Impact of balloon mitral valvotomy on quality of life and psychiatric morbidity in patients with severe mitral stenosis

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ABSTRACT

Objectives: To evaluate the quality of life (QoL), psychiatric comorbidities in patients with rheumatic heart disease-mitral stenosis (RHD-MS), and the impact of balloon mitral valvotomy (BMV) on the QoL and psychiatric morbidity. Materials and Methods: Fifty consecutive patients of RHD-MS were evaluated for QoL and psychiatric morbidity prior to BMV and at 3 months after the procedure. Results: The mean age of the study sample was 34.9 years (standard deviation, 11.1 years). At baseline assessment, majority (94%) had New York Heart Association Class II/III symptoms and QoL scores below average, that is, 50. About two–fifth (19 out of 50) of the patients had one or more psychiatric comorbidity, that is, depression (32%), anxiety (16%), and somatoform disorder (12%). Those with psychiatric comorbidity had poor QoL scores in social, emotional, and mental subscales (P < 0.05) at the baseline. At 3-month follow-up, there were significant improvements in symptoms and transmitral pressure gradients (P < 0.05), QoL scores (P < 0.05), and psychiatric comorbidities (P < 0.05) after BMV. Improvements in QoL were irrespective of the baseline psychiatric comorbidity. Conclusions: High prevalence of psychiatric illness and poor QoL scores were observed in patients with RHD-MS. BMV significantly improves the QoL and psychiatric comorbidities.

Keywords: Mitral stenosis, psychiatric morbidity, quality of life, rheumatic heart disease

Rheumatic heart disease (RHD) is the most common acquired heart disease in children and young adults of developing countries, leading to 250,000 premature deaths every year worldwide. It accounts for about 15% of all patients with heart failure in endemic areas. According to the World Health Organization (WHO) report (2005), at least 15.6 million people have RHD, 0.3 million individuals with RHD are added every year to the existing burden, and 60% of all cardiovascular diseases (CVDs) in children and young adults is from RHD. RHD is the most common cause of mitral stenosis (MS). MS leads to heart failure and even death if not intervened in time. Atrial fibrillation (AF) in such patients (27%–63%) further worsens the clinical condition and adversely affects the quality of life (QoL). QoL has become an essential end point in evaluating the impact of interventions and drug therapies in chronic illnesses. Although physiologic measures provide important information to clinicians, it is of limited interest to patients. As the physiological outcome measures often correlate poorly with functional capacity and well-being, response to intervention can be different in two patients with similar physiological measures because of difference in perception. In addition, various CVDs are associated with the high incidence of psychiatric comorbidity, and these may adversely impact QoL. Currently, balloon mitral valvotomy (BMV) is the standard of care in the management of patients with MS.
However, data pertaining to the impact of BMV on QoL and psychological parameters in chronic rheumatic MS patients are limited.

Although the prevalence of neuropsychiatric symptoms in patients with acute rheumatic fever who largely belongs to young age group (<15 years) has been reported, data pertaining to the level of psychiatric morbidity among chronically ill RHD patients are scarce. In this background, this study aimed to evaluate the QoL and psychiatric morbidity in patients with symptomatic severe MS who were subjected to BMV. In addition, an attempt was made to evaluate the outcome in the form of QoL and psychiatric morbidity after 3 months of intervention.

**MATERIALS AND METHODS**

This study was carried out at a tertiary care center in North India. All the study participants were recruited after obtaining written informed consent. The study was approved by the Ethics Committee of the institute.

Consecutive patients of severe MS, who were considered for BMV, were approached for participation into the study. To be included in the study, the patients were required to have chronic MS with mitral valve area ≤1.0 cm² and age >15 years. Pregnant females, patients of age ≤15 years, and those who were not willing to participate in the study were excluded. Follow-up assessments were carried out for patients who underwent successful BMV. Successful BMV was defined as mitral valve area >1.5 cm² or increase in area by >50% on two-dimensional echocardiography, in the absence of any complications such as severe mitral regurgitation and need for emergency surgery.

At baseline, initially, clinical presentation and radiographic, electrocardiographic (ECG), and echocardiographic details were recorded. QoL and psychiatric morbidity were measured using Short-Form survey-36 version 2 (SF-36 v2™) and PRIME-MD questionnaires, respectively. At 3-month follow-up, details about clinical presentation, echocardiography, QoL, and psychiatric morbidity were evaluated again.

