▪ *Basic Research*
Effect of Interventional Program on Symptoms Management for Patients Post Trans-Catheter Aortic Valve Replacement

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Abstract

Background: Interventional program considers as a method that contributes in increasing knowledge and subsequently enhancing symptoms management for patients post trans-catheter aortic valve replacement (TAVR). The positive atmosphere was created among the studied patients through interventional program encourage them to learn new knowledge and acquire health practices in order to manage their discomfort symptoms post TAVR. **Aim:** this study aims to assess the effect of interventional program on symptoms management, knowledge and practice level for patients post trans-catheter aortic valve replacement. **Design:** A quazi experimental design was used. **Setting:** This study was conducted in the Cardiac Critical Care Unit at Cardio- Thoracic academy which affiliated to Ain Shams university hospital, Cairo, Egypt. **Subjects:** A purposive subject of 80 adult patients from both gender post trans-catheter aortic valve replacement were recruited from the previously mentioned setting. **Data collection tools:** (1) Patients' structured interview questionnaire, (2) Patients' Cardiac Symptoms Survey. (3) Patients' knowledge regarding symptoms management post TAVR assessment tool. (4) Patients' observational checklist regarding symptoms management post TAVR. **Results:** Showed significant difference between cardiac symptoms of the studied patients pre and post the interventional program post Trans-Catheter Aortic Valve Replacement at ($p < 0.05$). Also, there was statistically significant difference among the studied patients regarding satisfactory level of knowledge and practice post the interventional program post Trans- Catheter Aortic Valve Replacement at ($p < 0.05$) compared to the pre level. **Conclusions**: The implementation of interventional program for patients post TAVR improve the patients' cardiac symptoms management, level of knowledge and practice. **Recommendations:** Implementing interventional program for educating patients undergoing TAVR is very important in order to enhance their knowledge and practice regrading symptoms management.

1. Introduction:

Aortic stenosis (AS) is the most common cardiac valve abnormality. The most common reason for an adult to undergo cardiac surgery is valve replacement, up to 40% of patients with severe AS may not be considered candidates for surgical aortic valve replacement (SAVR) because awaiting symptoms makes them prohibitively high risk due to age, frailty, medical co-morbidities, or decompensated heart failure. Transcatheter aortic valve replacement (TAVR) has become the therapeutic option of choice for patients with symptomatic, severe aortic valve stenosis (AS) who are at increased risk for surgical aortic valve replacement (SAVR) **(Frownfelter et al., 2020).**

Transcatheter aortic valve replacement is replacing an aortic valve made from animal tissue, it is a preferred procedure to treat high-risk patients requiring repeat surgical aortic valve replacement. It is minimally invasive procedure, requiring only a small cut in the skin. Thorough preprocedural planning, which includes precise measurements of the aortic root and aortic valve sizes, is essential for a successful TAVR. Although recent developments have increased the success rate of TAVR surgeries, they are not sufficient to eliminate altogether the physical, psychological and social problems that individuals face in the period following discharge **(Pramanik et al, 2020).**

Patients post TAVR reported that they experienced symptoms such as shortness of breath, chest pain, gastrointestinal disturbance, loss of appetite, swelling, fatigue, sleep disturbances, weight loss, anxiety related to the treatment. Long-term outcomes of patients after TAVR are needed to comprehensively assess the benefits of TAVR on post-operative quality of life. In addition, the implications of discharge planning on healthcare resource utilization are important to optimize the benefits of this procedure.The common complications can include vascular and bleeding complications are both associated with worse short- and long-term clinical outcomes including all-cause mortality **(Thyregod, 2018).**

Symptoms management after TAVR is an effective element of health interventional program. It focusses on relieving symptoms burden and teaching exercise, physical therapy, and adopting healthier lifestyle habits. Patients undergoing post-procedural TAVR are often observed in an intensive care unit (ICU). Hospitals are creating and deploying faster, more economical TAVR protocols without sacrificing patient outcomes as the procedure becomes the norm that can improve patients' outcomes and their quality of life **(Zoltowska et al, 2019).**

In order to provide patients with the best treatment possible, nurses play a crucial part in their care and must be knowledgeable about the TAVR surgery. In order to optimize patient outcomes, nurses must stay up to date on the most recent knowledge regarding TAVR. Implementing the interventional program is influencing patient behavior and resulting in the changes in knowledge, attitudes, and skills required to maintain or enhance health is known as the patient's educational program. Patients with TAVR benefit from education regarding the disease process, managing symptoms, and preventing complications **(Jiang, et al., 2021).**

Significance of the study

According to the statistical department in the Cardiovascular Unit in 2022, there were 2132 adult patients who had cardiothoracic surgeries and 1200 patients from them had valve surgeries. **Osterwald, and Gantioque, (2020)** mentioned that the development of Transcatheter aortic valve replacement (TAVR) has emerged as a support for patients considered being inoperable providing both enhancement in symptoms and statistically significant mortality benefit. Also, it becomes an option for individuals who are at risk of complications

from aortic valve replacement surgery as it is a minimally invasive heart technique. When an intervention program is implemented for TAVR patients, it will help the patient manage associated symptoms such as pain, fatigue, insomnia, and emotional distress by equipping them with the knowledge and skills to manage these symptoms and enhance their emotional well-being.

