Assessment of Awareness and Satisfaction for Patients Undergoing Percutaneous Balloon Mitral Valvuloplasty: Suggested Self-Care Guide

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Abstract

Background: Balloon valvuloplasty is an alternative to valve replacement in patients with critical stenosis although the treatment of choice for valvular heart disease is surgery **Aim:** The aim of this study was to assess awareness and satisfaction for patients undergoing percutaneous balloon mitral valvuloplasty and suggest self-care guide. **Design:** An exploratory descriptive research design was used to achieve the aim of the current study. **Subjects:** A purposive sample of 50 adult patients from both gender undergoing PBMV. **Setting:** The study was conducted at the following two settings: Cardiology Departments and outpatients` Clinics in Cardio-Vascular Hospital, affiliated to Ain Shams University Hospitals & Cardiology Departments in National Heart Institute/Egypt. **Tools:** Three tools were used in the current study, I. Patients' interviewing questionnaire which composed of demographic characteristics, patients' medical data, and patients' knowledge regarding Percutaneous Balloon Mitral Valvuloplasty, II. A self-reported checklist, it was used to assess patients' self-care practices regarding PBMV procedure. III. Patients' satisfaction rating scale to assess satisfaction of patients under study with quality of health care service**. Results**: Total (100%) of the studied patients had unsatisfactory total knowledge. 88.0% of them had unsatisfactory total self-care practice. And 86.0% of them were satisfied with health-care service quality provided. Finally, there was a strong positive correlation between total self-care practice & total knowledge. Meanwhile, there was a weak positive correlation between total satisfaction & total knowledge. **Conclusion:** based on findings of the current study, it could be concluded that: All of the studied patients had lake of knowledge and the majority of them had lake of self-care practice, in spite of the majority of them were satisfied with health-care service quality provided. **Recommendations:** Provide an educational program regarding knowledge and self-care practices for patients undergoing percutaneous balloon mitral valvuloplasty (PBMV).

Keywords: Percutaneous Balloon Mitral Valvuloplasty, Awareness & Satisfaction.

Introduction:

Mitral stenosis is a progressive disease consisting of a slow, stable course in the early years followed by an accelerated course later in life. Typically, there is a latent period of 20-40 years from the occurrence of rheumatic fever to the onset of symptoms. Once symptoms develop, it is almost a decade before they become disabling ***(Dougherty et al., 2021).***

Mitral stenosis is an obstruction of blood flowing from the left atrium into the left ventricle. It is most often caused by rheumatic endocarditis, which progressively thickens the mitral valve leaflets and chordae tendineae, added to the leaflets often fuse together. Eventually, the mitral valve orifice narrows and progressively obstructs blood flow into the ventricle ***(Romero, Torii, & Virmani, 2021).***

Percutaneous Balloon Mitral valvuloplasty (PBMV) is the treatment of choice for symptomatic mitral valve stenosis and recommended for older adults with surgical risks. This technique enlarges the orifice of a heart valve that has been narrowed by a congenital defect, calcification,

rheumatic fever, or aging. Moreover, as a "bridge to surgery" when heart function is severely compromised ***(Tang et al., 2021).***

Percutaneous mitral commissurotomy has demonstrated good immediate and midterm results and has replaced surgical mitral commissurotomy as the preferred treatment of rheumatic mitral stenosis in appropriate candidates. This procedure is performed in a cardiac catheterization laboratory under local anesthesia. The doctor inserts a balloon-tipped catheter through the patient's femoral vein or artery, threads it into the heart, and repeatedly inflates it against the leaflets of the diseased valve. This process increases the size of the orifice, improving valvular function and helping complications from decreased cardiac output. Patients remain in the hospital 24 to 48 hours after the procedure ***(Palacios, 2020).***

Nurses need to be aware that patients with mitral valve disease desire information about the condition, and not just at the time of diagnosis or development of symptoms ***(Ali et al., 2020).***

The quality and adequacy of healthcare services can be measured based on views and satisfaction of patients and their relatives. Patient satisfaction is the most important indicator of quality of care and it considered an outcome of healthcare services. Patient satisfaction measurement provided crucial information on performance thus contributing to total quality management ***(Karaca, & Durna, 2019).***

There is an increasing appreciation that clinically based measures of surgical outcome must be accepted with patients' awareness of their post-treatment situation and patient satisfaction research is becoming an independent growth indicator where emphasis is given for patient feedback on quality of care received ***(Gebremedhn & Lemma, 2017).***