**Assessment of quality of life**

The SF-36 v2 Health Survey which measures four domains of QoL in the area of physical health (physical functioning [PF], role-limitation physical [RP], bodily pain [BP], general health [GH]); four domains of QoL in the area of mental health (vitality [VT], social functioning [SF], role-limitation emotional [RE], and mental health [MH]); and two comprehensive indices, that is, physical component summary (PCS) and mental component summary (MCS) were used to assess the QoL at baseline and at 3-month follow-up after BMV. The data obtained were analyzed using the Quality Metric Health Outcomes™ Scoring Software 4.0 (Quality Metric Incorporated, 24 Albion Road, Bldg 400, Lincoln, R.I. 02865, USA), (license number: QM009826). Results were in the form of scores in each of the eight health concepts which range from 0 (worst) to 100 (best), and its use has been validated in vernacular language.

**Psychological assessment**

The Hindi-translated 3-page version of Prime Mental Disorders-Patient Health Questionnaire (MD-PHQ) was used at baseline and at 3 months to evaluate common mental disorders such as major depressive disorder, panic disorder, anxiety disorder, bulimia nervosa, and subthreshold disorders such as other depressive disorders, probable alcohol abuse or dependence, somatoform, and binge eating disorders. Hindi version of the PrimeMD-PHQ has been validated in the Indian setting.

Transthoracic echocardiography was performed using Vivid 5 ultrasound system (GE Health Care, Wauwatosa, WI, USA) using a 1.5–4 MHz phased-array transducer M4S by a senior cardiologist, and the details regarding morphology of mitral valve, severity of MS, mitral valve area using pressure half-time and two-dimensional methods, transmitral peak and mean pressure gradient, and other significant valvular lesions were noted. Preprocedural transesophageal echocardiography was done as a standard protocol to rule out left atrial or left atrial appendage clot prior to BMV. Intraprocedural fall in transmitral gradient during catheterization was also noted. Echocardiography was repeated prior to hospital discharge and at 3 months of follow-up.

The study was cleared from the institute’s Ethics Committee and adhered to the provisions of Declaration of Helsinki and international ethical guidelines.

**Statistical methods and data analysis**

Statistical Package for the Social Sciences software for Windows, version 17.0 (SPSS Inc., Chicago, IL, USA) was used for statistical analyses. Descriptive analysis was carried out using mean, standard deviation (SD), and median along with range for continuous variables. Descriptive analysis was computed in terms of frequency and percentages for discontinuous sociodemographic and clinical variables. Comparisons were done by using t-test and Mann–Whitney U-test for normally distributed and skewed numerical data and Chi-square test for categorical variables. Comparisons of continuous variables assessed at two time points were done by using paired t-test (normally distributed data) and Wilcoxon signed-rank test (skewed data). McNemar test
was used for dependent categorical data. \( P < 0.05 \) was set for statistical significance.

**RESULTS**

At baseline assessment, sixty patients were recruited into the study, out of whom, ten were lost to follow-up and excluded from the study. Baseline clinical, sociodemographic, electrophysiological, and echocardiographic parameters of the study group are shown in Table 1. The mean age of the study sample was 34.9 years (SD: 11.1, Range: 17–59 years). Majority (80%) of them were females. Majority of the patients belonged to lower middle (44%) or upper low (38%) socioeconomic status. The mean duration of symptoms was 44 months (range: 3–94 months). Majority (94%) of the patients had New York Heart Association (NYHA) Class III (60%) or Class II (34%) symptoms. Majority of the patients had symptoms of orthopnea/paroxysmal nocturnal dyspnea (82%) and palpitations (96%). About half of the patients had a history of systemic congestion in the form of pedal edema, and about 40% had a history of rheumatic fever. Twelve out of the total fifty patients had a history of prior intervention in the form of BMV or surgical closed mitral commissurotomy. Two patients had a history of psychiatric treatment; one patient was treated for anxiety disorder and the other for a psychotic episode, and both of them were off medications for more than 2 years at the time of cardiac intervention. Ten out of the forty female patients had a history of previous pregnancies complicated with pulmonary edema, which required hospitalization. One patient had a family history of RHD.