Aim of the study

The aim of the current study was to assess the effect of interventional program on symptoms management for patients post trans-catheter aortic valve replacement through the following:

1. Assessing patients' baseline data pre trans-catheter aortic valve replacement?
2. Assessing patients' level of knowledge and practice pre interventional program regarding symptoms' management?
3. Developing and implementing interventional program for patients pre transcatheter aortic valve replacement based on their needs?
4. Evaluating the effect of interventional program on symptoms management for patients post trans-catheter aortic valve replacement?
5. Evaluating the effect of interventional program on patients' level of knowledge and practice post trans-catheter aortic valve replacement?

Research Hypothesis:

- In order to achieve the aim of this study, it was hypothesized that, the implementation of the interventional program will lead to significant positive improvement on patients' symptoms management post trans-catheter aortic valve replacement.
- The implementation of the interventional program will lead to significant positive improvement on patients' knowledge and practice post trans-catheter aortic valve replacement.

Operational definition

- **Intervention program:** - it meant the nursing interventions that developed by researchers based on recent literature review focusing on educating the patients how to recognize and manage commonly experienced discomfort symptoms.
- **Symptoms' management post trans-catheter aortic valve replacement:** it refers to assess and manage the symptoms commonly experienced by the patients post TAVR, such as (shortness of breath, chest pain, fatigue, sleep disturbances, and anxiety ..etc).

Subjects and Methods

Research Design: A quasi-experimental design (pre & post test) was utilized to meet the aim of the current study. Quasi-experimental research is similar to experimental research in that there is manipulation of an independent variable. This type of research is often   performed in cases where a random selection cannot be performed **(Thomas, 2020).**

Setting: This study was conducted in the Cardiac Critical Care Unit at Cardio- Thoracic academy which affiliated to Ain Shams university hospital, Cairo, Egypt.

Subject:

 A purposive sample of 80 patients based on the following criteria; adult oriented patients from both gender undergoing TAVR for first time, agreed to participate in the study, regardless to their educational level and free from psychiatric disorders. The sample size was calculated as revealed from the statistical medical record department of Cardio-Thoracic academy which is affiliated to Ain shams university hospital during the year of **2023**, the total number of patients post **TAVR** were [n=1200].   Based on the following statistical approach, the sample size of the patients participating in this study were (80). The sample size was calculated by adjusting the power analysis with the confidence interval to 95% with margin of error accepted adjusted to 5% and a known total population of patients using the following equation:

$X = Z(^{c}/_{100})^2 r(100-r)$

$N = Nx/((N-1)E^2+x)$

$E = Sqrt [^{(N-n)x}/_{n(N-1)}]$

Where N is the population size, r is the fraction of responses that are interested in, and Z(c/100) is the critical value for the confidence level.

 Data Collection Tools:

 The following instruments were applied to obtain data for the current study**.**

Tool I-Patients' structured interview questionnaire

This tool was developed by the researchers and written in Arabic to suit the level of education for all patients included in the study who mostly rely in the use of Arabic language. It included two parts divided as following:

Part I: - it was concerned with assessment of demographic data for the studied patients which included (age, gender, level of education & working status).

Part II: it was concerned with assessment of patients' medical data included; smoking status, body mass index, practicing exercise, patient's medical history and family history of cardiac disorders.

Tool II: Patients' Cardiac Symptoms Survey (CSS)

It was used to assess level of the discomfort symptoms experienced by patients pre and post TAVR. It was adapted from ***Nieveen, et al., (2008)*** and translated into simple Arabic. It consisted of 9 symptoms which included the following; (shortness of breath, chest pain/angina, a fluttering or racing heartbeat, fatigue, leg swelling, sleep disturbance, loss of appetite, anxiety, and depression).

Scoring system:

Evaluation of symptoms was assessed through severity of each symptom. The numerical rating scale of category ranged from (1-10), (**mild =**1-3, **moderate =**4-7 and **severe** 8- 10).

