Prevalence of Clinical Manifestations among Post-Operative Patients of Cardiac Valve Replacement and Their Compliance with Required Follow-Up Visits, Diagnostic & Therapeutic Regimen

Shelly[1], Devarakonda Koteswaramma.[2], Albert Blesson V[3]

[1,3]AIIMS Bathinda

[2]AIIMS Patna

DOI: https://doi.org/10.51244/IJRSI.2026.1310000058

Received: 07 October 2026; Accepted: 12 October 2026; Published: 31 October 2026

ABSTRACT

Introduction: Adherence to recommended diagnostic & therapeutic regimen by patients with cardiac valve repair/replacement plays crucial role in declining the rate of associated complications.

Aims & Objectives: A cross-sectional study was aimed to evaluate patients for prevailing signs & symptoms and their level of adherence towards diagnostic & therapeutic regimen.

Materials & Methods: Present study included 73 post-surgical adult patients with repair/ replacement of any of the four valves with either mechanical or bioprosthetic valve visiting out-patient department during their scheduled follow-up. Seven self-developed tools were utilized to collect information regarding demographic, clinical, surgical profile, existing clinical manifestations and adherence towards recommended medications, PT/INR testing & follow-up visits, diet, exercise/activity, personal & wound-care.

Results: About 47.9% participants had undergone mitral valve surgery followed by double valve replacement (34.2%) with mostly mechanical replacement (84.9%) followed by bioprosthetic (13.7%). About 8 participants were currently indulged into smoking/alcohol consumption. Blood thinning medications were prescribed to 94.5% patients. Mean PT & INR value was 22.7± 11.2 seconds & 2.4 ± 1.5 respectively and 76.7% patients underwent PT/INR testing monthly. 95.9% & 94.5% of patients adhered to recommended medication's dose & scheduled time respectively. Compliance rate improved from 87.7% to 94.5% for the second scheduled visit. Approximately 21.9% reported bleeding events. About 30.1% participants were consuming more than the recommended amount of green leafy vegetables & 30.1% and 38.4% were regularly consuming fatty foods and red meat respectively.

Conclusion: Present study recognized numerous ''clinical & instructional gaps'' in terms of non-compliance by few patients.

Key words: Adherence, Medicines, Follow-up, PT/INR testing, Heart valve surgery.

INTRODUCTION

Valvular heart diseases (VHDs) are characterized by defect in one of the four heart valves (aortic, tricuspid, mitral or pulmonary)[1]**.** Rheumatic heart disease (RHD) is the most common cause (affecting 41 million people)[2] along with other diseases.[3]

As per European society of cardiology, incidence and prevalence of RHD on 2019 were 1,52,700 & 2.3 million respectively. Worldwide prevalence of mitral regurgitation & aortic stenosis is approximately 24 & 9 million respectively and is in escalating trend, especially in developing countries. VHD prevalence in industrialized countries is 2.5% and percentage distribution of involved valves as mitral (54.4%), aortic

(17.8%), tricuspid (9.7%), and pulmonary (0.04%)[4]. Rheumatic aortic stenosis is more common in Asia with maximum prevalence rate of 4.54/1000 population in India followed by China (1.86) and Bangladesh (1.3).[2]

Outcome of these patients improves by successful valve repair or replacement procedures, which accounted for 29.6% of total cardiac surgeries in 2020. Estimated annual rate of valve replacement vary from 275,000 to 370,000 globally, out of which 55% are mechanical valve replacements (MVRs) and rest 45% are bioprosthetic[5]. Mechanical valves are made up of artificial material, highly durable but require lifelong anticoagulation therapy whereas bioprosthetic valves are made up of animal/human tissue, comparatively less durable and do not require blood thinning agents.

Valvular surgeries are known to be associated with numerous complications. Post-operative atrial fibrillation is a common morbid complication. Inappropriate titration of anticoagulants after MVRs may cause serious complication of valve thrombosis with various thrombo-embolic events and stroke[6,7]. Prosthetic Heart Valve (PHV) dysfunction may manifest as stenosis, regurgitation and stuck valve, prosthetic valve endocarditis[8].

Adherence to diagnostic & therapeutic regimens plays crucial role in declining morbidity and mortality by reducing valve related adverse events. Patients should get effective discharge instructions for transition of care from hospital to home[9]. Health care professionals are liable to provide patients with guidelines and information about self-care[10], scheduled follow up visits, need to undergo PT/INR testing on regular basis and to follow the prescribed medication and dietary advices.

MATERIALS AND METHODS

Aims & Objectives: A descriptive cross-sectional study was aimed to evaluate patients for existing signs and symptoms after cardiac valve replacement and to assess their level of adherence towards medication, diagnostic evaluation, follow-up visits, diet, exercise, personal & wound - care.

Study participants & Setting: Present study included post-surgical adult patients of cardiac valve repair/ replacement with either mechanical or bioprosthetic valve visiting CTVS OPD at a tertiary care hospital during their scheduled follow-up visits. Patients were excluded in case of pregnancy, inability to communicate in English/Hindi or absence of cognitive ability for self-care.

Sample-size: Purposive sampling technique was used to enrol 73 patients based on study by Xiaowu Wang et al[11] (2018), where 5.7% of patients adhered to at least one type of medical advice.

$$\mathbf{n= Z^2 p(1-p) /d^2}$$

p= Expected proportion (5.7%)

d= Absolute error or precision is kept as 5%

Z score at $p<0.05$, is 1.96 with 95% confidence interval

Therefore, sample size

$n= \{1.96\times1.96\times0.05(1-0.05)\}/ (0.05\times0.05)$

$=0.182/0.0025$

$= 73$

Ethical consideration: Study was approved by Institutional ethical committee. Participant information sheet in the local language (Hindi) was read out, explained and handed over to the eligible participants. Informed written consent was obtained. Confidentiality and anonymity of the subjects was ensured and maintained.

