14] included 35 mcq questions concerned with self-care practices combined under seven major constructs as following (Wound care (6 Q), physical activity (5 Q), diet (6 Q), therapeutic drugs and follow-up (5 Q), stress management (4 Q), smoking cession (4 Q), rest and sleep (5 Q).

Scoring system: The total score of these items were 35 grades. Each item of them was calculated depending on the number of self- care practices the patients was performing. It consisted of two options (yes or no). "Yes" means the patient performed it and it was graded as 1 while, no mean that patient didn't perform it and it was graded as zero. These scores were converted into a percent score as following:

Score	Grades	Interpretation
less than 70%	(≤24)	unsatisfactory practices
The score equal and more 70%	(≥25)	satisfactory practices

Field of work: The systematic collection of data for this investigation encompassed a comprehensive seven-month period, commencing in October 2023 and concluding in April 2024. This entire process was meticulously executed across four clearly defined and distinct phases: An initial assessment, subsequent planning, the practical implementation, and a final evaluation.

The preparatory phase: The methodological foundation of this study involved a comprehensive review of both national and international literature pertaining to various facets of the research problem. This rigorous examination encompassed academic books, reputable websites, peer-reviewed articles, and relevant magazine publications. This extensive review was crucial for developing a thorough understanding of the research phenomenon and for informing the subsequent preparation of the data collection instruments and the substantive content of the educational intervention.

Formal permission for both data collection and the implementation of the educational intervention within the cardio-thoracic surgery clinic at Beni-Suef University Hospitals was duly secured. This authorization was obtained from the hospital's administrative personnel following the submission of a formal request letter, which originated from the Vice Dean of Postgraduate Affairs and the Faculty Dean of Nursing at Suez Canal University. Subsequently, structured meetings and discussions were conducted with the prospective patient participants. These sessions aimed to ensure their comprehensive awareness of the study's objectives, the inherent nature of the educational intervention, and to foster enhanced cooperation during its implementation phase.

Intervention development and pre-assessment: An initial assessment of patients' knowledge and self-care practices following heart valve replacement surgery was conducted. This preliminary evaluation served to illuminate existing knowledge gaps, clarify patients' perceptions, and identify specific self-care deficits, thereby providing crucial insights into their current needs. The educational intervention itself was systematically developed by the researcher. Furthermore, a comprehensive suite of teaching materials was prepared to support this intervention. These resources included structured lectures, interactive discussions, practical demonstrations with opportunities for re-demonstration by participants, engaging PowerPoint presentations, and an informative booklet. This multifaceted approach ensured thorough coverage of both theoretical concepts and practical information pertinent to patient recovery and self-care.

Assessment phase (Pre-test): The assessment phase, serving as the pre-test, commenced with individual interviews of the patients who met the established inclusion criteria for the study. During these interviews, the overarching aim and intrinsic nature of the research were

clearly elucidated, and their informed written consent to participate was obtained prior to any data collection. All participating patients received explicit assurance that any information acquired from them would be maintained with strict confidentiality, and their inherent right to withdraw from the study at any point in time was clearly communicated. Baseline data were comprehensively assessed from these patients pre-program implementation, utilizing both Tool I and Tool II. These instruments were completed by the researchers prior to the intervention's commencement within the aforementioned clinical settings.

Specifically, researchers completed these tools by engaging with patients during the peri-operative phase, approximately three days before their heart valve replacement surgery, within both The Cardio-Thoracic Department and the associated Inpatient Clinic. This foundational assessment phase extended for a duration of three months, spanning from the beginning of October 2023 to the end of December 2023.

Planning and designing phase: Building upon the insights garnered from the initial assessment of the studied patients' actual needs, the planning and design phase commenced. This comprehensive literature review was undertaken to acquire more in-depth information on the subject, thereby enabling the precise development of the educational intervention. The educational intervention was meticulously structured to encompass both theoretical knowledge and practical skills directly relevant to patients' understanding, perceptions, and self-care practices. The content of the accompanying patient booklet was specifically designed by the researcher, composed in clear and accessible Arabic language, and richly supplemented with illustrative photos and diagrams to facilitate patient comprehension of the presented material. This extensive planning and design phase spanned approximately four months, from the beginning of January 2024 to April 2024.