Tool III: Patients' knowledge regarding symptoms management post trans-catheter aortic valve replacement assessment tool: The researchers-developed and modified this tool based on the recent literature review in Arabic language to assess patient's knowledge regarding symptoms' management for patients post trans-catheter aortic valve replacement pre and post the interventional program (**Dabbagh et al.,2018 &** *Spaziano et al.2018)*. It was consisted of ten subtitles with total 72 statements in the form of true and false questions and it was distributed as following; management of shortness of breath (6 statements), chest pain or angina pain (5 statements), incisional pain; (9 statements), fluttering heart beat; (4 statements) fatigue (7 statements), leg swelling (6 statements), sleep disturbance; (12 statements), loss of appetite; (10 statements), anxiety (10 statements) and depression (3 statements).

Scoring system:

The total score of knowledge was 72 grades. Each correct answer was given one mark and the incorrect answer was given zero. It was considered that:

- ≥ 85% was satisfactory level of knowledge (≥ 61.2 grades correct answers).
- < 85% was unsatisfactory level of knowledge (< 61.2 grades correct answers).

Tool IV: Patients' observational checklist regarding symptoms management post trans-catheter aortic valve replacement: this tool was adopted from (**Zoltowska et al, 2019 & Fownfelter et al., 2020**) to assess patient's practice regarding symptoms' management post trans-catheter aortic valve replacement pre and post the interventional program. It included 37 steps distributed as the following: temperature assessment 8 steps, pulse assessment 5 steps, respiration assessment 4 steps, breathing exercise 12 steps and relaxation technique 8 steps).

Scoring system:

The total score of patients' practices was 37 marks, each step done correctly was given one mark and zero for the step which was not done or done incorrectly. It was considered that:

- ≥ 85% was satisfactory level of the practice (≥ 31.4 correct actions).
- < 85% was unsatisfactory level of the practice (<31.4 correct actions).

Tool Validity

Testing validity of the proposed tools by using face and content validity. It was used to determine whether the tools covered the aim of the study. Validity was tested by a jury of 7 experts, all of them were professors of critical care & emergency nursing, at faculty of nursing - Ain Shams University. The expertise reviewed the tools for clarity, relevance, comprehensive, simplicity, and applicability; no modification was done.

Tool Reliability

The reliability was done by Cronbach alpha coefficient test which revealed that each item of the utilized tools consisted relatively homogenous items. The internal consistency of symptoms management tool was 0.89, for the knowledge assessment questionnaire was 0.81, and for the observational checklist for practice was 0.87 which indicated high reliability.

Pilot Study

The pilot study was applied to 10% of the studied subjects to test feasibility of the research process, applicability clarity of the used tools. As well as, estimation of the time required for data collection. Based on the finding of pilot study, no modification was done. Subjects who participated in pilot study were included in the study.

Field work:

- The fieldwork included three phases: **Assessment**, **implementation** and the **evaluation** phase.

- All the study phases took six months started from (September 2023 till end of February 2024).

A-Assessment & planning Phase

- This phase started by interviewing the patients included in the study who met the inclusion criteria and explaining the aim and nature of the study as well as obtaining their approval to participate in the study prior to data collection.

- The baseline data were assessed from the patients pre interventional program implementation by using Tool I, II, III & IV. These tools were filled by researchers pre-program implementation in the previously mentioned setting. The researchers filled these tools from patients during the peri-operative period waiting for TAVR in addition to preparation of the booklet that took two months.

- The tools took for each patient about 30-45 minutes. The researchers were available 3 days per week and met around **4-5** patients per day as following; Monday, Tuesday and Wednesday assigned from 9.00 am to 1.30 pm.

- All data collected in the assessment phase from patients included in the study were analyzed to identify the patients' needs. Based on the studied patients' needs, the recent related literature review and experts' opinions, the researchers developed interventional program and instructional illustrated booklet in Arabic simple language based on **(Aitken et al., 2019 & Hardin et al.,2019)**

- The booklet contained introduction, objectives and main three parts as following;

Part 1: Anatomy & physiology of the heart, definition, indications, preoperative preparation prior to TAVR and emergency.

Part 2: Symptoms management post TAVR including; shortness of breath, chest pain /angina pain, incisional pain, a fluttering or racing heartbeat, fatigue, sleeping disturbance, leg swelling, loss of appetite, anxiety, and depression).

Part 3: General instructions and guidelines to be followed post TAVR regarding medication (brand, generic name, indication, proper rout and side effect), proper movement in the bed, return to work, the allowed and restricted activities post discharge from hospital.

- Educational media were prepared e.g video and posters prior starting the implementation.

- The structured educational booklet was developed, and revised, it was written in language with illustrations of coloured pictures, in order to be easy for the patients to memorize the required action.

B-Implementation Phase

- The educational sessions carried out within the previously mentioned setting through the identified 3 days for the patients included in the study.

- The studied patients divided into 16 groups each one had 5 patients. The researchers' point of view for dividing the patients into small groups was; to motivate and increase their interest and enhance retention of knowledge and practical skills towards for management for common experienced discomfort symptoms post TAVR and post program implementation.