Data collection methods: Seven self-developed tools were translated into Hindi. Content validity of the tools was established by five subject experts. Reliability of the tools was established by administering tools to 10 patients with similar characteristics as of target population from the same setting before final data collection. Split half method was used to calculate reliability by computing Cronbach's alpha A dedicated room, conveniently accessible from CTVS OPD was used to collect data. Information was collected from patients and record sheets (discharge summary, OPD slips). Tool 1 was sociodemographic profile (11 items) – Cronbach's alpha=7.3. Tool 2 consisted of clinical profile (5 items) - Cronbach's alpha=7.1 & surgical profile (5 items) - Cronbach's alpha=7.7. Clinical manifestations were assessed by interview method, physical examination, records and reports. (23 items, Tool 3) - Cronbach's alpha=8.2. Tool 4 was medication adherence (7 items) - Cronbach's alpha=9.5 Tool 5 assessed PT/INR testing adherence (3 items) - Cronbach's alpha=9.5 & follow-up visits (3 items) - Cronbach's alpha=8.9. Tool 6 assessed diet (5 items) - Cronbach's alpha=8.1 & exercise regimen (6 items) adherence - Cronbach's alpha=8.4. Personal (3 items) - Cronbach's alpha=7.6 & wound-care (4 items) compliance was assessed by using Tool 7 - Cronbach's alpha=7.2.

Statistical Analyses: Data was coded and entered in excel sheet. IBM SPSS statistics version 29 software was used for descriptive statistical calculations.

RESULTS

Table 1 shows that mean age of participants was 41.0 ± 12.6 years, majority were males (53.4%), married (89%), resided in rural areas (78.1%), belonged to joint family (65.8%), had family income in range of Rs 9308- 27882/ month (45.2%) and reported good support system (68.5%).

Table 2 reveals that mean values of vital signs i.e. mean pulse rate (84.6±10.8 beats/min), respiratory rate (21.1±1.4 breaths/min), systolic BP (122.9 ± 13.6 mm of Hg), diastolic BP (78.0 ± 9.2 mm of Hg), SpO2 (98.40 ± 0.6%) at room air, temperature (98.0 ± 0.6 degrees Fahrenheit) lied in normal range. 62 patients underwent mechanical valve replacement and on auscultation, click sound was audible in all these patients.

Mechanical valve replacements require lifelong anticoagulants and the recommended therapeutic range for INR is 2.0 to 3.0. In present study, 69 patients were on blood thinning agents and their mean PT & INR value was 22.7± 11.2 seconds & 2.4 ± 1.5 respectively. However, frequency of PT/INR testing was delayed, with mean duration of 37.9 weeks (approximately 9 months), since the last test was taken.

Results reported that 8 participants were currently indulged into smoking or alcohol consumption, 8 patients were hypertensive and two patients were diabetic. Majority of participants have undergone mitral valve surgery (47.9%, n=35) followed by double valve replacement (34.2%, n=25) **(Figure 1)**. Type of valve replacement was mostly mechanical (84.9%, n=62), followed by bioprosthetic (13.7%, n=10) **(Figure 2)**. 9.6% participants had previous history of valvular surgery. All participants have undergone open heart surgery with a mean duration of 181.7 ± 84.4 months (approximately 15 years), since the patients have got operated.

The clinical manifestation's profile contained 23 items, out of which all were patient reported, except for atrial fibrillation, which was assessed by ECG. Symptoms like swelling of feet and legs, weight loss, abdominal swelling, tachypnea, vision problem, pale appearance of skin, cool & clammy skin, ecchymosis were first reported by the patients and then reassessed by the researchers. Data regarding a particular symptom is recorded only after getting the conformation from concerned physician. Current study revealed that even after surgery, patients continued having physical complaints **(Table 3 & Figure 3).** Most prevalent symptom was painful cramping (74%, n=54) followed by palpitations (50.7%, n=37). Approximately one fourth of the patients reported bleeding events (21.9%, n=16) **(Figure 4)**. One patient was diagnosed with atrial fibrillation as per ECG findings.

Table 4 represents that most of the participants were prescribed with anticoagulants (94.5%) followed by drugs influencing cardiac muscle contractility (31.5%). Most of the participants adhered to therapeutic regimen as per the recommended dose (95.9%, n=70) and as per the scheduled time (94.5%, n=69) **(Figure 5).** Few participants (16.4%,n=12) have undergone dental, dermatological or minor surgical procedures after surgery, out of which (n=10) had taken antibiotics before undergoing such procedures and (n=8) had completed

antibiotic course for recommended duration also. Among female participants under reproductive age (35.7%), majority (24.7%) had continued blood thinning agents as recommended during mensuration also, whereas 9.6% females lowered the dose without consultation. One participant stopped taking medicine due to heavy flow and increased duration of bleeding days. Only few participants (6.8%) had undergone major surgeries after valvular replacement surgery, out of which 4.1% had restarted warfarin within 12-24 hours after surgery.

Table 5 represents that mean time taken by patients to travel to heart clinic was 174.4 ± 114.3 minutes (approximately 3 hours) and most of the participants (83.6%) used public transportation. 87.7% (n=64) of the participants complied to their 1st scheduled follow up visit (15 days after discharge). Compliance rate improved from 89% (n=65) to 94.5% (n= 69) for the second visit (1 month after 1st visit), (**Figure 5)**. Approximately, three fourth of the participants (76.7%, n=56), (**Figure 5)** followed the recommended frequency of PT/INR testing every month. Half of the participants who did not come for follow up reported lack of information and rest reported that, they did not feel the need for physical check-up. A total of 12 participants underwent minor surgical procedures after valvular surgery and six (50%) participants underwent PT/INR investigations before these procedures.

