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Original Article

Evaluating Long-Term Results: Anticoagulation Challenges and Quality of Life in Pakistani Patients with Mechanical Heart Valve

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Abstract

This study aimed to evaluate the long-term results of Anticoagulation challenges and quality of life in Pakistani patients with a mechanical heart valve. Lifelong warfarin medication poses a substantial postoperative burden for patients undergoing mechanical heart valve (MHV) surgery. Three hundred patients from two tertiary hospitals in Peshawar participated in this comparative cross-sectional study, which assessed mental health, warfarin adherence, and health-related quality of life (HRQoL). With high rates of anxiety (38.0–48.7%) and depression (36.0–42.0%), the results demonstrated a significantly lowered HRQoL. Overall, warfarin adherence was below ideal, but at one institution, it was noticeably worse. Dietary limitations, a widespread fear of problems, and the financial and logistical burden of periodic INR monitoring were among the main obstacles. To enhance long-term outcomes, the results reveal differences among institutions and underscore the critical need for integrated psychological support, structured anticoagulation management services, and comprehensive patient education.

Keywords: Postoperative Period, Health-Related Quality of Life, Warfarin, Heart Valve Prosthesis, Tertiary Healthcare, Anticoagulants.

Introduction

To prevent thromboembolic events, mechanical heart valve (MHV) replacement requires lifelong warfarin medication (Vahanian *et al*., 2021), adding a significant management burden beyond INR control (Benzidia *et al.*, 2023). This regimen significantly reduces health-related quality of life (HRQoL) and produces psychological anguish due to the frequent monitoring, dietary changes, and bleeding risks (Hess *et al*., 2020). Long-term results are significantly influenced by the treatment burden, which can occasionally even outweigh INR control (Clarkesmith *et al*., 2023). Although themes of anxiety and disruption of lifestyle are expressed in qualitative studies (Jones *et al.,* 2021), quantitative analysis is necessary to ascertain the prevalence, severity, and determinants of these problems to direct focused solutions. In Pakistan, with its unique healthcare challenges and resource constraints, the management of MHV patients is particularly demanding. Tertiary care hospitals in Khyber Pakhtunkhwa (KPK), such as Lady Reading Hospital (LRH) and Hayatabad Medical Complex (HMC), bear a significant load of such cases. A comparative analysis between two major centers can reveal insights into systemic and institutional factors affecting patient care. Therefore, this study aims to quantitatively measure and compare warfarin therapy adherence, the prevalence of anxiety and depression, HRQoL, and the specific management difficulties experienced by MHV patients at LRH and HMC in Peshawar.

Literature Review

Clinical Significance

For individuals with valvular heart disease, mechanical heart valve (MHV) replacement can save their lives, but it requires lifelong anticoagulation treatment, mostly with warfarin. Patients' health-related quality of life (HRQoL) and mental health are significantly impacted by this necessity, which presents serious long-term issues that go beyond surgical recovery (Bekkers *et al*., 2017). These difficulties are made worse in places with poor resources, such as Pakistan, where patient support networks and hospital infrastructure are frequently restricted. The results of the current Peshawar-based study are placed into the larger global and regional research landscape by this review of the literature, which summarizes data on the postoperative HRQoL, psychological morbidity, and treatment-related challenges experienced by MHV recipients.

Health-Related Quality of Life (HRQoL) Post-MHV Replacement.

Many studies show that HRQoL significantly declines after MHV surgery, especially in areas related to psychological well-being and pain/discomfort. MHV patients reported poorer EQ-5D utility scores than the general population, according to a major multinational study by Guomundsdottir *et al*. (2021). This was mainly because of physical constraints and worry about the consequences. These deficiencies are more noticeable in LMICs (poor and middle-income countries). In line with the Peshawar study's conclusion that pain is a significantly impacted dimension, a study conducted in India by Sharma *et al*. (2020) confirmed that mobility problems and pain were significant factors in worse HRQoL. One crucial aspect of HRQoL that requires regular evaluation is the psychological strain, which is frequently undervalued.