Implementation phase: During the implementation phase, the researcher visited the clinic twice weekly, specifically on Saturdays and Tuesdays, from 9:00 AM to 12:00 PM. The follow-up rate involved 2-4 patients who had undergone heart valve replacement surgery per day. However, on some occasions, the required subjects meeting the specified inclusion and exclusion criteria were not available. Data collection during this phase utilized the previously mentioned tools.

The structured and planned educational intervention was delivered through a series of sessions. These sessions incorporated a variety of teaching methods and media to enhance patient engagement and comprehension. These included: Discussions, lectures, colorful posters, animation videos, PowerPoint presentations, pamphlets, and handouts.

A total of five educational sessions were conducted, with each session lasting between 60 and 80 minutes. The first session began with an orientation explaining the study's

aim and the educational intervention's goals. Each subsequent session commenced with a concise summary of the prior session. Patients and their caregivers were encouraged to ask for any clarification, elaboration, or additional explanation regarding any content presented during the sessions.

Part 1: (Theoretical sessions):
First session was concerned with definition of heart valve disease (HVD), manifestations of HVD, causes of HVD, Methods of HVD diagnosis and treatment of HVD.
Second session was concerned with definition of heart valve replacement surgery, benefits, complications and treatment after heart valve replacement surgery.

Part 2: (Practical sessions):
First session was concerned with prescribed exercises to promote rehabilitation after heart valve replacement surgery.
Second session was concerned with promoting daily living activity after heart valve replacement surgery and steps of surgical site care.
Third session was concerned with precautions to avoid complications after heart valve replacement surgery.

Evaluation phase (Post- test): Following the complete implementation of the educational intervention, a series of assessments were conducted to evaluate its efficacy. An **immediate post-test** was administered upon the conclusion of all educational sessions, utilizing the identical data collection instruments employed during the pre-test phase. Subsequently, a **follow-up test** was conducted three months later to ascertain the sustained effects of the intervention.

Validity of the tools:
The **content and face validity** of the study instruments were rigorously assessed by a panel comprising five experts in the field of medical-surgical nursing. This jury evaluated whether the included items were comprehensive, readily understandable, clinically applicable, unambiguous, and appropriate for achieving the study's stated objectives. All necessary modifications were subsequently implemented in accordance with the experts' recommendations.

Reliability: Cronbach Alphas were calculated for the knowledge and self –care practices questionnaire and the result was (0.893, 903) after back-to-back Arabic translation which means that the tool has excellent reliability.

Pilot study: A pilot study was systematically conducted on 10% of the total study sample, comprising eight patients who had undergone heart valve replacement. The primary objectives of this pilot phase were to rigorously test the applicability, clarity, and feasibility of the data collection tools. Subsequent modifications were implemented based on the outcomes of this preliminary investigation. Furthermore, the pilot study proved instrumental in estimating the requisite time for questionnaire completion

and in identifying any potential obstacles that might be encountered during the full-scale data collection process. Patients who participated in this pilot study were subsequently excluded from the main study sample to prevent bias, given that modifications to the instruments were made following their participation.

Statistical analysis

Data entry and analysis were made by using SPSS software (SPSS 21.0 Version). Statistical analysis summarized participant demographics (n=80), including age (Mean and standard deviation), gender, settlement, and education (Frequency distributions). Paired t-tests evaluated pre- post- and follow up intervention changes in self-care practices score and determine intervention effectiveness on knowledge, and self -care. Paired t-test is a method used to test whether the mean difference between pairs of measurements is zero or not. A one-way ANOVA when collected data about one categorical independent variable and one quantitative dependent variable. The independent variable should have at least three levels (i.e. at least three different groups or categories). A Chi-square test is a statistical test that is used to compare observed and expected results. The goal of this test is to identify whether a disparity between actual and predicted data is due to chance or to a link between the variables under consideration. $P \leq 0.05$ was considered significant.