Patients who are more satisfied with their care are more likely to follow medically prescribed regimens and thus contributing to the positive influence on health. Patients' opinions are the best source that can tell the providers of what is important, that is why this information can be used in healthcare planning and evaluation ***(Alsaqri, 2016).***

Significance of the study:

In an Egyptian study, the prevalence of rheumatic heart disease (RHD) was approximately 20 million cases occur in third world countries annually. There is a high incidence of advanced mitral stenosis in adult life. A genetic predisposition to develop RHD appears to be important in certain countries like India, Egypt and Turkey ***(Rashed et al., 2010).***

Information is a key factor for optimal management of post-procedural symptoms so patients should receive consistent information and effective self-care instructions to be prepared for transition of care from hospital to home. An effective practical self-care advice will increase patients` confidence in care at home, improve health status and feel safe and comfortable ***(LeMone et al., 2015 & Allen et al., 2013).***

Therefore, this study was conducted for the purpose of assessing patients' knowledge, practices and level of satisfaction and suggest self-care guide to improve both the quality and value of care for patients undergoing percutaneous balloon mitral valvuloplasty.

Aim of the study:

The present study was conducted to fulfill the following aim: assess awareness and satisfaction for patients undergoing percutaneous balloon mitral valvuloplasty and suggest self-care guide. This aim was achieved through the following:

1. Assessment of the studied patients' awareness (knowledge and practices) about percutaneous balloon mitral valvuloplasty procedure.
2. Assessment of the studied patients` level of satisfaction.
3. Suggest self-care guide based on studied patients' level of knowledge and practices.

Research questions:

The current study was formulated to answer the following questions:

- What is the level of awareness (knowledge and practices) of patients undergoing percutaneous balloon mitral valvuloplasty?
- What is the level of satisfaction for patients undergoing percutaneous balloon mitral valvuloplasty?

Research Design:

An exploratory descriptive research design was adopted to fulfill the aim of current study.

Setting:

The study was conducted at the following two settings:

1. Cardiology Departments and out patients` Clinics in Cardio Vascular Hospital, affiliated to Ain Shams University Hospitals/ Egypt.
2. Cardiology Departments and out patients` Clinics in National Heart Institute/Egypt.

Subjects

A purposive sample of 50 adult patients from both gender undergoing PBMV at the previous two mentioned setting within six months considering special criteria through the period from September 2020 to February 2021.

Tools of data collection:

Data were collected through using the following three tools:

Tool (I): Patients' interviewing questionnaire: **(Appendix I):**

This tool was developed by the investigator in a simple Arabic language based on reviewing of relevant recent related literatures ***(Meneguz-Moreno et al., 2018; Passeri & Dal-Bianco, 2018; Sanati, & Firoozi, 2017).*** It was composed of three parts:

Part 1: Patients' sociodemographic characteristics: It was used to assess patients' demographic characteristics regarding age, gender, educational level, marital status, working, Place of residence, family income, number of family members and number of family rooms. It was composed of 9 end closed question.

Part II: Patients' Medical data: It was used to collect the medical data for patients undergoing percutaneous balloon mitral valvuloplasty. It was included 9 closed ended questions regarding; past and present medical history as disease onset, symptoms**,** medication, past surgical history and family history.

Part III: Patients' knowledge assessment: It was developed by the investigator after reviewing recent related literature ***(Meneguz-Moreno et al., 2018; Passeri & Dal-Bianco, 2018; Sanati, & Firoozi, 2017),*** to assess patients' knowledge regarding percutaneous balloon mitral valvuloplasty. It consisted of 61 questions in the form of (25 MCQs) and (36 true or false questions). The questions were divided into six parts.

a. **Mitral valve:** it included (4 MCQs).
b. **Mitral stenosis; etiology, symptoms and treatment:** it included (3 MCQs) and (6 true or false questions).
c. **PBMV preparation:** it included (2 MCQs) and (6 true or false questions).
d. **PBMV procedure:** it included (3 MCQs) and (9 true or false questions).
e. **Post-intervention and discharge:** it included (4 MCQs) and (7 true or false questions).
f. **Home self-care, wound care and follow up:** it included (9MCQs) and (8 true or false questions).

❖ **Scoring system:**

The total score for the third part which was concerned with patients' knowledge was 61 degrees, if the patient's answer was correct it was given one degree, and was given zero degree if the answer was incorrect or don't know. The total degrees for every patient was summed up then categorize as follow:

- More than or equal to 60% (37 or more) was considered satisfactory level of knowledge.
- Less than 60% (<37) was considered unsatisfactory level of knowledge.