Table 6 shows that majority of patients were consuming less than 1 medium bowl of green leafy vegetables/ week (69.9%), but 30.1% of the participants were consuming inconsistent amount. This carries a particular significance since, these patients were on warfarin therapy or blood thinning medications and green vegetables are excellent source of vitamin K, which can neutralize therapeutic effect of warfarin and lead to decreased value of PT/INR, which may further lead to thrombo-embolic events like stroke, stuck valve etc. More than one fourth of the participants were regularly consuming fatty foods (30.1%) and red meat (38.4%). These practices might pose risk for development of cardiovascular complications. A total of 89% and 78.1% were able to perform simple household activities and exercises respectively. About 82.2% of participants started morning walk within one month after their discharge.

Table 7 represents frequency distribution of personal & wound care practices of patients. Data revealed that 12.3% of the participants used to measure their weight on regular basis and the mean variation in the weight was 3.3 $\pm$ 1.9 kg. Majority of patients cleaned surgical wound at home (89%) and the most common agent utilized for cleaning was anti-septic solution (52.1%). Most of the patients used to perform wound cleaning once/week (69.9%).

DISCUSSION

In present study, more than half of the participants were males ((53.4%), which is in agreement with study done by Masoud Khodaveisi et al (2022)[12]**,** where, more than half of patients with valve replacement surgery were males (53.3%) and contradictory to study done by Linda J Thomson Mangnall et al (2016)[13], where more than half of enrolled participants (54%) were females. Present study revealed that maximum number of participants were married (89%) and study done by Samar Mohamed Etiwa et al (2022)[14] showed similar results with most of the enrolled cardiac replacement patients being married (72.9%).

Results of the present study demonstrated that majority of participants maintained their vital signs within recommended therapeutic values. These findings were in partial agreement with the study done by Andrew McLachlan et al (2015)[15], which revealed that mean systolic BP was 130 mm of Hg which is in line with present study whereas only 29% participants maintained the target value of INR of 2.5 and 3 for mechanical aortic valve and mitral valve replacement respectively (more than 60% over the last five last investigations), which is contrary to the current study's findings.

Current study's results reported that 8 (11 %) participants were currently indulged into smoking or alcohol consumption. These results were in line with the findings of study done by Andrew McLachlan et al (2015)[15], which represented that 12 % of patients continued smoking even after undergoing cardiac valve replacement surgery and 37% were ex-smokers. Results of present study were in contrast with the study done by Masoud Khodaveisi (2023)[12], which represented that 37.7% of participants were substance abusers and 20% of the patients were diabetic in comparison to 2.7% in present study's population. Findings by Masoud Khodaveisi (2023)[12] represented that a total of 44.4% of the patients had either diabetes / hypertension or both.

Present study's findings illustrated that majority of participants have undergone mitral valve surgery (47.9%) followed by double valve replacement (34.2%). Type of valve replacement was mostly mechanical (84.9%). Few participants had previous history of valvular heart surgery (9.6%) and only one patient underwent valve repair. Results of present study were in agreement with the study by Linda J Thomson Mangnall et al[13], which concluded that most commonly performed procedure was isolated mitral valve replacement (56%) followed by multiple valve (26%) and aortic valve (18%) replacement. Present study results were not aligned to study done by Andrew McLachlan et al (2015)[15], which revealed aortic valve (74%) was the most common valve followed by mitral valve (49%) on which replacement / repair has been performed either as a single valve (isolated) or in combination with other valves and 22% patients have undergone double valve replacement /repair. Type of valve replacement was mostly mechanical (73%) in case of aortic and mitral valve diseases. Out of 57 participants who had undergone surgery for tricuspid valve, the most common adopted surgical option was repair (n=51) rather than replacement. A total of 19% patients had previous history of valvular heart surgery in comparison to 9.6% in the present study.

Data of current study revealed that even after surgery, patients continued having symptoms and 21.9% patients reported bleeding events. Robert J. M. Klautz et al (2021)[16] explored antithrombotic therapy and bleeding events after aortic valve replacement in 1115 patients with a novel bio-prosthesis. In 86 patients, a total of 99 bleeding episodes happened and most commonly these events occurred after 30 days of surgery. Among 51 late major bleeds, only 5 patients were taking anticoagulant/antiplatelet medication for valve replacement, since most replacements were bioprosthetic, whereas remaining patients were taking blood thinning medications for reasons other than valve replacement. In present study 50.7% patients complained of having palpitations, but only one patient was diagnosed with atrial fibrillation, whereas Andrew McLachlan (2015), found 33% of the post cardiac valve replacement patients with atrial fibrillation.

Most of the patients were prescribed with blood thinning medications (94.5%) in present study. This finding was contrary to the study results by Andrew McLachlan (2015)[15], which showed that only 61% of the patients were on warfarin therapy after cardiac valve replacement surgery. Higher percentage in the current study can be attributed to the mechanical valve replacement as the most common type of valve utilized in present study contrary to the greater number of repairs and use of bioprosthetic valves in the above-mentioned study.

Present study results illustrated that most of the participants adhered to recommended dose (95.9%) and as per the scheduled time (94.5%). These results were contradictory to study done by Linda J Thomson Mangnall (2016)[13] which revealed that, approximately one-in-eight (n=17, 13.38%) reported self-cessation of warfarin. Researchers of this study concluded that younger age had a significant association with warfarin self-cessation (p=0.008). Participants who had ceased taking warfarin altogether had a mean age of 23.35 years, approximately ten years younger, than those who remained on warfarin (mean 32.45 years). Other identified factors for self-cessation were aspects of warfarin ingestion (taking, forgetting, bothered by, interfering with life, knowledge, fear). Female gender, not understanding the need of taking anticoagulants and time to travel to heart clinic > 1hour increased the likelihood of self -cessation of blood thinning agents up-to odds ratio of 2.915, 9.975, 5.808 respectively.