Ethical consideration: The investigation obtained requisite primary ethical approval from The Research Ethics Committee of the Faculty of Nursing, Suez Canal University, under ethical code 166. Adherence to ethical considerations was paramount throughout the study. This encompassed clearly elucidating the study's objectives and inherent nature to all prospective participants, alongside unequivocally offering them the option to withdraw from participation at any juncture without consequence. It was explicitly communicated that engagement in the study was entirely voluntary, and strict measures were implemented to guarantee both participant anonymity and confidentiality of all collected data. Patients provided both written and verbal informed consents to participate, reinforcing their understanding that they retained the right to withdraw at any point during the data collection process. The study adhered to the Helsinki Declaration throughout its execution.

RESULTS

Table (1) revealed that 41.25% of the studied patients were at age ≥ 50 years with a mean values of 44.5 ± 11.20 years old, 53.75% of them were males. Regarding educational level 36.3% of the studied patients were illiterate and 37.5% of them were primary education. As for

occupational status 37.5% of the studied patients were hand workers, 56.2% of them were married. Concerning place of residence, 83.8% of the studied patients were living in rural area.

Table (1): Number and percentage distribution of demographic characteristics of the studied patients (n=80)

Demographic characteristics	The studied Patients (n=80)	
	No	%
Age		
21<30 years	13	16.2
30<40 years	15	18.75
40<50 years	19	23.75
≥50years	33	41.25
Age (Mean± SD) 44.5 ± 11.20		
Gender		
Male	43	53.75
Female	37	46.25
Educational status		
Illiterate	29	36.3
Primary	30	37.5
Secondary	8	10
University graduated	13	16.2
Occupational status		
Manal working	30	37.5
Employee	13	16.2
Retired	9	11.25
Other (house wife)	28	35
Marital status		
Single	11	13.8
Married	45	56.2
Divorce	10	12.5
Widowed	14	17.5
Place of residence		
Urban	13	16.2
Rural	67	83.8

Table (2) showed that, the mean knowledge score of the subtotal domains, in post-program was **20.93 ± 3.78**, compared to **9.13 ± 4.39** in pre-program and it was reduced in follow up 3 months after educational program to become **19.49 ± 4.13**. Also, there were a highly statistical significant difference observed regarding all items of patients' knowledge related to heart valve replacement surgery throughout periods of the program between pre-post program and pre-follow up program study with P value= 0.000, while there was no statistical significant difference between post-program and follow up with p value= 0.563

Table (2): Mean and standard deviation of patients' subtotal knowledge dimensions regarding heart valve replacement surgery pre/ post/ follow up educational program intervention (n=80):

Subtotal knowledge dimensions	Max scores	Pre-Program	Post-program	Follow up-program after 3 months	Pre- post Test t- test P value	Pre-follow up Test t- test P value	Post -follow up Test t- test P value
Anatomy and physiology	2	0.97±0.12	1.83±0.35	1.75±0.51	13.580 0.000**	10.399 0.000**	1.097 0.279
Definitions	3	1.27±0.48	2.79±0.28	2.73±0.49	13.199 0.000**	7.640 0.000**	1.045 0.693
Risk factors and cause	3	1.02±0.71	2.42±0.65	2.29±0.41	9.782 0.000**	6.048 0.000**	2.012 0.049*
Clinical picture	2	0.57±0.68	1.87±0.12	1.64±0.60	15.185 0.000**	12.362 0.000**	1.267 0.210
Surgical management	2	0.69±0.28	1.68±0.35	1.55±0.70	12.695 0.000**	9.797 0.000**	1.888 0.068
Therapeutic drugs and periodic follow-up	5	2.25±0.63	4.17±0.72	4.01±0.91	8.954 0.000**	8.056 0.000**	1.953 0.098
Complication	3	1.08±0.87	2.49±0.37	2.33±0.98	6.987 0.000**	6.498 0.000**	2.615 0.012*
Prevention	4	1.28±0.62	3.38±0.74	3.19±0.88	22.889 0.000**	15.146 0.000**	1.636 0.0230
Total knowledge	**24**	**9.13±4.39**	**20.93±3.78**	**19.49±4.13**	**32.871 0.000****	**21.365 0.000****	**1.891 0.563**

(There was no statistically significant difference P value >0.05, *there was a statistically significant difference P value≤ 0.05, **A highly statistical significant difference P ≤ 0. 001).