- The researchers motivated the family members who accompanied the patients to attend the educational sessions in order to support the patients for proper implementation of the interventional program to enhance their knowledge and practice about symptoms management post TAVR.

- The researchers distributed a hard copy of the instructional illustrated booklet for each patient in each group directly prior the first educational session and advised them to bring it in each educational session.

- Implementation of interventional program delivered to the 16 groups. Each group consisted of 5 patients and their family members. Each group took three sessions for covering the program content each session was 45 minutes.

- The implementation of interventional program period for covering all the patients in the 16 groups took two months. Every educational session started by explaining the objective of the session and briefing the previous session then providing the patients with the knowledge and practical skills related to the proposed topic.

- The researchers offered opportunities for the patients and their families to ask questions for further explanations during or post interventional sessions. At the end of each session, the researcher summarized and reinforced the session content.

C-Evaluation Phase

- Immediately after implementation of the interventional program. The researchers evaluated the effect of the program regrading symptoms management, level of patients' knowledge and practice post program implementation by the same used tools II, III & IV through two months.

Administrative design:

An official letter was issued from the dean of the Faculty of Nursing, Ain Shams University, to the director of Cardiothoracic Academy Hospital, Ain Shams university, explaining the purpose of the study to obtain the permission to conduct this study.

Ethical considerations:

The research approval was obtained from ethical committee of faculty of nursing before conducting the study work with Number 23.10.144. The aim of the study was be clarified to the patients included in the study before starting data collection by the researchers. Researcher had assured maintaining, anonymity and confidentiality of patients' data included in the study. The studied patients were informed that they allowed to choose to participate or not in the study, and that they had the right to withdraw from the study at any time.

Statistical Analysis:

The data obtained had reviewed, coded, analyzed and tabulated. Descriptive statistics (frequencies and percentages, mean and standard deviations were done using computer program (SPSS) version (28). Chi-square test used in the relationship between patients' knowledge and practice post the interventional program post Trans- Catheter Aortic Valve Replacement. Pearson correlation coefficient test was used in the relationship between patients' knowledge practice and cardiac symptoms pre and post the interventional program post Trans- Catheter Aortic Valve Replacement. It's considered significant when P value less than or equal (0.05).

Results:

Table (1): Exhibits that, most of the studied sample (86.52%) aged 50 and above years old with Mean ± SD (66.1 ± 9.9). Regarding gender, more than half (55%) of them were female. As for level of education, near half (46.5%) of them had pre-university education. in addition to working status, near three quarter of them had no work (72.5%).

Table (2): reveals that more than three quarters (52.5%) of the studied sample are current smokers. In addition to body mass index, near half of them (42.5%) were overweight. Regarding practicing exercise: the majority of them (92.5%) weren't practicing exercise; meanwhile slightly near three quarters of them were diabetic (70%) and near half (48.75%) had hypertension. As regard to family history, more than three quarters of the studied patients had a family history of cardiac disease.

Table (3): Displays significant difference between cardiac symptoms of the studied patients pre and post the interventional program post Trans- Catheter Aortic Valve Replacement at (p< 0.05).

Table (4): Reveals statistically significant difference between satisfactory level of knowledge of the studied patients regarding symptoms management pre and post the interventional program post Trans- Catheter Aortic Valve Replacement at (p< 0.05).

Table (5): Shows significant difference between satisfactory level of practice of the studied patients regarding symptoms management pre and post the interventional program post Trans- Catheter Aortic Valve Replacement at (p< 0.05).

Table (6): Clarifies that there was significant negative correlation between total satisfactory level of patients' knowledge and their cardiac symptoms pre and post the interventional program implementation post Trans- Catheter Aortic Valve Replacement at (p< 0.05). Also, reveals that there was significant negative correlation between total satisfactory level of patients' practice and their cardiac symptoms pre and post the interventional program implementation post Trans- Catheter Aortic Valve Replacement at (p< 0.05). Likewise, there was significant positive correlation between patients' knowledge and their practice post the interventional program implementation post Trans- Catheter Aortic Valve Replacement at (p< 0.05).