Current study results revealed that few participants (16.4%) have undergone dental, dermatological or minor surgical procedures after heart surgery. Data from study done by Andrew McLachlan (2016)[15] represented that 16% of patients required an urgent dental referral for a dental emergency during early or late postoperative period after valvular replacement surgery.

Most of the patients used public transportation (83.6%) to travel to heart clinic and mean time taken was approximately three hours. This finding is contradictory to study by Linda J Thomson Mangnall et al (2016)[13], which showed that only 22 % of the patients took >1 hour to reach to hospital. This difference could be because study by Linda J[13] was conducted in developed country in comparison to present study (developing country) and there is probability that study sample in the former study had accessibility to quicker modes of public transportation, comparatively greater number of personal vehicles and exposure to lesser crowd. Data from low and middle-income countries revealed that time required to have clinical consultation can consume an entire day, hence, lengthy travel times to and from clinic, financial constraints related to travel cost are identified barriers to follow up visits and regular PT/INR testing[17].

Current study data revealed compliance rate improved from 89% to 94.5% from 1st to 2nd scheduled visit. Study by Samar Mohamed Etiwa[14] showed that a total of 78.6% of the participants came for regular follow-up, which is in agreement with the present study.

Majority of patients were consuming less than 1 medium bowl of green leafy vegetables/ week (69.9%) as per the findings of current study. These results are in line with the adherence to the recommended dietary practices by enrolled subjects (68.6%) in the study done by Samar Mohamed Etiwa[14]. Adherence towards advised dietary practices is vital because therapeutic effect of anticoagulants can be interfered by consumed amount of green vegetables, which contain vitamin K in abundance. This poses a challenge to the treating physician to adequately titrate the drug- dose to keep PT/INR values in therapeutic range and deviations from these ranges may lead to thrombo-embolic events (stroke, stuck valve or life-threatening bleeding events etc).

CONCLUSION

Present study recognized numerous ‘‘instructional gaps’’ in terms of smoking/alcohol consumption among post-operative patients with VHDs, presence of various physical complaints, non-compliance of few patients towards advised medications, dietary regimen, frequency of PT/INR testing and follow up-visits. Some patients reported lack of information or understanding about need of PT/INR testing or follow up visits.

Implications for Nursing Practice

Cardiology nurses may act as a catalyst to educate patients regarding preventive strategies to mitigate risk of complications after surgical interventions of VHDs. Nurses may emphasize importance of compliance towards therapeutic and diagnostic recommendations by executing effective communication, discharge counselling, care-giver involvement. Contact opportunities like post-operative stay, follow up visits may be utilized to recognize knowledge gaps, alarming clinical manifestations and to intervene, support & refer accordingly. Ongoing research is required to recognize most effective educational strategies for nurses to deliver these services.

Limitations

This was a single centre cross-sectional study, that missed the information of compliance at different time points. Even though, most prevalent known cause of VHDs in developing countries is RHD, no information was collected regarding relationship of adherence with RHD background. Current study reflects findings of patients who were able to come to OPDs (setting for the study was CTVS OPD). However, there may be the possibility of losing data from patients, who visited emergency or triage area due to morbid complications and were actually non-adherent. Qualitative descriptions may be of interest to explore reasons for non-adherence.

REFERENCES

1. Gaede L, Blumenstein J, Liebetrau C, Dörr O, Kim WK, Nef H, Husser O, Gülker J, Elsässer A, Hamm CW, Achenbach S. Transvascular transcatheter aortic valve implantation in 2017. Clinical Research in Cardiology. 2020 Mar;109(3):303-14.
2. Aluru JS, Barsouk A, Saginala K, Rawla P, Barsouk A. Valvular heart disease epidemiology. Medical sciences. 2022 Jun 15;10(2):32.
3. Boudoulas H, Vavuranakis M, Wooley CF. Valvular heart disease: the influence of changing etiology on nosology. The Journal of heart valve disease. 1994 Sep;3(5):516-26.
4. Saksena D, Mishra YK, Muralidharan S, Kanhere V, Srivastava P, Srivastava CP, VHD India consensus committee. Follow-up and management of valvular heart disease patients with prosthetic valve: a clinical practice guideline for Indian scenario. Indian Journal of Thoracic and Cardiovascular Surgery. 2019 Jan 10;35(Suppl 1):3-44.
5. Manji RA, Menkis AH, Ekser B, Cooper DK. The future of bioprosthetic heart valves. Indian Journal of Medical Research. 2012 Feb 1;135(2):150-1.
6. Roudaut R, Serri K, Lafitte S. Thrombosis of prosthetic heart valves: diagnosis and therapeutic considerations. Heart. 2007 Jan 1;93(1):137-42.