Tool (II): A self-reported checklist (Appendix II):

It was developed by the investigator after reviewing recent related literature ***(Lewis et al., 2016, Nicol et al., 2012 & Taylor et al., 2011).*** It was used to assess patients' self-care practices regarding PBMV procedure. It was composed of (28 items) covering the following:

- **Preoperative practices** included (5 items) to be observed at the day before procedure such as: care of operative site, eating, drinking and medication regimen. On the day of procedure such as morning care, cloths and personal items removal.

- **Postoperative practices** included (23 items) to be observed at intermediate postoperative period as positioning, oral fluid, food intake, pain control measures, ambulation, activities, deep breathing, coughing and extremity exercises and wound care.

❖ **Scoring system:**

The total score for the self-care observational checklist which was concerned with patients' self-care practices regarding PBMV procedure was 28 degrees, each item done correctly was given one grade and each item that was not done was given zero. The total degrees for every patient was summed up then categorize as follow:

- More than or equal to 60% (17 or more) was considered satisfactory level of self-care practices.
- Less than 60% (<17.5) was considered unsatisfactory level of self-care practices.

Tool (III): Patients' satisfaction rating scale (Appendix III):

It was adopted from ***(Lee & Kim, 2017)*** and translated to assess satisfaction of patients under study with quality of health care service. This tool consisted of (32) items covering the five sub-items as the following:

- **Empathy:** included (7 items).
- **Tangibles**: included (5 items).
- **Safety:** included (6 items).
- **Efficiency:** included (6 items).
- **Improvement of care services**: included (8 items).

❖ **Scoring system:**

The items in the patients' satisfaction questionnaire were scored on a five point Likert scale, responses were scored as very unsatisfied (1), unsatisfied (2), neutral (3), satisfied (4), very satisfied (5) for each item. For the whole scale the total score were summed up and divided by the number of the items for given mean scores.

- More than or equal to 60% (96 or more) was considered satisfied.
- Less than 60% (<96) was considered unsatisfied.

Results:

Table (1): illustrates that the mean age of studied patients was (38.14 ± 9.85), 42% of them were between 31 and 40 years, 54.0% have intermediate education level, 64.0% were not working and 52.0% had sufficient income.

Figure (1): shows that approximately three quarters of the studied patients (72%) were female.

Figure (2): indicates that approximately three quarters of the studied patients (74%) were married.

Figure (3): illustrates that more than half of the studied patients (56%) with urban residence.

Table (2a) shows that the mean years of the studied patients complaining of mitral stenosis was (7.50 ± 6.18). 78% of studied patients have got rheumatic fever before. 88.0% of them discovered diseases as a result of symptoms and the most reported symptoms (88.0%) were Palpitation & Lower limb edema.

Table (2b): table illustrates that 64% of studied patients take medication to relieve symptoms. 84.0% of them didn't have balloon mitral valvuloplasty before and 88.0% didn't

have a family history of mitral stenosis. All the patients (100%) in the study sample didn't have any heart surgery before and 72.0% of them didn't have a previous surgery for other disease.

Table (3): demonstrates that 92% of studied patients have unsatisfactory knowledge regarding mitral valve Anatomy/ physiology, 88% of them regarding mitral stenosis etiology/ symptoms/ treatment and 74% regarding preparation. All studied patients (100%) have unsatisfactory knowledge regarding Procedure, Post-intervention /Discharge, Total Balloon valvuloplasty, Homecare/ Follow-up and Total Knowledge level. All studied patients (100%) have un-satisfactory total knowledge level.

Table (4a): illustrates that 88% of the studied patients had unsatisfactory practice level concerning "morning of the procedure" and "total practices before the procedure and 58% of them had unsatisfactory practice level concerning "day before the procedure.

Table (4b): illustrates that 88% of the studied patients had unsatisfactory practice level concerning "deep breathing and coughing exercises", "extremity exercises" and "total practices after the procedure" and 84% of them had unsatisfactory practice level concerning "ambulation and activity".

Figure (4): shows that 12% of the studied patients had satisfactory total self-care practice while 88% of them had unsatisfactory total self-care practice.

Table (5): indicates that 80% of the studied patients were satisfied concerning tangible and 86% of them were satisfied with efficiency. Moreover 86% of the studied patients were satisfied with total satisfaction**.** 86% of studied patients were satisfied. While 14% of them were unsatisfied.

Table (6): illustrates that only, there was a highly statistically significant relation between patients' total knowledge and their characteristics regarding "Having balloon mitral valvuloplasty before" ($p<0.01$).