Table (1): Percentage distribution of the studied patient's demographic data (n = 80)

Demographic data	No.	%
Age		
18 <30	1	1.25
30< 40	3	3.75
40 < 50	7	8.75
≥ 50	69	86.25
Min. – Max 25 – 77 Mean ± SD 66.1 ± 9.9		
Gender		
Male	44	55
Female	36	45
Level Education		
can't not read & write	3	3.75
Read and write	18	22.5
Pre university education	37	46.5
University education	22	27.5
Working status		
Yes	22	27.5
No	58	72.5

Table (2): Percentage distribution of the studied patient's medical data (n = 80)

Medical data	No.	%
Smoking status		
Never	9	11.25
Former	29	36.25
Current	42	52.5
Body mass index		
Under weight	5	6.25
Healthy weight	20	25
Over weight	34	42.5
Obesity	21	26.25
Practicing exercise		
Yes	6	7.5
No	74	92.5
Past history		
DM	56	70
HTN	39	48.75
Respiratory disorders	6	7.5
Renal disorders	4	5
Family history of cardiac disorders		
Yes	61	76.25
No	19	23.75

Table (3): Comparison of cardiac symptoms of the studied sample pre and post the interventional program post Trans- Catheter Aortic Valve Replacement (n = 80)

Items	Studied patients												Chi-square	
	Pre program						Post program							
	Mild		Moderate		Severe		Mild		Moderate		Severe			
	N	%	N	%	N	%	N	%	N	%	N	%	X²	P-value
Shortness of breath	2	2.5	12	15	66	82.5	67	83.75	8	10	5	6.25	9.831	0.001*
Chest pain/angina	5	6.25	21	26.25	54	43.2	61	76.25	12	15	7	8.75	8.362	0.041
A fluttering or racing heartbeat	19	23.75	23	28.75	38	47.5	64	80	7	8.75	9	11.25	7.885	0.031
Fatigue	14	17.5	19	23.75	47	58.75	69	86.25	4	5	7	8.75	8.921	0.020
Swollen ankles or feet	7	8.75	21	26.25	52	65	70	87.5	3	3.75	7	8.75	9.738	0.003
Difficulty sleeping	11	13.75	19	23.75	50	62.5	68	85	7	8.75	5	6.25	7.454	0.011
loss of appetite	30	37.5	21	26.25	19	23.75	80	100	0	0	0	0	8.297	0.003
Anxiety	14	17.5	31	38.75	35	43.75	63	78.75	4	5	13	16.25	7.668	0.016
Depression	31	38.75	41	51.25	8	10	55	68.75	21	26.25	4	5	6.222	0.001

Table (4):   Comparison of total satisfactory level of knowledge of the studied patients regarding symptoms management pre and post the interventional program post Trans- Catheter Aortic Valve Replacement (n = 80)

Items	Studied patients				Chi-square	
	pre program (n=80)		Post program (n=80)			
	N	%	N	%	X^2	P-value
Management of shortness of breath	0	0	60	75	10.588	0.001*
Management of chest pain/angina	0	0	63	78.75	10.924	0.004*
Management of fluttering or racing heartbeat	0	0	59	73.75	9.642	0.001
Management of fatigue	12	15	71	88.75	5.406	0.020
Management of leg swelling	21	26.2	68	85	6.550	0.010
Management of Sleep disturbance	23	28.75	73	91.25	4.285	0.038
Management of loss of appetite	16	20	69	86.25	3.299	0.069
Management of Anxiety	3	3.75	64	80	9.380	0.000
Management of Depression	0	0	58	72.5	3.589	0.058
Total	**15**	**18.75**	**61**	**76.25**	**8.588**	**0.001**

Table (5): Comparison of total satisfactory level of practice of the studied patients regarding symptoms management pre and post the interventional program post Trans-Catheter Aortic Valve Replacement (n = 80)

| Items | Studied patients | | | | Chi-square | |
| | pre program (n=80) | | Post program (n=80) | | | |
	N	%	N	%	X^2	P-value
Temperature assessment	7	8.75	75	93.7	5.772	0.041*
Pulse assessment	0	0	60	75	4.285	0.038*
Respiration assessment	4	5	67	83.7	6.831	0.025*
Breathing exercise	5	6.25	74	92.5	5.738	0.018*
Relaxation technique	12	15	76	95	5.454	0.019*
Total	**5**	**6.25**	**65**	**81.25**	**8.297**	**0.003***

Table (6): Correlations between total satisfactory level of patients' knowledge, practice and their cardiac symptoms pre and post the nursing interventional program implementation post Trans- Catheter Aortic Valve Replacement (n = 80)

| Items | Total level of patients' knowledge | | | |
| | Pre | | Post | |
	Pearson Correlation Coefficient	P-value	Pearson Correlation Coefficient	P-value
Total level of patients' practice	.0235	.0501	0.501	0.002
Patients' cardiac symptoms	- 0.082	0.533	- 0.428	0.010
Items	Total level of patients' practice			
	Pre		Post	
	Pearson Correlation Coefficient	P-value	Pearson Correlation Coefficient	P-value
Patients' cardiac symptoms	- 0.218	0.097	- 0.327	0.010

Discussion:

Aortic stenosis is a common condition among the elderly and is associated with poor survival without surgery once symptoms develop. In addition, patients with severe aortic stenosis experience progressive symptoms and reduced functional status and quality of life. Despite the success of surgical valve replacement at alleviating symptoms, improving functional status, and extending survival, a substantial minority of patients with severe aortic stenosis go untreated because of comorbid medical conditions. The discussion of this study finding was proving the researchers' hypothesis expected that implementation of interventional program for patients post Transcatheter Aortic Valve Replacement (TAVR) had significant positive improvement on symptoms management, patients' knowledge and practice.