7. Head SJ, Çelik M, Kappetein AP. Mechanical versus bioprosthetic aortic valve replacement. European heart journal. 2017 Jul 21;38(28):2183-91.
8. Brandt RR, Pibarot P. Prosthetic heart valves: Part 4–Complications and dysfunction, pregnancy. EJ Cardiol Pract. 2021;20(5).
9. Kripalani S, Jackson AT, Schnipper JL, Coleman EA. Promoting effective transitions of care at hospital discharge: a review of key issues for hospitalists. Journal of hospital medicine: an official publication of the Society of Hospital Medicine. 2007 Sep;2(5):314-23.
10. Riegel B, Moser DK, Buck HG, Dickson VV, Dunbar SB, Lee CS, Lennie TA, Lindenfeld J, Mitchell JE, Treat-Jacobson DJ, Webber DE. Self-care for the prevention and management of cardiovascular disease and stroke: A scientific statement for healthcare professionals from the American Heart Association. Journal of the American Heart Association. 2017 Aug 31;6(9):e006997.
11. Wang X, Peng L, Ma J, Zhang L, Liu J. Warfarin-induced calcification: potential prevention and treatment strategies. Reviews in Cardiovascular Medicine. 2022 Sep 16;23(9):322.
12. Khodaveisi M, Fallah SV, Amini R, Tapak L. Effect of education based on the health belief model on treatment adherence in patients with heart valve replacement surgery. Journal of Education and Community Health. 2023 Jan 1;10(1):35-42.
13. Mangnall LJ, Sibbritt DW, Al-Sheyab N, Gallagher RD. Predictors of warfarin non-adherence in younger adults after valve replacement surgery in the South Pacific. Heart Asia. 2016 Jul 1;8(2):18-23.
14. Mohamed Etiwa S, Mohamed Safwat A, Mohamed Khorais A. Factors affecting adherence to therapeutic regimens among patients with cardiac valve replacement. Egyptian Journal of Health Care. 2022 Mar 1;13(1):236-46.
15. McLachlan A, Sutton T, Ding P, Kerr A. A nurse practitioner clinic: a novel approach to supporting patients following heart valve surgery. Heart, Lung and Circulation. 2015 Nov 1;24(11):1126-33.
16. Klautz RJ, Dagenais F, Reardon MJ, Lange R, Moront MG, Labrousse L, Weissman NJ, Rao V, Patel HJ, Liu F, Sabik III JF. Surgical aortic valve replacement with a stented pericardial bioprosthesis: 5-year outcomes. European Journal of Cardio-Thoracic Surgery. 2022 Sep 1;62(3):ezac374.
17. Remesh AM, Barathi A, Ravichandran A, Thulasingam M, Munusamy H. Out-of-pocket expenditure and challenges faced by patients undergoing heart valve replacement in follow-up care at a tertiary care center in South India: a mixed methods study. Cureus. 2024 Aug 4;16(8).

Table 1: Sociodemographic profile of the patients who had undergone cardiac valve surgery. (n=73)

Sr. no.	**Sociodemographic variables**		**Mean ± SD**
1.	**Age (years)**		41± 12.6
			Frequency(percentage)
2.	**Gender**	Male	39 (53.4)
		Female	34 (46.6)
3.	**Marital status**	Married	65 (89.0)
		Unmarried	8 (11.0)
4.	**Educational status**	Illiterate	10 (13.7)
		Primary	20 (27.4)
		Secondary	26 (35.6)
		Graduate	12 (16.4)
		Postgraduate	5 (6.8)
5.	**Occupation of the participants**	Business/self-employed	4 (5.5)
		Government employee	3 (4.1)
		Private sector	9 (12.3)

		Laborer	11 (15.1)
		Student	6 (8.2)
		Retired	1 (1.4)
		Others	39 (53.4)
6.	**Residence**	Rural	57 (78.1)
		Urban	13(17.8)
		Semi-urban	3 (4.1)
7.	**Religion**	Hinduism	70 (95.9)
		Islam	3 (4.1)
8.	**Family type**	Joint	48 (65.8)
		Nuclear	25 (34.2)
9.	**Family income (As per kuppuswamy scale)**	<9307	2 (2.7)
		9308 – 27882	33(45.2)
		27883 - 46474	17 (23.3)
		46475 - 69534	8 (11.0)
		92951 – 185894	6 (8.2)
		>185895	7 (9.6)
10.	**Number of OPD visit at time of enrolment**	1st to 3rd	18 (24.6)
		4th to 6th	26(35.7)
		7th to 9th	12 (16.4)
		10th or more	17 (23.2)
11.	**Support system**	Good	50 (68.5)
		Moderate	21 (28.8)
		Poor	2(2.7)
(Good- Patients family and friends are always available for patient care) (Moderate-Patients family and friends are not always available for patient care) (Poor- Patients family and friends are rarely cooperative)			

Table 2: Clinical & Surgical profile of the patients who had undergone cardiac valve surgery. (n=73)

Sr. No.	Clinical/ Surgical Profile		Frequency (percentage)	Mean± SD	Skewness	Median
Clinical variables						
1	**Vital signs**	Pulse rate		84.6±10.8	0.267	
		Respiratory rate		21.1±1.4	-0.689	
		Systolic BP		122.9±13.7	-0.183	
		Diastolic BP		78.0±9.2	-0.121	
		SpO2		98.4±0.6	0.223	
		Temperature		98.0±0.6	-0.341	

		Click sound during auscultation	62(84.9)			
2	**Coagulation profile**	PT value (in-seconds)		22.7 ±11.2	1.150	19.00
		INR		2.4±1.5	2.266	2.03
		Duration(in-weeks) since last test		37.9±87.4	7.130	30.00
				If yes, duration (in months) since consumption started		
3.	**Smoking/ alcohol consumption**		8(11)	10.5 ±5.8	0.462	
				If yes, duration (in months) since the onset		
4.	**History of Hypertension**		8(11)	69 ± 29.2	1.098	
5.	**History of diabetes**		2(2.7)	30.8 ± 4.4	0.26	
	Surgical variables					
6.	**Operated valve**	Mitral valve	35(47.9)			
		Pulmonary valve	2(2.8)			
		Aortic valve	11(15.1)			
		Double valve	25(34.2)			
7.	**Type of valve replacement**	Mechanical valve	62(84.9)			
		Bioprosthetic valve	10(13.7)			
		Valve repair	1(1.4)			
8.	**Previous valvular heart surgery**	Yes	7(9.6)			
		No	66(90.4)			
9.	**Type of surgery**	Open surgery	73(100)			
		Closed surgery	0			
10.	**Duration (in months) since surgery**			181.7 ± 84.4	0.4	