Table (7): shows the presence of highly statistically significant relation between patients' total practice and their socio-demographic characteristics regarding their Education Level ($p =0.0026$), Marital Status ($p =0.0081$) and the presence of statistically significant relation between patients' total self-care practice and their socio-demographic characteristics regarding Place of residence ($p =0.0319$) and Having balloon mitral valvuloplasty before ($p =0.0421$).

Table (8): illustrates that there was no statistically significant relation between patients' total satisfaction and their socio-demographic characteristics.

Table (9): illustrates that there was a strong positive correlation between total practice & total knowledge ($r=0.602$). Meanwhile, there was a weak positive correlation between total Satisfaction & total knowledge ($r=0.367$).

Table (1): Percentage distribution of the studied patients according to their socio-demographic characteristics (N=50).

Item	Frequency (50)	Percent %
Age		
up to 30 years	12	24.0%
31 to 40	21	42.0%
41 to 50	11	22.0%
more than 50	6	12.0%
Mean ± SD	38.14 ± 9.85	
Minimum & Maximum	19.00 & 59.00	
Education Level		
Illiterate	6	12.0%
Primary	5	10.0%
Intermediate	27	54.0%
University	12	24.0%
Job		
Not working	32	64.0%
Working	18	36.0%
Family Income		
Insufficient	24	48.0%
Sufficient	26	52.0%

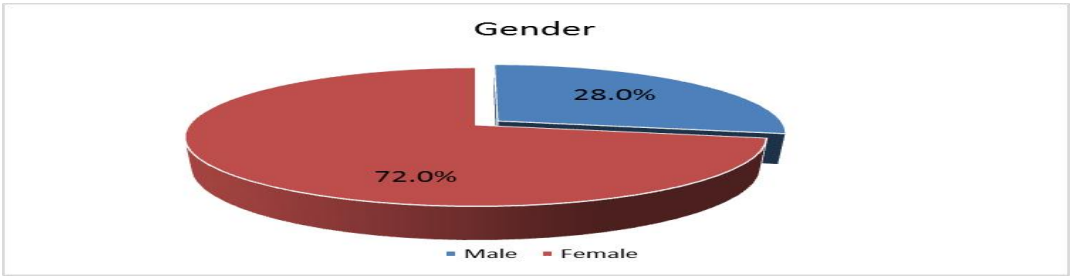

Figure (1): Percentage distribution of the studied patients according to their gender (N=50).

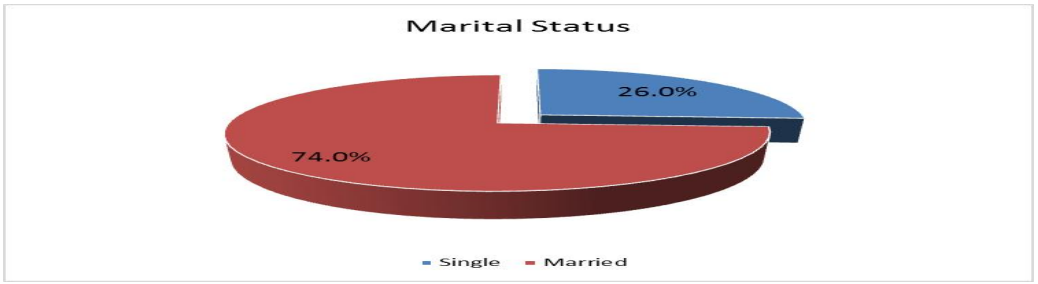

Figure (2): Percentage distribution of the studied patients according to their marital status (N=50).

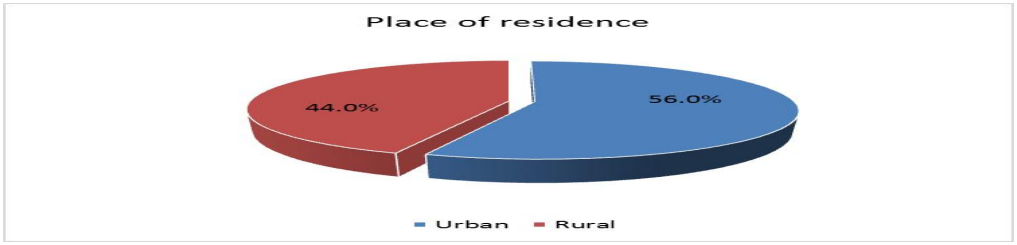

Figure (3): Percentage distribution of the studied patients according to their residence (N=50).

Table (2a): Percentage distribution of the studied patients according to their medical data (N=50).