The current study finding revealed that regarding age, most of them were above-50 age ranged from 25-77 with a mean age (66.1 ± 9.9). This result supported that aortic stenosis is more common among older age. Regarding gender, more than of the studied patients in the sample were males, from the researchers' point of view, aortic valve stenosis is considered one of cardiovascular disease that more likely to be susceptible to risk factors such as , advanced age ,life stressors and unhealthy behaviors. This result goes in the same line with **Rodés-Cabau, et al., (2010) found** in their study entitled "Transcatheter aortic valve implantation for the treatment of severe symptomatic aortic stenosis in patients at very high or prohibitive surgical risk: acute and late outcomes of the multicenter Canadian experience" most of the studied sample were males and mean age was $81 ± 8$.

Concerning educational level of the studied patients, near half of them had pre-university education, and nearly three quarter of them are not work, from the researchers' point of view, this may be due to that most of the studied patients were old age above 50 years in addition to, they are suffering from many discomfort signs and symptoms interfere with their physical ability.

Regarding medical data of the studied patients, the present study showed that more than half of the studied sample were current smokers. This result contradicted with **Goel et al., (2012)** in their study "Percutaneous coronary intervention in patients with severe aortic stenosis: implications for transcatheter aortic valve replacement" and found that only 3.9 of the studied sample were current smokers. As regard to body mass index, near half of them were overweight. From the researchers' point of view, this might be due to the newly customs and traditions eating habits that introduced to Egyptian, society especially in the last years, majority of Egyptian were eating unhealthy and junk foods. These results explained as overweight was considering predisposing factor for cardiac disease such as aortic stenosis. This result is agreement with **Jones et al., (2019)** in their study **"Multidisciplinary transcatheter aortic valve replacement heart team program improves mortality in aortic stenosis"** showed that most of the studied sample were overweight. Regarding practicing exercise, the majority of them weren't practicing exercise, this may be due that most of the studied sample hadn't the culture of practicing exercise and most of them were old age above 50 years old.

Concerning comorbid disease of the studied patients, slightly near three quarters of them were diabetic and near half were hypertension. This result may be due to, Aortic valve stenosis is caused by certain health problems such as high blood pressure, diabetes or high cholesterol which may have an impact on proper functioning of aortic valve. This result matched the result of **shea (2019)** who stated that less than half & most of the studied sample had diabetes and hypertension respectively.

As regard to family history, more than three quarters of the studied patients had a family history of cardiac disease; based on **Fownfelter, et al., (2020),** family history of cardiovascular disease (CVD) is considered one of the predisposing risk factors that can affect proper function of heart, especially if it is associated with another risk factors such as high blood pressure and diabetes, have strong genetic determinants.

Related to severity of shortness of breath the current study results revealed that there was statistically significant difference among the studied patients post interventional program implementation compared to pre-program implementation where p (>0.05). Meanwhile, there was statistically significant difference among the studied patients regarding the satisfactory level of knowledge about shortness of breath management post the interventional program and post TAVR compered to pre at (p< 0.05).   From the researchers' point of view this could be due to availability of knowledge through interventional program and increase awareness of patients regarding symptoms management associated with TAVR. These study results supported with the study conducted by **Abbasi et al., (2018)** entitled "Effects of the self-management education program using the multi-method approach and multimedia on the quality of life of patients with chronic heart failure: A non-randomized controlled clinical trial" and found that educational program had positive effect on symptoms severity with health team instructions with p value <0.01**.

 Regrading severity of chest pain the present study results found that there was statistically significant difference among the studied patients post interventional program implementation compared to pre-program implementation where p (>0.05). Furthermore, there was statistically significant difference among the studied patients regarding the satisfactory level of knowledge about chest pain management post the interventional program and post TAVR compered to pre at (p< 0.05). The reason of this result may be due to the patients included in the present study have practical skills regarding management chest pain post interventional program implementation. This study result was in disagreement with the study conducted by **Kourbelis et al., (2020)** entitled "Effectiveness of discharge education strategies versus usual care on clinical outcomes in acute coronary syndrome patients" and stated that no significant difference was reported between the intervention and control for adherence with instructions related chest pain.