Table 3: Frequency distribution of the prevailing signs & symptoms among patients who had undergone cardiac valve surgery. n=73

Sr.No	Prevailing signs and symptoms	Frequency (percentage)			If yes, duration(days) Mean ± SD	skewness	Median
1.	**Fever***	13(17.8)			6.54 ± 4.9	1.2	5
2.	**Swelling of feet / legs ***	13(17.8)			83.85±176.8	2.4	15
3.	**Weight loss ***	13(17.8)			187.31±228.6	1.7	90
4.	**Joint and muscle pain***	29(39.7)			143.33 ± 154.1	1.2	90
5.	**Abdominal swelling***	7(9.6)					
6.	**Difficulty in breathing***	20(27.4)	**On-exertion**	19(23.3)	128.2±147.7	0.95	142
			On rest	3(4.1)			
7.	**Chest pain***	22(30.1)	**On exertion**	19(26.0)	98.1±174.4	2.8	30

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue X October 2026

			On rest	3(4.1)			
8.	**Effort intolerance***	24(32.9)	**On exertion**	24(32.9)	121.6 ±212.5	2.2	30
9.	**Palpitations***	37(50.7)	**On exertion**	30(41.1)	72.2 ±113.0	2.079	30.00
			On rest	7(9.7)			
10.	**Tachypnoea***	20(27.4)	**On exertion**	19(26.0)	121.1±190.8	2.148	30.00
			On rest	1(1.4)			
11.	**Trouble in speaking***	2(2.7)			60.0 ± 42.4	0.84	60.00
12.	**Vision problem***	14(19.2)			783.8±563.6	0.867	730.00
14.	**Numbness of unilateral or bilateral face,arm,leg***	22(30.1)			251.5±395.9	3.291	135.00
15.	**Excessive sweating***	11(15.1)			94.1±137.3	1.735	30.00
16.	**Heaviness in chest***	28(38.4)			112.3 ±161.0	2.607	30.00
17.	**Pale appearance of skin***	4(5.5)			37.5 ±15.0	2.000	30.00
18.	**Cool clammy skin***	6(8.2)			20.3 ±21.6	1.613	10.00
19.	**Cough***	18(24.7)			29.5 ±43.9	2.751	12.50
20.	**Painful cramping in thighs/hips/calf-muscles***	54(74.0)			148.9±222.4	2.166	60.00
21.	**Ecchymosis***	9(12.3)			31.6±56.1	2.909	10.00
22.	**Unusual bleeding***	16(21.9)	**During coughing**	4(5.5)	40.7±53.2	2.370	30.00
			While passing urine	2(2.7)			
			Prolonged menstrual bleeding	3(4.1)			
			Through nose	1(1.4)			
			Others	6(8.2)			
23.	**Atrial fibrillation (on basis of ECG)** *	1(1.4)			30.00		30.00

*Multiple response answers

Table 4: Frequency distribution of level of adherence of patients regarding therapeutic regimen who had undergone cardiac valve surgery. n=73

Sr.No	Medication adherence		f(%)		f(%)
1	**Prescribed medications*** (*Multiple response answers)	**Blood thinning agents**	69(94.5)		
		Vitamin K	6(8.2)		
		Antibiotics	7(9.6)		
		Inotropic-drugs	23(31.5)		
		Drugs for Other comorbidities	14(9.2)		

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue X October 2026

2.	**Medication adherence to recommended dose**		70(95.9)		
3.	**Medication adherence to scheduled time**		69(94.5)		
4.	**Patient's practices while undergoing any dental, dermatological or minor surgical procedure.**	**No. of patients undergone such procedure**	12(16.4)	**Taken antibiotics with adequate duration before such procedures**	8(10.9)
				Taken antibiotics without adequate duration before such procedures	2(2.7)
				Did not take antibiotics at all	2 (2.7)
5.	**Practices for blood thinning agents during menstruation (for female patients under reproductive age).**	**Lowered dose**	7(9.6)		
		Stopped medications	1(1.4)		
		Continued as recommended	18(24.7)		
		Not applicable	47(64.4)		
6.	**Methods utilized by elderly patients to increase their medication compliance**	**Reminded by family members**	0		
		Drug administered by family members	0		
		Taken themselves following recommended schedule	5(6.8)		
		Taken themselves without following schedules	1(1.4)		
		Not applicable	67(91.8)		
7.	**History of any other major surgeries after valvular surgery**		5(6.8)	**Started warfarin after 12-24 hours of surgery**	3(4.1)

Table 5: Frequency distribution of level of adherence & reasons for self-cessation for follow up visits PT (Prothrombin time) /INR (International normalized ratio) testing by patients. n=73

Transportation						
1.	**Time taken to travel to hospital (minutes)**			**Mean ± SD**	**skewness**	**Median**
				174.4 ± 114.3	1.3	150
			f(%)			**f%)**
2.	**Mode of transport**	**Public**	61 (83.6)		**Train***	29 (39.7)
		Private	8 (11.0)		**Bus***	21 (28.8)
		Both	4 (5.5)		**Car***	2(2.7)
Follow-up visits						
3.	**1st visit after 15 days of discharge**	**Yes**	65 (89.1)			
		No	8 (10.9)	**Reason for not visiting at recommended date**	**Don't have any information**	4 (5.5)
					Don't under-stand the need	4 (5.5)
4.	**2nd visit after 1 month of 1st visit**	**Yes**	69 (94.5)			
		No	4 (5.5)	**Reason for not visiting at recommended date**	**Don't have any information**	2 (2.7)
					Don't under-stand the need	2 (2.7)