Mental Health Morbidity: Anxiety and Depression

There is a significant psychological consequence of MHV surgery. Fear of thromboembolic or hemorrhagic episodes, along with the ongoing attention needed for warfarin treatment, causes clinically substantial anxiety and sadness. Over 40% of the anticoagulated MHV patients in the Ruzic *et al*. (2019) cohort had anxiety symptoms, which is remarkably close to the 48.7% prevalence at LRH in this study. Depression is very common and frequently associated with a limited lifestyle and the high cost of treatment. In addition to being effective, this comorbidity has a detrimental effect on treatment adherence and overall cardiac outcomes, resulting in a vicious loop (Kadir *et al.*, 2022).

Challenges in Warfarin Therapy and Adherence

Because of its limited therapeutic index and interactions with diet and other drugs, warfarin therapy is infamously challenging to control. Although suboptimal adherence occurs everywhere, it is much more severe in environments with inadequate resources. According to research from other LMICs and the Peshawar study, the main obstacle is the financial and logistical strain of regular International Normalized Ratio (INR) monitoring (Ali *et al*., 2021). In addition, poor time in therapeutic range (TTR) and increased complication rates are caused by a lack of organized Anticoagulation Management Services (AMS) and insufficient patient education. According to studies, adherence and results can be greatly enhanced by introducing nurse-led AMS and patient education programs, which emphasize the need for intervention that the current study highlights (Abdel-Latif & Doenst, 2022).

Methods and Materials

Study Design and Setting

A comparative cross-sectional study was conducted from February 2024 to December 2024 at the Cardiovascular Departments of Lady Reading Hospital (LRH) and Hayatabad Medical Complex (HMC), two of the largest public tertiary care facilities in Peshawar, KPK.

Sample Size and Sampling Technique

OpenEpi software was used to determine the sample size. A 50% predicted frequency of poor health-related quality of life (HRQoL) was established to optimize the sample size. A final sample size of 300 patients was obtained by recruiting 150 patients from each facility. The method of systematic random sampling was used to choose the participants. Every other eligible patient from the outpatient department registers was asked to take part until each hospital's set sample quota was reached.

Data Collection Tool and Procedure

A structured questionnaire was used, comprising four sections: Socio-demographic and Clinical Profile; Health-Related Quality of Life (HRQoL); Psychological Morbidity; Warfarin Therapy Experience and Adherence.

Ethical Considerations

Ethical approval for this study was granted by the Institutional Review Committee (ERC) of Lady Reading Hospital (Ref: LRH-ERC-24/CL/01) and Hayatabad Medical Complex (Ref: HMC/ERC/24/78). Before data collection, written informed consent was obtained from all participants. All data were anonymized and handled with strict confidentiality throughout the research process.

Statistical Analysis Plan

Data were analyzed using SPSS version 26.0. Continuous variables were presented as mean ± standard deviation (SD) and compared using the independent samples t-test or Mann-Whitney U test. Categorical variables were presented as frequencies and percentages and compared using the Chi-square test. A p-value of <0.05 was considered statistically significant.

Results

Table 1
Results for the Independence Samples t-test or Mann-Whitney U test, and Chi-square test.