Sinus rhythm was seen in 36 patients (72%) and atrial fibrillation (AF) was seen in 14 patients (28%). History of systemic embolization (CVA) was higher in patients with AF (35.7%) when compared with patients of sinus rhythm \( (P < 0.001) \). Rest of the clinical parameters were comparable in patients with sinus rhythm and AF. About one-third of patients had left atrial abnormality (32%) and one-fourth had right ventricular hypertrophy (24%) on ECG. On chest X-ray, left atrial enlargement was seen in 41 patients (82%) and features of pulmonary hypertension was seen in 32 patients (64%). Baseline echocardiography showed mean mitral valve score of 6.9 ± 0.8, mean mitral valve area by two dimensions was 0.7 ± 0.15 cm\(^2\), and mean gradient across mitral valve was 15.4 ± 6.2 mmHg. Mean right ventricular systolic pressure was 31.5 ± 19.5 mmHg in 35 patients, who had significant tricuspid regurgitation.

**Baseline quality of life and psychiatric morbidity**

Baseline QoL score using is shown in Table 2. Majority of the baseline scores in both physical and mental subscales of

| Table 1: Baseline characteristics of study group (n=50) |
|--------------------------------------------------------|
| Age (years) | 34.9±11.1 |
| Gender Male/Female | 10 (20%)/40 (80%) |
| Socio economic status |  |
| Upper | 2 (4%) |
| Upper middle | 7 (14%) |
| Lower middle | 22 (44%) |
| Upper low | 19 (38%) |
| Lower | 0 (0%) |
| Clinical symptoms |  |
| NYHA class | III (60%), II (34%), 1 (6%) |
| Duration of symptoms (in months) | 44.0 (29.4) |
| Orthopnea/PND | 41 (82%) |
| Palpitations | 48 (96%) |
| Edema | 25 (50%) |
| Hemoptyis | 5 (10%) |
| CVA | 5 (10%) |
| Penicillin prophylaxis | 33 (66%) |
| Acute Rheumatic fever | 20 (40%) |
| Prior intervention | 12 (24%) |
| Hospitalization with pulmonary edema | 18 (36%) |
| Family History of RHD | 1 (2%) |
| Prior psychiatric treatment | 2 (4%) |
| Pulmonary edema in Previous Pregnancy | 10 (20%) |
| ECG |  |
| NSR | 36 (72.0%) |
| AF | 14 (28.0%) |
| LA abnormality | 16 (32.0%) |
| RA abnormality | 4 (8.0%) |
| Bi-atrial abnormality | 6 (12.0%) |
| RVH | 12 (24.0%) |
| LVH | 4 (8.0%) |
| Right axis deviation | 2 (4.0%) |
| RBBB | 4 (8.0%) |
| LBBB | 1 (2.0%) |
| Chest X ray |  |
| LAE | 41 (82.0%) |
| PAH/PVH | 32 (64.0%) |
| Echocardiography |  |
| MV score | 6.9 (0.8) |
| MV area (cm\(^2\)) | 0.7 (0.15) |
| Maximum gradient across MV (mmHg) | 24.6 (8.1) |
| Mean gradient across MV (mmHg) | 15.4 (6.2) |
| Right ventricular systolic pressure (mmHg) | 31.5 (19.5) |
| Mild MR | 13 (26) |
| Aortic valve disease | 19 (38) |
| Significant TR | 35 (70) |
| Normal ejection fraction | 50 (100) |

PND: Paroxysmal nocturnal dyspnea, CVA: Cerebrovascular accident, RHD: Rheumatic heart disease, H/O: History of, NYHA: New York Heart Association classification of dyspnea, ECG: electrocardiography, NSR: normal sinus rhythm, AF: Atrial fibrillation, LAE: left atrial enlargement, RAE: right atrial enlargement, RVH: right ventricular hypertrophy, LVH: left ventricular hypertrophy, RBBB: right bundle branch block, LBBB: left bundle branch block, LAE: left atrial enlargement, PAH/PVH: pulmonary arterial/venous hypertension, MV: mitral valve, SD: standard deviation, MR: mitral regurgitation, TR: tricuspid regurgitation.
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Table 2: Baseline quality of life scores and psychiatric morbidity in study group (n=50)