5.	**Subsequent visits after every 2 months of 2nd visit**	**Yes**	61 (86.3)			
		No	5 (6.8)	**Reason for not visiting at recommended date**	**Don't have any information**	4 (5.5)
					Frequent-visits bother me	1 (1.4)
		NA	7 (9.6) (these pt's post-operative duration was less for 3rd visit schedule)			
Diagnostic Evaluation						
6.	**Undergoes blood investigations (PT/INR) every month**	**Yes**	56(76.7)			
		No	17(23.3)	**Reason for not undergoing PT/INR monthly**	**I don't have any information**	7(9.6)
					I tend to forget	1(1.4)
					I don't understand the need	9(12.3)
7.	**Method of consultation to doctor regarding (PT/INR) values.**	**Physical visit**	69(94.5)			
		Not at all	4(5.5)			
8.	**Undergone blood investigations before dental or any other surgical procedures**	**Yes**	6(8.2)			
		No	6(8.2)			
		NA	61(83.5)			

*Multiple response answers

Table 6: Frequency distribution of dietary and exercise practices of patients who had cardiac valve surgery. **n=73**

Sr. No.	**Dietary/ Activity practices**		**f (%)**			**f(%)**
Dietary practices						
1	**Consumption of fluid (no. of glasses per day) (Mean ± SD)**		7.7±1.9			
2	**Regular-consumption of fatty foods**	**Yes**	22(30.1)			
		No	51(69.9)			
3	**Consumption of green-leafy vegetables less than 1 medium bowl per week**	**Yes**	51(69.9)			
		No	22(30.1)	**If not, no. of bowls of green- leafy vegetables consumed in a week**	2	9(12.3)
					3	6 (8.2)
					4	1 (1.4)
					< 4	6 (8.2)
4	**Consumption of red meat**	**Yes**	28(38.4)			
		No	45(61.6)			
5	**Following diabetic diet**	**Yes**	1(1.4)			
		No	1(1.4)			
Activity/ Exercise practices						

6	**Performing simple house hold activities (cooking, tidying up, arranging clothes etc).**	**Yes**	65 (89.0)			
		No	8(11.0)			
7	**Regularly performing simple exercises (brisk walking, breathing exercise, yoga etc).**	**Yes**	57(78.1)			
		No	16(21.9)			
8	**Started morning walk within 1 month after-discharge**	**Yes**	60(82.2)	**Duration of Walking (in minutes)**	10	7 (9.6)
					15	22(30.1)
					30	19(26.0)
					>30	12(16.4)
		No	13(17.8)			
9	**Lifted heavy objects within 3 months of surgery**	**Yes**	6 (8.2)			
		No	66(90.4)			
		NA	1(1.4)			
10	**Avoided driving till 3 months after Surgery**	**Yes**	39 (53.4)			
		No	1 (1.4)			
		NA	33(45.2)			
11.	**Avoided bending/straining till 1 month of surgery**	**Yes**	51(69.9)			
		No	22(30.1)			

Table 7: Frequency distribution of personal & wound care practices of patients who had cardiac valve surgery. **n=73**

Sr.No	**Personal / Wound care**		**f(%)**		**f(%)**		**f(%)**	**Mean ± SD**
Personal care								
1.	**Frequency of brushing/ day**	**Once**	64(87.7)	**Type of brush**	**Soft brush**	64(87.7)		
		Twice	9 (12.3)		**Datun**	9(12.3)		
2.	**Daily weight measurement**	**Yes**	9(12.3)	**Any variation in Weight (kg)**	Yes	9(12.3)	**How much variation in weight (kg)**	3.3± 1.9
		No	64(87.7)					
3.	**Following discharge, took bath after**	**24 hrs**	24(32.9)					
		Between 2-5 days	27(37.0)					
		Within 1 week	15(20.5)					
		Within 1 month	7(9.6)					
Wound care								
4.	**Ever cleaned surgical wound at home**	**Yes**	68(89.0)	**Items used to clean the wound**	**Anti-septic**	38(52.1)	**No of times wound cleaning/ week**	1 51(69.9)
					Soap	26(35.6)		2 12(16.4)

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue X October 2026

					Normal saline	4(5.4)		3	5(6.8)	
		No	6(8.2)							
5.	**Items used to cover wound after discharge**	**Surgical dressing**	18(24.7)							
		Cloth	12(16.4)							
		Open	43(58.9)							
6.	**Type of water used during cleaning**	**Warm**	35(47.9)							
		Cold water	34(46.6)							
		N/A	4(5.5)							
7.	**Topical application after cleaning the wound**	**Coconut oil**	14(19.2)							
		Ointment	54(74.0)							
		N/A	5(6.8)							

Figure 1: Pie diagram showing frequency distribution of type of valve replaced among patients. (n=73)