 In relation to severity of fluttering heart rate, the current study result detected that there was statistically significant difference among the studied patients post interventional program implementation compared to pre-program implementation where p (>0.05). In addition to, there was statistically significant difference among the studied patients regarding the satisfactory level of knowledge about fluttering heart rate management post the interventional program and post TAVR compered to pre at (p< 0.05). From the researchers' point of view, this result explained that the implemented interventional program increased the patients' awareness regarding to management the experienced symptoms of TAVR. These study findings were in agreement with study conducted by **Al-Ahdal & Makki (2020)** about "Emergency Management of Arrhythmias Post-Cardiac Surgery at Cardiac Centers" Khartoum, reported that there were numerous risk factors including advanced age, pre-existing conditions that cause cardiac Arrhythmias as fluttering heart rate.

 Concerning severity of fatigue and tiredness the current study result detected that there was statistically significant difference among the studied patients post interventional program implementation compared to pre-program implementation where p (>0.05). Also, there was statistically significant difference among the studied patients regarding the satisfactory level of knowledge about management of fatigue post the interventional program and post TAVR

compered to pre at (p< 0.05). From the researcher's point of view, these results may be due to effectiveness of interventional program content, its preparation with Arabic language and easy medical terms to understand it. These study results were consistent with the study conducted by **Draper et al., (2020)** entitled "psychosocial interventions to optimize recovery of physical function and facilitate engagement in physical activity during the first three months following cardiac surgery", and reported that psychosocial support had been identified as possible ways to increase exercise participation and adherence.

As regards to severity of leg swelling the current study results displayed there was statistically significant difference among the studied patients post interventional program implementation compared to pre-program implementation where p (>0.05). Meanwhile, there was statistically significant difference among the studied patients regarding the satisfactory level of knowledge about leg swelling management post the interventional program and post TAVR compered to pre at (p< 0.05). These results may be due to the developed interventional program contained well organized instructions and general guidelines regarding management of leg swelling which reflected positively on their physical activity. These study results were consistent with the study conducted by **Lazar, (2020)** about the role in optimizing medical therapy and maintaining compliance with secondary prevention guidelines in patients undergoing cardiac surgery and stated that intervention program had positive effect on patients 'outcomes.

Regarding to severity of sleep disturbance the current study results revealed that there was statistically significant difference among the studied patients post interventional program implementation compared to pre-program implementation where p (>0.05). In addition to, there was statistically significant difference among the studied patients regarding the satisfactory level of knowledge about management of sleep disturbance post the interventional program and post TAVR compered to pre at (p< 0.05). These study results were in cohort with the study conducted by **Højskov et al., (2019)** about early physical and psycho-educational rehabilitation in patients undergoing cardiac surgery and found that psycho-educational rehabilitation improved patients sleep pattern by the instruction provided from health team.

In concerns to loss of appetite the present study showed that, that there was statistically significant difference among the studied patients post interventional program implementation compared to pre-program implementation where p (>0.05). Furthermore, there was statistically significant difference among the studied patients regarding the satisfactory level of knowledge about management of loss of appetite post the interventional program and post TAVR compered to pre at (p< 0.05).   From the researcher's point of view, these results may be due to the conducted interventional program included valuable knowledge which motivated the patients and to follow the health instructions regarding management the loss of appetite.

Furthermore, the current study revealed that, there was statistically significant difference among the patients post interventional program implementation compared to pre-program implementation for anxiety where p (>0.05). Also, there was statistically significant difference among the studied patients regarding the satisfactory level of knowledge about anxiety management post the interventional program and post TAVR compered to pre at (p< 0.05). Form the researchers' point of view, these results explained that the designed interventional program offered many instructions and general guidelines for managing anxiety, which strength the patients' copying mechanism for relieving experienced anxiety symptoms post TAVR. These study results were in consistent with the study conducted by **Soofi etal., (2020)** about, the impact of a social support program supervised by a multidisciplinary team on psychosocial distress and knowledge among heart failure patients, at Saudi Arabia and found

that social support program supervised by multidisciplinary team was reduced anxiety, improved knowledge, self-care behavior, and quality of life among patients with heart failure.

Related to depression the present study showed, that there was statistically significant difference among the patients post interventional program implementation compared to pre-program implementation where p (>0.05). In addition to, there was statistically significant difference among the studied patients regarding the satisfactory level of knowledge about depression management post the interventional program and post TAVR compered to pre at (p< 0.05). These results not matched with the study conducted by **Correa-Rodríguez etal., (2020)** about Prevalence of depression in coronary artery bypass grafting (CABG): a systematic review and meta-analysis, and found that based on the different measurement tools used, the prevalence of depression pre-CABG ranged from 19–37%, and post-CABG from 15-33%. There was a considerable presence of depression in this type of patient.