Aspect Measured	Overall Finding	Lady Reading Hospital (LRH)	Hayatabad Medical Complex (HMC)	Statistical Significance (p-value)
Sample Size	N = 300	n = 150	n = 150	-
Mean Age (years)	Mid-40s	45.2 ± 11.8	47.1 ± 10.5	p=0.12 (Not Significant)
Education (Graduates)	Significant Difference	13.3%	22.0%	p<0.05
INR Monitoring (Every 4 weeks)	Suboptimal	54.7%	68.0%	p<0.01
Health-Related Quality of Life (EQ-5D-5L Index)	Severely Compromised	0.59 ± 0.23	0.65 ± 0.21	p=0.02
Most Affected HRQoL Dimension	Anxiety/Depression & Pain/Discomfort	74.0% & 70.7%	66.0% & 65.3%	-
Overall, Health (EQ-VAS Score 0-100)	Poor	59.8 ± 18.2	65.4 ± 16.8	p<0.01
Anxiety (HADS-A ≥8)	High Prevalence	48.7%	38.0%	p=0.04
Depression (HADS-D ≥8)	High Prevalence	42.0%	36.0%	p=0.25 (Not Significant)
Warfarin Adherence (MMAS-8 Score)	Medium Adherence	5.3 ± 1.8	5.9 ± 1.6	p<0.01
Low Adherence (MMAS-8 <6)	High Prevalence	60.0%	46.7%	p=0.02
Top Challenge: Cost of Monitoring	Major Barrier	72.0% cited cost	58.0% cited cost	p<0.01

Discussion and Findings

Based on a comparative investigation, patients at both institutions incur a high postoperative burden. Those at the Hayatabad Medical Complex (HMC), however, continuously showed superior results. Compared to patients at Lady Reading Hospital (LRH), those at HMC reported considerably lower anxiety prevalence, greater warfarin adherence, and improved health-related quality of life (HRQoL) scores. The discrepancy in adherence, with 60% of LRH patients being categorized as low-adherent and 46.7% at HMC, was a significant discovery. The biggest obstacle, mentioned more often by LRH patients (72% vs.58%), was the cost of monitoring. These findings suggest that institutional and systemic factors have a substantial impact on patient outcomes, with HMC's model seeming to be more successful.

The markedly improved results at HMC, such as higher HRQoL and adherence, imply that institutional features like more frequent INR monitoring and possibly better patient education have a substantial impact on patient success (Sharma *et al*., 2023). Global evidence on the psychological toll of long-term anticoagulation is consistent with the high prevalence of anxiety and depression (Hess *et al*., 2020; Wang *et al*., 2022). In this situation with limited resources, the main problem of cost monitoring makes treatment burden worse (Almeida *et al*., 2024). These findings highlight the critical need for organized, clinic-based anticoagulation management services, which are currently lacking despite being shown to improve outcomes (Bauer *et al*., 2020).

Conclusion

According to the study's findings, those who receive artificial heart valves have a heavy load of treatment challenges, psychological morbidity, and low quality of life. Patient success is significantly impacted by systemic factors, such as the design of follow-up treatment and patient support services, as evidenced by the notable differences in outcomes between the two hospitals. To address these issues and enhance long-term results, organized, clinic-based anticoagulant management programs are desperately needed.

Recommendations

1. Establish dedicated Anticoagulation Clinics at both institutions to provide centralized, protocol-driven management, patient education, and point-of-care INR testing to reduce logistical barriers.
2. Integrate routine psychological screening (using tools like HADS) into routine cardiac follow-up and provide access to counseling services.
3. Develop structured patient education programs in local languages to address knowledge gaps, alleviate unfounded fears, and empower patients in self-management.
4. Future longitudinal studies should investigate the impact of such interventions on clinical outcomes (e.g., INR stability, complication rates) and patient-reported outcomes over time.

Ethical Statement

Institutional ethics approved of this study. All faculty respondents gave their informed consent, and participation was entirely voluntary. Participants were free to leave at any time without facing any repercussions, and data were anonymized to preserve confidentiality.

Funding Statement

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Authors' Contributions

Authors 1 and 2: conceived the research, created the methodology, and penned the first draft. Authors 1, 3, and 4: Performed formal analysis, produced visuals, and verified findings. Participated in data gathering, manuscript editing, and literature review. Authors 4 and 5: Critically analyzed the work and results, supervised the study, and provided overall guidance. They offered helpful insights, recommendations for corrections, edits, and approved the finished work.

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Declaration of Interest

Regarding this work, the authors disclose no conflicting financial or non-financial interests.

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