Item	Frequency (50)	Percent %
How many years have you complained of mitral stenosis?		
less than one year	6	12.0%
1 to 5	19	38.0%
6 to 10	10	20.0%
11 to 15	13	26.0%
more than 15	2	4.0%
Mean ± SD	7.50 ± 6.18	
Minimum & Maximum	0.00 & 30.00	
Did you get rheumatic fever when you were young?		
No	11	22.0%
Yes	39	78.0%
How was the disease discovered?		
Symptoms	44	88.0%
Accidentally	6	12.0%
What are your symptoms?		
Palpitation	44	88.0%
Shortening of breath	40	80.0%
Fatigue	42	84.0%
Orthopnea	38	76.0%
Chest pain	40	80.0%
Lower limb edema	44	88.0%
Frequent cough	43	86.0%

Table (2b): Percentage distribution of the studied patients according to their medical data (N=50).

Item	Frequency (50)	Percent %
Have you taken medications to relieve these symptoms?		
No	18	36.0%
Yes	32	64.0%
Have you ever had balloon mitral valvuloplasty before?		
No	42	84.0%
Yes	8	16.0%
If yes: how many years ago?		
two	2	4.0%
Six	2	4.0%
Eight	1	2.0%
Ten	1	2.0%
Twelve	1	2.0%
twenty-four	1	2.0%
Have you had any heart surgery before that?		
No	50	100.0%
Yes	0	0.0%
Have you had any previous surgery for other diseases?		
No	36	72.0%
Yes	14	28.0%
Has any family member ever had a heart valve disease?		
No	44	88.0%
Yes	6	12.0%

Table (3): Percentage distribution of total knowledge of patients undergoing PBMV (N=50).

Subscale	Unsatisfactory		Satisfactory		Mean	SD
	Frequency	Percent	Frequency	Percent		
Mitral valve Anatomy/ physiology	46	92.0%	4	8.0%	**32.00**	**19.00**
Mitral stenosis etiology/ symptoms/ treatment	44	88.0%	6	12.0%	**33.43**	**17.46**
Preparation	37	74.0%	13	26.0%	**39.75**	**14.66**
Procedure	50	100.0%	0	0.0%	**31.71**	**11.19**
Post-intervention /Discharge	50	100.0%	0	0.0%	**33.82**	**4.12**
Total Balloon valvuloplasty	50	100.0%	0	0.0%	**34.36**	**6.61**
Homecare/Follow-up (Wound care).	50	100.0%	0	0.0%	**34.63**	**5.53**
Total Knowledge Score	50	100.0%	0	0.0%	**34.12**	**7.04**

Table (4a): Percentage distribution of total level of self-care practice of patients undergoing PBMV before the procedure (N=50).

Item	Unsatisfactory		Satisfactory		Mean	SD
	Frequency	Percent	Frequency	Percent		
Day before the procedure	29	58.0%	21	42.0%	**41.33**	**24.80**
Morning of the procedure	44	88.0%	6	12.0%	**22.67**	**22.78**
Total Practices before the procedure	44	88.0%	6	12.0%	**32.00**	**17.77**

Table (4b): Percentage distribution of total level of self-care practice of patients undergoing PBMV after the procedure (N=50).

Item	Unsatisfactory		Satisfactory		Mean	SD
	Frequency	Percent	Frequency	Percent		
Post-operative positions	37	74.0%	13	26.0%	**47.00**	**38.35**
Oral fluid and food intake	35	70.0%	15	30.0%	**33.33**	**26.08**
Pain control measures	36	72.0%	14	28.0%	**34.00**	**24.73**
Ambulation and activity	42	84.0%	8	16.0%	**38.33**	**15.15**
Deep breathing and coughing exercises	44	88.0%	6	12.0%	**30.00**	**22.02**
Extremity exercises	44	88.0%	6	12.0%	**26.00**	**35.34**
Wound care	32	64.0%	18	36.0%	**44.00**	**29.69**
Total practices after the procedure	44	88.0%	6	12.0%	**36.09**	**16.39**

Figure (4): Percentage distribution of the studied patients according to their total self-care practice level (N=50).

Table (5): Percentage distribution of total Satisfaction level regarding patient undergoing PBMV (N=50).

Item	Unsatisfied		Satisfied		Mean	SD
	Frequency	Percent	Frequency	Percent		
Empathy	25	50.0%	25	50.0%	**66.93**	**15.25**
Tangible	10	20.0%	40	80.0%	**79.00**	**7.89**
Safety	33	66.0%	17	34.0%	**65.75**	**7.40**
Efficiency	7	14.0%	43	86.0%	**77.17**	**7.77**
Improvements of care service	22	44.0%	28	56.0%	**71.25**	**10.37**
Total Satisfaction score	7	14.0%	43	86.0%	**71.59**	**7.94**

Table (6): Relations between patients' total knowledge and their sociodemographic characteristics (N=50).