Table (3) illustrated that the mean practice score of patients' total self- care practice, in post-program implementation was 29.80 ± 3.12 compared to pre-program (15.92 ± 6.42). While, in follow up it was reduced to 27.10 ± 2.48. Additionally, there were a highly statistical significant difference regarding patients' total self-care practice after heart valve replacement surgery with P value= 0.000.

Table (3): Mean and standard deviation of patients' subtotal self-care practices dimensions regarding heart valve replacement surgery pre/ post/ follow up educational program intervention (n=80)

Subtotal self- care practices dimensions	Max scores	Pre-program	Post-Program	Follow up-program After 3 months	Pre- post Test t- test P value	Pre-follow up Test t- test P value	Post -follow up Test t- test P value
Wound care	6	2.97±0.96	4.98±0.64	4.73±0.65	12.859 0.000**	15.816 0.000**	1.722 0.080
Physical activities	5	1.68±1.16	4.25±0.84	3.66±1.05	21.275 0.000**	15.400 0.000**	7.260 0.000**
Diet	6	1.62±0.94	4.23±0.72	3.98±0.81	21.045 0.000**	18.125 0.000	6.214 0.000**
Therapeutic drugs and periodic follow-up	5	1.83±1.37	3.82±0.96	3.42±0.52	9.426 0.000**	8.639 0.000**	2.888 0.012*
Stress management	4	1.99±0.81	3.24±0.66	3.21±0.79	11.975 0.000**	10.025 0.000**	2.984 0.013*
Smoking	4	1.98±0.80	3.33±0.61	3.26±0.72	9.124 0.000**	8.589 0.000**	1.562 0.098
Rest and sleep	5	2.31±1.24	4.65±0.47	4.11±0.69	16.972 0.000**	11.975 0.000**	6.766 0.000**
Total	**35**	**15.92±6.42**	**29.80±3.12**	**27.10±2.48**	17.483 0.000**	17.325 0.000**	9.769 0.000**

(There was no statistically significant difference P value >0.05, *there was a statistically significant difference P value≤ 0.05, **A highly statistical significant difference P ≤ 0. 001).

The presented data in table (4) demonstrate a highly statistically significant correlation between patients' age and their overall self-care practices in both the post-program implementation phase (P=0.002) and during the follow-up assessment (P=0.000∗∗). Furthermore, a consistently highly statistically significant relationship was observed between patients' educational level and their place of residence with their total self-care practices across all measured phases—pre-program, post-program implementation, and follow-up—each exhibiting a P-value of 0.000. These findings underscored the profound influence of specific demographic factors on patients' engagement in self-care behaviors throughout their recovery trajectory.

Table (4): Relation between total patients` self-care practice and their demographic characteristics thorough program pre/ post/ follow up educational program intervention (n=80):