Regarding the total satisfactory level of practice among the studied patients pre and post the interventional program, the result revealed that, there was significant improvement regarding level of practice among the studied patients in symptoms management post the interventional program compared to pre-program. From the researchers' point of view, this improvement may be due to the intervention program involving specific contents regrading improvement patients' level of practice including temperature assessment, pulse assessment, respiration assessment, breathing exercise and relaxation technique post TAVR.

The result goes in the same line with **Zou et al., (2023)** in a study entitled " Impact of cardiac rehabilitation on pre-and post-operative transcatheter aortic valve replacement prognoses" and found that both pre-and post-operative cardiac rehabilitation, including exercise training, nutritional modifications, and cession of smoking, under the supervision of trained team could be highly beneficial for TAVR patients, by further improving functional capacity and quality of life post-surgery. Also, the result is in agreement with **Hao (2022)** who found that enhanced rehabilitation intervention can reduce adverse events and pain for patients with heart valve replacement and improve their postoperative recovery, quality of life.

The current result revealed that, there were significant negative correlation between total level of patients' knowledge, and their cardiac symptoms pre and post the interventional program implementation post TAVR, while, there was significant positive correlation between patients' knowledge and their practice post the interventional program implementation post Trans- Catheter Aortic Valve Replacement. result shown that nursing education has a positive effect on reducing patients' level of anxiety and post-operative complications. From the researchers' point of view, the improvement of patients' knowledge and practice had direct effect on reducing cardiac symptoms. The result is consistent with **Abdelrahman (2021) and Qiu (2024)**, who found that nursing education has a positive effect on reducing patients' level of anxiety and post-operative complications. Also, the nurses provide supportive, educational, preventive measures and psychological support to the cardiac patients.

Conclusion:

In the light of results of this study, it can be concluded that the intervention program had statistically significant positive effect on symptoms management, knowledge and practice level of the studied patients. In addition, there was statistically significant relation between level of symptoms and total satisfactory level of knowledge and practice regrading symptoms management post the interventional program implementation post Trans- Catheter Aortic Valve Replacement where p (<0.05).

Recommendation:

In the light of the findings obtained from the current study, the following recommendations are suggested:

- o Implementing the developed interventional program for educating patients undergoing TAVR is very important in order to enhance their knowledge and skills regrading symptoms management.
- o Designing cardiac rehabilitation program with multi-disciplinary team is necessary for all patients undergoing TAVR to reduce common experienced discomfort symptoms.

- o Providing all patients undergoing TAVR with the designed instructional illustrated Arabic booklet regarding common experienced symptoms discomfort is effective in displaying available management approaches of symptoms.

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الملخص العربى

تأثير البرنامج التدخلي على تخفيف الأعراض للمرضى بعد استبدال صمام الأورطي بواسطة القسطرة

مقدمة: يعتبر البرنامج التدخلي وسيلة تساهم في زيادة المعرفة وبالتالي تعزيز تخفيف الأعراض للمرضى بعد استبدال الصمام الأورطي بواسطه القسطرة (TAVR). استخدام برنامج تداخلي يساعد على تعلم معارف جديدة واكتساب ممارسات صحية من أجل تخفيف أعراض بعد إجراء عملية استبدال الصمام الأورطي عن طريق القسطرة.

الهدف: هدفت هذه الدراسة إلى تقييم تأثير البرنامج التدخلي على تخفيف الأعراض ومستوى المعرفة والممارسة للمرضى بعد استبدال الصمام الأورطي بواسطه القسطرة.

التصميم: تم استخدام التصميم شبه التجريبي . **مكان الدراسة:** أجريت هذه الدراسة في وحدة العناية المركزة للقلب بأكاديمية القلب والصدر التابعة لمستشفى جامعة عين شمس، القاهرة، مصر.

النتائج: أظهرت النتائج اختلافات بين الأعراض القلبية لدى المرضى قبل وبعد البرنامج التدخلي بعد استبدال الصمام الأورطي بواسطه القسطرة عند ($P<0.05$). كما كان هناك فروق ذات دلالة إحصائية بين المرضى الذين شملتهم الدراسة فيما يتعلق بمستوى مرض من المعرفة والممارسة بعد البرنامج التدخلي بعد استبدال الصمام الأورطي عبر القسطرة عند ($P<0.05$) مقارنة بالمستوى السابق.

الخلاصة والتوصيات: أثبتت الدراسة إن تنفيذ البرنامج التدخلي للمرضى بعد إجراء عملية استبدال القسطرة عن طريق القسطرة (TAVR) يؤدي إلى تحسين مستوى المعرفة والممارسة وتخفيف الأعراض لدى المرضى. اوصت الدراسة بتكرار الدراسة الحالية على عينة أكبر لتحقيق تعميم النتائج والاستفادة على نطاق أوسع من البرنامج التدخلي.