Sociodemographic characteristics	Patients' total knowledge			
	Mean	SD	t	p-value
Age				
up to 30 years	33.21	7.04		
31 to 40	33.92	6.83	0.28	0.8378
41 to 50	35.81	8.68		
more than 50	33.60	5.44		
Gender				
Male	32.97	5.03	-0.72	0.4747
Female	34.58	7.69		
Education Level				
Illiterate	35.40	7.13		
Primary	35.08	7.93	1.07	0.3704
Intermediate	32.54	5.48		
University	36.65	9.42		
Marital Status				
Single	33.97	6.62	-0.09	0.9267
Married	34.18	7.26		
Job				
Not working	33.90	7.18	-0.30	0.7622
Working	34.53	6.95		
Place of residence				
Urban	35.11	7.75	1.12	0.2683
Rural	32.87	5.93		
Having balloon mitral valvuloplasty before				
No	34.69	7.55	2.95	0.0051**
Yes	31.18	0.69		

(**) Highly statistically significant at p<0.01

Table (7): Relations between patients' total self-care practice and their sociodemographic characteristics (N=50).

	Total self-care practice			
sociodemographic characteristics	**Mean**	**SD**	**t**	**p-value**
Age				
up to 30 years	29.61	5.97		
31 to 40	35.80	16.18	1.92	0.1391
41 to 50	42.94	19.03		
more than 50	30.45	5.07		
Gender				
Male	33.99	12.01	-0.37	0.7096
Female	35.73	15.72		
Education Level				
Illiterate	27.00	5.05		
Primary	30.79	9.89	5.50	0.0026**
Intermediate	47.13	18.66		
University	27.00	5.05		
Marital Status				
Single	28.65	6.66	-2.77	0.0081**
Married	37.56	16.04		
Job				
Not working	33.95	13.59	-0.83	0.4115
Working	37.54	16.59		
Place of residence				
Urban	39.16	18.22	2.21	0.0319*
Rural	30.26	5.42		
Having balloon mitral valvuloplasty before				
No	36.13	15.85	2.09	0.0421*
Yes	30.60	2.88		

(**) Highly statistically significant at p<0.01 (*) Statistically significant at p<0.05

Table (8): Relations between patients' total satisfaction and their sociodemographic characteristics (N=50).

	Total satisfaction			
Sociodemographic characteristics	**Mean**	**SD**	**t**	**p-value**
Age				
up to 30 years	71.03	7.38		
31 to 40	69.57	10.55	**1.28**	**0.2909**
41 to 50	74.93	1.13		
more than 50	73.70	1.53		
Gender				
Male	72.04	9.66	**0.25**	**0.8062**
Female	71.42	7.31		
Education Level				
Illiterate	72.04	9.66		
Primary	71.42	7.31	**0.95**	**0.4257**
Intermediate	72.04	9.66		
University	71.42	7.31		
Marital Status				
Single	73.68	1.84	**1.78**	**0.0816**
Married	70.86	9.09		
Job				
Not working	70.97	7.54	**-0.74**	**0.4655**
Working	72.70	8.71		
Place of residence				
Urban	70.84	10.29	**-0.75**	**0.4564**
Rural	72.55	3.03		
Having balloon mitral valvuloplasty before				
No	71.80	8.56	**0.42**	**0.6779**
Yes	70.51	3.28		

Table (9): Correlation between patients' total scores of different study variables.

Variables	Pearson correlation coefficient		
	Total knowledge	Total practice	Total Satisfaction
1. Total knowledge	-	-	-
2. total practice	0.602 **	-	-
3. total Satisfaction	0.367 **	0.111	-

(**) Highly statistically significant at p<0.0

Discussion:

Percutaneous balloon mitral valvuloplasty is an alternative to valve replacement in patients with critical stenosis although the treatment of choice for valvular heart disease is surgery, This technique enlarges the orifice of a heart valve that has been narrowed by a congenital defect, calcification, rheumatic fever, or aging ***(Allen et al., 2013).***

The current study was carried out aiming to assess the awareness and satisfaction for patients undergoing percutaneous balloon mitral valvuloplasty and suggesting self-care guide. Discussion of the findings of this study will cover the main parts of the results.

Concerning the **socio-demographic characteristics** of the studied patients', the result of the present study indicated the majority of patients in the study sample were female & married. This result in the same line with results of a study conducted by ***Ali et al., (2020)*** who conducted a study in Egypt titled "Suggested Discharge Guidelines For Patients Undergoing Percutaneous Balloon Mitral Valvotomy" which indicated that the gender and marital status of the majority of the study sample was married and females.