Socio-demographic characteristics		Patients` self-care practice					
		Pre-program		Post-program		Follow- up program after 3months	
		$\overline{X}\pm SD$	F/t P- value	$\overline{X}\pm SD$	F/t P- value	$\overline{X}\pm SD$	F/t P- value
Age	▪ 21<30 years ▪ 30<40 years ▪ 40<50 years ▪ ≥50years	5.76±1.63 3.00±0.00 1.00±0.00 2.24±1.31	F= 26.989 P=0.000**	8.38±0.65 7.00±0.00 6.00±0.00 7.56±0.93	F= 6.374 P=0.002**	8.30±1.10 5.00±0.00 2.00±0.00 6.15±1.58	F= 11.878 P=0.000**
Gender	▪ Male ▪ Female	12.82±5.75 13.10±7.57	t= 0.186 0.853	26.37±3.19 27.55±2.88	t= 2.469 P=0.038*	23.90±2.28 24.44±2.81	t= 0.945 P= 0.347
Educational status	▪ Illiterate ▪ Primary ▪ University graduated	1.89±1.23 2.44±1.32 5.76±1.36	F= 42.221 P=0.000**	7.51±0.91 7.55±0.97 8.38±0.65	F= 4.736 P=0.011*	5.75±1.93 6.26±1.44 8.30±1.10	F= 11.687 P=0.000**
Occupational status	▪ Hand working ▪ Employee ▪ Not working ▪ Other	12.25±5.66 15.23±6.01 5.00±0.00 13.07±7.50	F= 1.219 P=0.309	26.15±3.45 27.23±2.12 27.00±0.00 27.51±2.97	F= 1.121 P= 0.346	23.61±2.32 24.92±1.89 21.00±0.00 24.51±2.81	F= 1.799 P=0.154
Marital status	▪ Single ▪ Married ▪ Divorce ▪ Widower	14.45±6.12 14.48±6.70 12.27±6.41 14.28±6.70	F= 0.906 P=0.409	26.90±2.16 27.00±2.55 26.72±3.21 27.00±3.55	F= 0.049 P=0.952	24.72±2.00 24.91±3.18 23.94±2.40 24.21±3.14	F= 0.466 P=0.629
Place of residence	▪ Urban ▪ Rural	2.20±1.30 5.76±1.36	t= 8.917 P=0.000**	7.53±0.94 8.38±0.65	t= 3.093 P=0.001**	6.04±1.68 8.30±1.10	t= 4.644 P=0.000**

(There was no statistically significant difference P value >0.05, *there was a statistically significant difference P value≤ 0.05, **A highly statistical significant difference P ≤ 0. 001).

Table (5) clarified that there was a significant positive correlation between knowledge in post-test and follow up phase with self-care practices in post and follow up phase.

Table (5): Correlation between study variables through pre/post/follow up of educational program intervention (n=80):

Variables		pre - program Knowledge	post – program Knowledge	follow up-program Knowledge	pre - program self-care	post – program self-care	follow up-program self-care
Total knowledge	Pearson Correlation	.065	.339**	.618**	.049	.243*	.235*
	Sig. (2-tailed)	.569	.002	.000	.667	.030	.036
Total self-care practice	Pearson Correlation	.243*	.310**	.562**	.018	1.000**	.445**
	Sig. (2-tailed)	.030	.005	.000	.877	.000	.000
**. Correlation is significant at the 0.01 level (2-tailed).							
*. Correlation is significant at the 0.05 level (2-tailed).							

DISCUSSION

Evaluation of patients' degree of knowledge and self-care practices after valve replacement considered critical point because patients experience post-operative complications such as the need for anticoagulant medications associated with bleeding, anemia, leakage of the prosthetic valve, and infectious palpitations, dyspnea, thromboembolic stroke, and endocarditis [14].

Regarding the **demographic characteristics** of the patient cohort, the study's findings revealed that the mean age for the majority of individuals who underwent heart valve replacement was **44.5 ± 11.20 years**. From a researchers' perspective, this observation potentially suggests an increased incidence of heart disease correlating with advancing age. This interpretation aligns with broader epidemiological understanding, indicating that older populations generally exhibit a heightened susceptibility to a more diverse array of illnesses and complex health issues [15]. This outcome align with a research study by **Atya et al.** [16] who studied "effect of exercise protocol on patients undergoing heart valve surgery. They reported that the majority of participants mean age was 44.80 ± 11.71 years old with slightly over one-third of patients falling between the forty and fifty-year age range. On other hand, these findings disagree with **Grab et al.** [17] who carried study entitled "new perspectives in patient education for cardiac surgery using 3d-printing and virtual reality in Germany". They reported that the majority of patients in their study had mean age of 64.8 ± 10.9 years.