| QoL scores                           | Mean (±SD) |
|--------------------------------------|------------|
| **Physical subscale**                |            |
| PF: Physical Functioning             | 32.2±14.8  |
| RP: Role Limitation Physical         | 14.0±14.5  |
| BP: Bodily Pain                      | 57.4±35.0  |
| GH: General Health                   | 9.4±15.8   |
| **Mental subscale**                  |            |
| VT: Vitality                         | 23.2±17.3  |
| SF: Social Functioning               | 48.5±37.2  |
| RE: Role Limitation Emotional        | 56.5±26.8  |
| MH: Mental Health                    | 37.0±20.5  |
| **Component summary scores**         |            |
| PCS: Physical Component Summary      | 29.4±6.4   |
| MCS: Mental Component Summary        | 34.3±12.8  |

| Psychiatric morbidity                | Mean (±SD) or frequency (%) |
|--------------------------------------|----------------------------|
| Patients with at least one psychiatric diagnosis | 19 (38)               |
| Somatoform disorder                   | 6 (12.0)                   |
| PHQ-9 module                          |                           |
| Presence of depression                | 16 (32.0)                  |
| Major depressive syndrome             | 9 (18)                     |
| Other depressive syndrome             | 7 (14)                     |
| Total PHQ items positive              | 52±22.4                    |
| Mean PHQ-9 score                      | 7.9±5.0                    |
| Panic syndrome                        | 0 (0.0)                    |
| Other anxiety syndrome                | 8 (16.0)                   |
| Eating disorder                       | 0 (0.0)                    |
| Patients having both somatoform disorder and depression | 4 (8.0)               |
| Patients having both depression and anxiety | 6 (12.0)                |
| Patients having both somatoform disorder and anxiety and other anxiety syndrome | 2 (4.0)               |
| Patients having somatoform disorder and depression | 2 (4.0)               |

Physical functioning, RP: Role Limitation ; Physical, BP: Bodily pain, GH: General Health, VT: Vitality, SF: Social functioning, RE: Role Limitation Emotional, MH: Mental Health, PCS: Physical component summary, MCS: Mental component summary, PHQ: Patient Health Questionnaire, PF

Table 3: Baseline quality of life scores in patients with and without psychiatric morbidity in study group

| QoL scores                           | With any Psychiatric morbidity (n=19) | Without any psychiatric morbidity (n=31) | t/u*  |
|--------------------------------------|--------------------------------------|----------------------------------------|-------|
| Physical functioning                 | 28.1 (12.6)                          | 35.1 (15.7)                            | -1.70 |
| Role Limitation Physical             | 12.8 (14.8)                          | 14.9 (14.5)                            | 278.0 |
| Bodily pain                          | 48.5 (34.7)                          | 63.9 (34.4)                            | -1.55 |
| General health                       | 7.9 (12.6)                           | 10.6 (17.9)                            | 303.5 |
| Vitality                             | 19.0 (15.4)                          | 26.2 (18.3)                            | -1.44 |
| Social functioning                   | 30.4 (30.5)                          | 61.6 (36.4)                            | 145.0*** |
| Role Limitation Emotional            | 43.6 (25.2)                          | 65.8 (24.4)                            | -3.13** |
| Mental health                        | 28.1 (15.6)                          | 43.4 (23.5)                            | -2.70** |
| Physical component summary           | 29.3 (6.1)                           | 29.4 (6.7)                             | 0.023 |
| Mental component summary             | 27.5 (8.9)                           | 39.2 (12.9)                            | -2.78** |

*P<0.05, **P<0.01, ***P<0.001, *independent sample t-test, u: Mann Whitney u test

QoL were below average of 50. Scores computed among males and females were largely comparable in the study group. There was no difference in QoL scores among patients with sinus rhythm and AF. Baseline psychiatric morbidity is depicted in Table 2. Six (12%) patients fulfilled the criteria for somatoform disorder. Sixteen (32%) patients fulfilled the criteria for depressive syndrome, out of which nine (18%) were categorized as having major depressive syndrome and seven (14%) had other depressive syndrome. Other anxiety syndrome was noted in eight patients (16%), and none of the patients had panic syndrome or eating disorder. Four patients (8%) had both somatoform and depressive syndromes, six patients (12%) had both depressive syndrome and other anxiety syndrome, two patients (4%) had both somatoform disorder and anxiety, and two patients (4%) fulfilled the criteria for somatoform
disorder, depressive syndrome, and other anxiety syndrome together.