Also, this result comes in agreement with ***Claudia (2014)*** titled "mitral stenosis" who found that, female patients were most of the study subjects. In contrary, this result wasn't consistent with ***Lattuca et al., (2018)*** who conducted a study in France titled "Impact of video on the understanding and satisfaction of patients receiving informed consent before elective inpatient coronary angiography: a randomized trial" which found that majority of patients in the study sample were male**.**

In relation to job, the results of the current study indicated that near two thirds of patients included in the study sample were not working. This result is consistent with ***Ali et al., (2020)*** who found that more than half of the patients were not working. Conversely, this finding contradicted by ***Krishna et al., (2012)*** who conducted a study in India titled "Immediate and Long-term Results Following Balloon Mitral Valvotomy in Patients with Atrial Fibrillation" which found that the majority of the study subjects were working.

This result could be explained in the view of that majority of study sample their age exceeding 30 years old so majority of them were married and the higher percent of females were not working in our society because of traditions and this start to be changed lately but will take time to be equal with male.

Concerning the **medical data,** the current study showed that the most reported symptoms were Palpitation & Lower limb edema. This was supported by ***Khashaba, et al. (2009)*** in their study titled "Pooled analysis of percutaneous mitral valvuloplasty in Egypt" who reported that the common symptoms of the study subjects were palpitation, shortening of breath and fatigue and two thirds of them had orthopnea and cough.

This findings are expected as many other studies in the literature reported that Palpitation & Lower limb edema for example ***Ali et al., (2020)*** who found that the most reported symptoms were Palpitation, shortness of breath, fatigue & Lower limb edema.

Concerning patients' medical history of having balloon mitral valvuloplasty before, current study findings illustrated that the majority of studied patients didn't have balloon mitral valvuloplasty before. This mean that

percentage of failure or the need for repeated percutaneous balloon mitral valvuloplasty is low. Agreeing with these result a study conducted by ***Tomai et al., (2014)*** titled "Twenty year follow-up after successful percutaneous balloon mitral valvuloplasty in a large contemporary series of patients with mitral stenosis" which concluded that Up to 20 years after successful percutaneous balloon mitral valvuloplasty, a sizeable proportion of patients still exhibit a good clinical result.

The current study assessed the patients' knowledge regarding percutaneous balloon mitral valvuloplasty. The finding indicates that in general there was unsatisfactory level of knowledge regarding the anatomy, preparation and procedure of percutaneous balloon mitral valvuloplasty among the studied patients. The highest patients' Knowledge was their knowledge regarding "Preparation". While the lowest patients' knowledge was their knowledge regarding "procedure".

These results are consistent with ***Ali et al., (2020)*** who showed that the majority of studied population had medically insufficient knowledge about treatment, prescribed diet and life style changes for patients of mitral stenosis, did not have enough knowledge about signs and symptoms, advantages of the procedure or prescribed drugs.

In contrary, These findings were not supported by ***Goff et al., (2014)*** who stated in a study titled "How cardiologists present the benefits of percutaneous coronary interventions to patients with stable angina: a qualitative analysis" that, nearly two thirds of the patients had sufficient pre-procedure knowledge in the field of dietary guidance, prevention of infection, and treatment methods, while the knowledge regarding percutaneous balloon mitral valvuplasty "its results, and probable complications" were insufficient in more than half of the studied patients.

The results of the current study revealed that in general the patients in the study sample have low level of satisfactory practice. These results are consistent with ***Anjali et al., (2020)*** who revealed in their study in India titled "Effectiveness of Adaptive Rehabilitation Package on Knowledge, Skill, Stress And Satisfaction Among Patients Undergoing Cardiac Surgery" that patients had low skill levels.

This finding follows the previous finding of having patients in the study sample low knowledge level as knowledge and practice interdependent on each other. There is no practice without knowledge and vice versa.

In this regard the findings of the present study illustrated that the highest self-care practice was their performance regarding "Post-operative positions" while the lowest self-care practice was their performance regarding "Morning of the procedure". This finding agreed with ***Allen et al., (2013).*** Who conducted a study in Germany which revealed that the lowest self-care practice was the patients' practice regarding "morning of the procedure".

The current study findings revealed that the majority of study participants have unsatisfactory self-care practice level regarding ambulation and activity following the procedure of percutaneous balloon mitral valvuloplasty. This result was consistent with this of ***Ali et al., (2020)*** whose study revealed that more than half of the studied patients expressed resuming activity and maintaining hygiene as a physical need.