Regarding the distribution of patients by **gender**, the current study found that males constituted a higher percentage than females, with over half of the patient cohort being males. This aligns with the findings of **Ahmed et al.** [18] who reported a predominance of male patients. From an interpretive standpoint, this observed male-to-female ratio might be attributed to a higher incidence of heart disease among males. Cardiac conditions are more frequently associated with risk factors such as advanced age, elevated life stressors, and certain unhealthy behaviors, which tend to be more prevalent in male populations [19]. However, these findings contrast with those of **Ramadan** [20] who indicated that half of the participants were under forty years old and two-thirds were females. This discrepancy suggests potential variations in study populations or specific cardiac conditions investigated across different research endeavors.

Regarding the level of education, approximately more than two-thirds of the studied patients were either illiterate or in primary education. This might be due to the study's setting where included patients were primarily from rural areas with high literacy rates, which may correlate with a lack of awareness about heart disease risks [21]. These findings are in the same line with **Khodaveisi et al.** [22] who found that most of the patients in study groups were males and the majority of studied patients had reading and writing literacy. On the other hands, these findings disagree with **Grab et al.** [17] who reported that the majority of patients in their studies had bachelor's degree.

Regarding patients' occupational status, the findings of the present study revealed that the highest percentage of the patients were house wife and manual workers. This finding could be attributed to variation in the levels of education and occupation that affected some patterns of lifestyle linked to heart disease, such as physical strain or limited access to health resources. This study is in agreement with **Maarouf et al.** [23] who studied reported that more than quarter of the study were house wives. While this finding is in contradict with **Motoi et al.** [24] who studied showed that most of the patients included in the study were employee.

According to marital status the present study showed that, more than half of studied patients were married. This funding is in the same line with **Atya et al.** [16] who found

that most of the study' subjects were married. Also, this result is consistent with **Elsayed & Gaballah** [25] who reported that most of the study patients were married. From researchers' point this might be attributed to the Egyptian social and religious principles, which dominate the value of marriage. Conversely, the study disagree with **Gebauer et al.** [26] who showed that more than two third of studied patients were single.

Regarding the place of residence, the current study found that more than eighty percent of studied patients lived in rural area. This might be due to low economic status, which could reflect limited access to healthcare facilities and education, potentially influencing the severity of their heart conditions. The finding is in the same line with **Abdallah et al.** [13] who reported that majority of studied patients lived in rural areas. On the other hand, this finding disagree with **Mohamed et al.** [27] who carried out a study about factors affecting adherence to therapeutic regimen among patients undergoing coronary artery bypass graft surgery and stated that the majority of the studied patients lived in urban areas. In my point of view, people who live in rural areas lacked health and educational services, moreover, culture norms, beliefs and place of living of patients had an effect on behaviors and patterns of life style.

In relation to total patients' knowledge level after heart valve replacement surgery, the current study revealed majority of studied patient under study had an unsatisfactory level of knowledge regarding anatomy, physiology, risk factors, causes, clinical picture, surgical of management for disease, therapeutic drugs, complications occurred after valve replacement and prevention of complications after surgery. From the research point of view, this might be related to that most of study subjects were illiterate and primary education also lack of health education from hospital staff. While in post-program, there was a significant improvement of knowledge scores levels among studied patients immediately after educational program compared to pre-program implementation. This contributed to that the researcher had suitable learning media and material for teaching. However, the mean scores of these items were decreased after 3 months of program. This outcome unequivocally reflects the **positive efficacy of the educational program** in enhancing patients' overall knowledge levels. In the researchers' assessment, this observed improvement was significantly attributable to several interconnected factors. These included the patients' increased familiarity and deeper understanding of the educational curriculum, the strategic reinforcement provided across sessions, and the judicious incorporation of **multiple instructional media**, such as visually engaging booklets and laptop-based presentations, which collectively fostered greater clarity and comprehension. The systematic integration of continuous feedback during each session also constituted a successful pedagogical approach, substantially augmenting patients' knowledge base regarding heart valve replacement. This particular finding aligns with the research conducted by **Abdallah et al.** [13] who demonstrated a statistically significant improvement in patients' knowledge concerning heart valve replacement following an educational intervention. Conversely, this result diverges from the observations of **Ni et al.** [27] in their cross-sectional study. They reported that the majority of patients possessed good knowledge even without a specific implementation program. Furthermore, the finding is inconsistent with **Clifford et al.** [28] who stated that patients exhibited acceptable levels of knowledge, attitude, and practice. From the researchers' perspective, this discrepancy across studies might be attributable to several factors within the contrasting contexts. These could include a higher baseline educational level among patient populations in other studies, the presence of continuous patient learning facilities within their hospitals, greater availability of pre-existing educational materials in those healthcare settings and the routine provision of preoperative educational sessions as standard care.