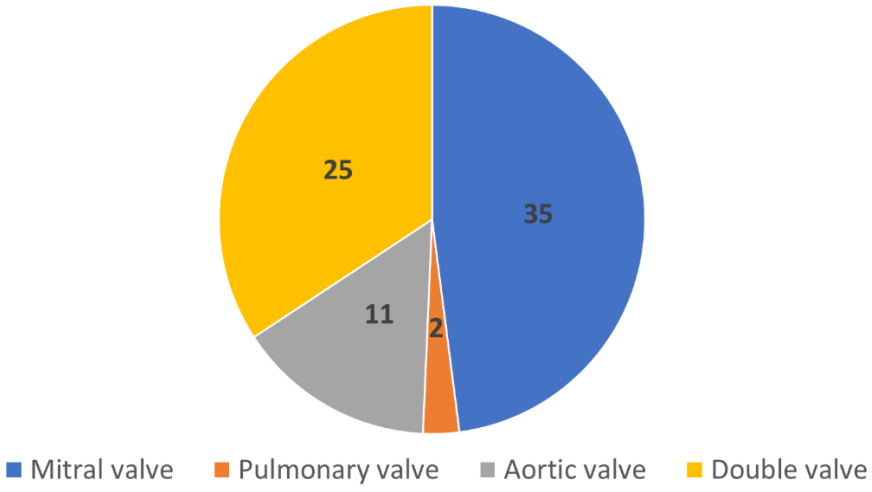
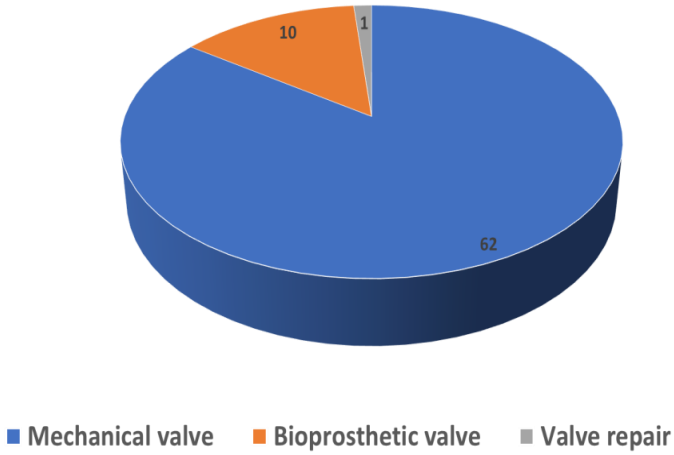


Figure 2: Pie diagram showing frequency distribution of type of replacement of valve among patients. (n=73)



ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue X October 2026

Figure 3: Bar diagram showing prevailing signs & symptoms among patients who had undergone cardiac valve surgery (n=73)

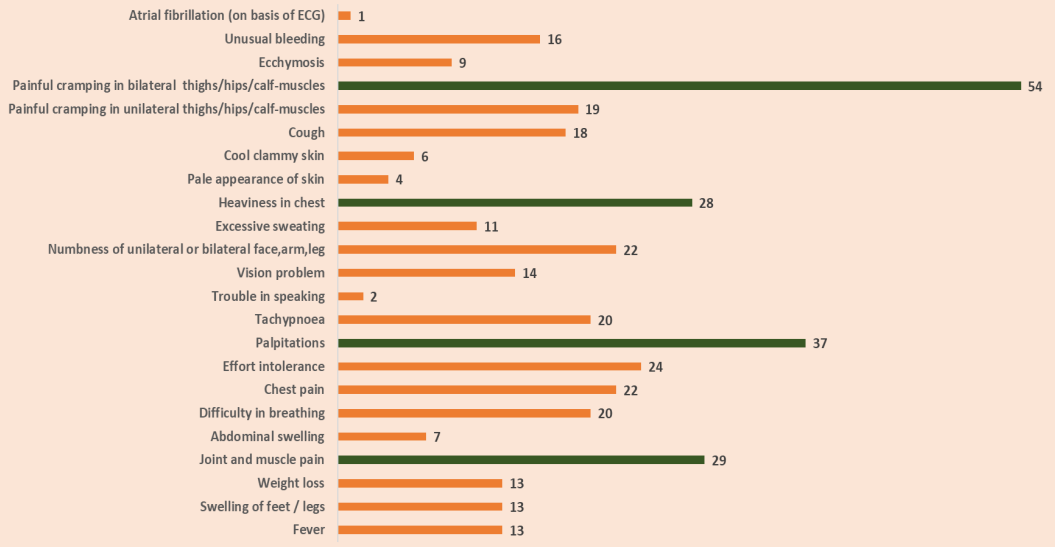


Figure 4: Pie diagram showing frequency distribution of bleeding sites among patients with prevailing symptom of bleeding after cardiac valve surgery. (n=16)

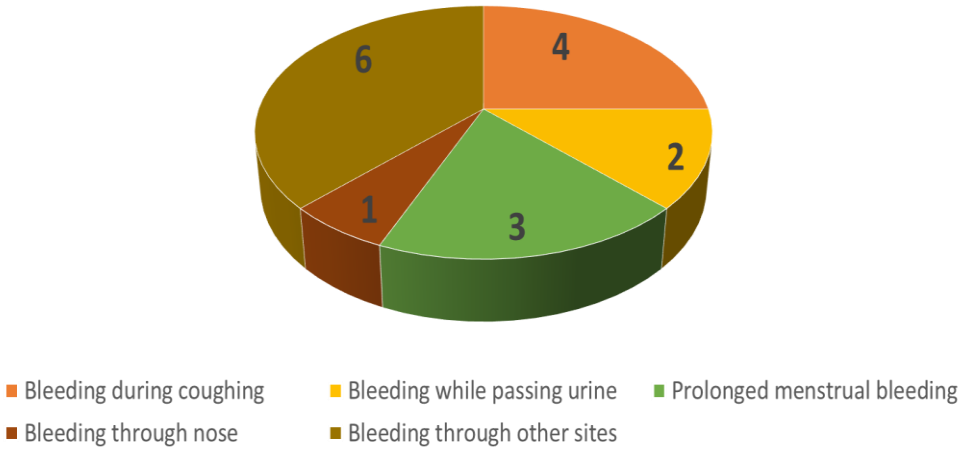


Figure 5: Bar diagram showing compliance to therapeutic regimen, PT/INR testing, scheduled follow up visits among patients who had undergone cardiac valve surgery. (n=73)