This finding was not supported by ***Van Bemmel et al., (2010)*** who found in a study titled "Impact of valvular heart disease on activities of daily living of nonagenarians" that the majority of patients did not experience limitation of their daily activities, more than half of them expressed that need to relief fatigue did not prevent daily activities before the procedure, and that full recovery of daily physical activity needed less than two weeks in most patients undergoing percutaneous balloon mitral valvuloplasty.

In general, the current study findings showed that patients were satisfied and indicated that the highest patients' satisfaction toward care dimensions was upon "Tangible" while the lowest patients' Satisfaction toward

care dimensions was upon "safety". In the same regard, a study conducted with ***Anjali et al., (2020)*** who revealed that the study participants had high satisfaction level. In the same line, a study conducted by ***Tranmer & Parry (2004)*** titled **"**Enhancing postoperative recovery of cardiac surgery patients: a randomized clinical trial of an advanced practice nursing intervention" indicated that Patients were generally satisfied with the care received in hospital and felt prepared for stay at home**.**

In general, regarding correlations between different study variables: current study findings illustrate the presence of statistically significant positive correlations between total self –care practice & total knowledge. This means that with increased knowledge, practice increase and vice versa. This result agreed with the results of a study conducted by ***Anjali et al., (2020)*** who revealed that there was a Positive moderate correlation between patients' knowledge and skills. Agreeing with this, ***Williamson, (2008)*** found that there was a correlation between patients knowledge and their self-care practices following coronary artery bypass graft surgery.

In the other hand, the current study results indicate the presence of statistically significant positive correlation between patients' total satisfaction and total knowledge. This result was consistent with the results of a study conducted by ***Anjali et al., (2020)*** who indicated that there was a positive moderate correlation between patients' knowledge and satisfaction.

Conversely, there was no correlation between patients' satisfaction and their practice. This result inconsistent with those of a study conducted by ***Anjali et al., (2020)*** who revealed that there was a Positive fair correlation between patients' satisfaction and skills.

Concerning relations between different study variables and patients characteristics; current study findings illustrated that there was statistically significant relation between patients' total knowledge and their characteristics regarding "Having balloon mitral valvuloplasty before". This result is supported by ***Lattuca et al., (2018)*** who identified six independent predictive factors of improved knowledge: younger age, a higher level of education, previous follow-up by a cardiologist, a history of coronary angiography, prior information about coronary angiography and the use of the educational video. In the same line, ***Abdelhamid et al., (2019)*** illustrated in their study titled "Effect of Self-Management Support Program on Improving Knowledge and Practices of Patients with Diabetic Foot" that age and female gender are negative predictors of patients' knowledge.

Regarding patients' total practice, current study findings results indicate the presence of statistically significant correlations between patients' total practice and their personal characteristics regarding their education level, marital status, place of residence and having balloon mitral valvuloplasty before. In the same vein, ***Abdelhamid et al., (2019)*** found in their study that education was positive predictor of patients' practice.

Conversely, concerning patients' total satisfaction, current study findings illustrate that there was no statistically significant correlation between patients' total satisfaction and their characteristics. This finding opposed by results of a study titled "Health Care Providers' Awareness Regarding Quality Management System and Its Relation to Patient Satisfaction" conducted by ***Adam & Abd Rabou, (2018)*** in Egypt which revealed that the presence of statistically significant relations between patients' satisfaction and their characteristics regarding their age and income.

Conclusion:

This study concluded that: All of the studied patients had unsatisfactory level of knowledge regarding percutaneous balloon mitral valvuloplasty and the majority of the studied patients had unsatisfactory level of self-care practices, in spite of the majority of the studied patients were satisfied with health care service provided. Moreover, there was a strong positive correlation between total patients' level of knowledge and the total self-care practices.

Meanwhile there was a positive correlation between patients' total level of satisfaction and the total level of knowledge.

Recommendations:

Based on the current study findings the following recommendations are proposed:

- Provide an educational guidelines regarding knowledge and self-care practices for patients undergoing percutaneous balloon mitral valvuloplasty (PBMV).
- Patients are in need to a simplified illustrated and comprehensive Arabic booklet including information about percutaneous balloon mitral valvuloplasty (PBMV) and self-care management.
- Establish educational programs for nurses and health care professionals to acknowledge the importance of patient education and training prior to the procedure.
- Continuous assessment of the needs of the patients undergoing percutaneous balloon mitral valvuloplasty (PBMV) is highly recommended.
- Replication of the study in different settings in Egypt on larger probability samples to help in generalizability of findings.
- Further research studies are needed to focus on the assessment of the quality of life for such group of patients.

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