Concerning patients' self- care practices after heart valve replacement:

Regarding the overall satisfactory level of **self-care practices** among the studied patients, a statistically significant improvement was observed following the interventional program when compared to the pre-program baseline. From an interpretative standpoint, this notable enhancement in patient self-care practices is likely attributable to the comprehensive content of the intervention program. This program specifically addressed critical areas pertinent to enhancing patient practice not limited to wound care, activity and exercise regimens, dietary considerations, therapeutic drug management and follow-up protocols, stress management techniques, smoking cessation, and recommendations for optimal rest and sleep post-heart valve replacement (HAVR). The present findings align with the observations of **Zou et al.** [29] who revealed that both pre-operative and post-operative cardiac rehabilitation, encompassing exercise training, nutritional modifications, and smoking cessation under the guidance of a specialized team, can confer substantial benefits for patients undergoing transcatheter aortic valve replacement (TAVR) by enhancing functional capacity and improving quality of life post-surgery. Similarly, these results resonate with those of **Hao J** [30] who demonstrated that enhanced rehabilitation interventions contribute to reducing adverse events and pain, while simultaneously improving postoperative recovery and the quality of life for patients following heart valve replacement surgery.

Regarding the influence of demographic characteristics on the total self-care score of the studied

patients, the current investigation reported a statistically significant association between patient age, educational level, and place of residence with their total knowledge immediately following program implementation. Conversely, no statistically significant differences were observed among patients' gender, occupational status, and marital status in relation to their total self-care practices level. This particular finding is consistent with the research of **Gill *et al.* [7]** who reported significant relationships between patients' knowledge and practice with age and place of residence. They also highlighted that nearly all patients experienced tiredness following coronary artery bypass graft (CABG) and valvular surgery, with over two-thirds reporting difficulties in performing activities of daily living. Additionally, their work indicated that female patients exhibited higher levels of anxiety regarding operations compared to male patients. Conversely, this finding diverges from the conclusions of **Assmann *et al.* [31]** who showed that the assessment of post-operative socio-demographic characteristics (Gender, marriage & employment) possessed greater predictive value for patient practices after CABG than did multiple medical variables.

CONCLUSION

The majority of patients initially demonstrated unsatisfactory total knowledge and self-care practices concerning heart valve replacement surgery prior to the program's implementation. Conversely, following the intervention, over two-thirds of the participants achieved satisfactory knowledge and self-care practices during both the immediate post-program assessment and the follow-up evaluation, despite a slight observed decrease at the follow-up point. Furthermore, a highly statistically significant difference was observed, with a P-value ≤ 0.000, providing robust support for the study's hypotheses.

RECOMMENDATIONS

From this study's findings, the following recommendations are put forth:

1. **For patients:** Patients need clear education on pre- and post-operative care, including comprehensive booklets for heart valve replacement surgery preparation.
2. **For nurses:** Cardiac nurses require specialized training in discharge planning and regular practice evaluation. Standardized educational programs are essential to improve nursing practices in this area.
3. **For healthcare services:** Implementing structured patient follow-up via calls and clinic visits will aid in early problem identification. Establishing specialized cardiac clinics in all health centers is recommended for ongoing patient guidance.
4. **On the educational level:** Equip care units and clinics with simplified, illustrated discharge protocols. Develop engaging audiovisual materials and a dedicated website for patient instructions. Investigation of role-playing for training.
5. **For future research:** Replicating this study with a larger, probability-based sample is crucial to enhance generalizability and maximize the educational program's utility.

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