Baseline QoL in patients with any psychiatric morbidity was compared to those without any psychiatric comorbidity [Table 3]. The analysis revealed poorer QoL scores in patients with psychiatric morbidity in the domains of SF (P < 0.001), RE (P < 0.01), MH (P < 0.01), and MCS (P < 0.01).

**Clinical and echocardiographic parameters after balloon mitral valvotomy**

Significant improvements were seen in NYHA class, mitral valve area, and transmitial gradient following BMV [Table 4]. Majority of patients were in NYHA Class III and II before procedure and it improved to Class I in 94% patients after BMV. Mean mitral valve area by echocardiography improved from 0.7 ± 0.15 to 1.5 ± 0.2 cm². Proportion of patients having orthopnea or paroxysmal nocturnal dyspnea (82%), pedal edema (96%), and palpitations (96%) was reduced to 6%, 6%, and 46%, respectively (P < 0.05). There was no significant change in the ECG rhythm after BMV.

**Impact of balloon mitral valvotomy on quality of life in patients with mitral stenosis**

The effect of BMV on QoL is described in Figure 1. Mean scores in all areas of physical subscale such as PF (32.2), RP (14.0), BP (57.4), and GH (9.4) improved to mean scores of 89.8, 88.0, 77.3, and 63.7, respectively (P < 0.001). Similarly, in mental subscale of QoL, mean scores of VT (23.1), SF (48.5), RE (56.5), and MH (37.0) improved to 60.5, 88.7, 85.8, and 75.0, respectively (P < 0.001). Finally, mean component scores of PCS (29.4) and MCS (34.3) also improved to 52.0 and 49.4, respectively (P < 0.001).

**Impact of balloon mitral valvotomy on psychiatric morbidity in patients with mitral stenosis**

As shown in Figure 2, six patients fulfilled the criteria for somatoform disorder at baseline, while none had somatoform disorder at follow-up. Sixteen (32%) and four (8%) patients had depression pre- and post-BMV, respectively. When classified further, nine patients had major depressive syndrome and seven patients had other depressive syndrome (pre-BMV) that reduced to one patient with major depressive syndrome and three patients with other depressive syndrome at follow-up. Eight patients (16%) had other anxiety syndrome at baseline and none at 3 months of follow-up. None of the patients had new-onset psychiatric disorder at follow-up. None of these patients received any psychotropic medications for their psychiatric ailments during the 3 months of interventional period despite being advised to seek treatment.

**Differences among patients with baseline sinus rhythm and atrial fibrillation after balloon mitral valvotomy**

Table 4 shows improvements in mean gradients across mitral valve from 16.6 to 7.9 mmHg in sinus rhythm patients and from 12.3 to 6.5 mmHg in AF patients (P = 0.011). Improvements in PF and role limitation due to PF were

| Table 4: Effects of balloon mitral valvotomy (BMV) on clinical, electrophysiological and quality of life parameters in patients in sinus rhythm and with atrial fibrillation |
|----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Parameters           | NSR (n=36)      | AF (n=14)       | P between the groups* |
|                      | Pre-BMV (3 months) | Post-BMV (3 months) | Pre-BMV (3 months) | Post-BMV (3 months) | Pre-BMV (3 months) | Post-BMV (3 months) |
| NYHA class           |                 |                 |                 |                 |                 |                 |
| Class I              | 2.6 (0.6)       | 1.1 (0.3)       | 14.6***          | 2.9 (0.5)       | 1.3 (0.5)       | 11.4***          | 0.080 |
| MVA (in cm²)         | 0.8 (0.2)       | 0.8 (0.2)       | -14.4***         | 0.86 (0.1)      | 1.4 (0.2)       | -9.5***          | 0.689 |
| Maximum mitral gradient (in mmHg) | 26.0 (8.2) | 15.5 (5.8) | 6.5*** | 20.3 (6.8) | 14.5 (4.8) | 3.4** | 0.062 |
| Mean mitral gradient (in mmHg) | 16.6 (5.8) | 7.9 (3.3) | 8.2*** | 12.3 (6.2) | 6.5 (1.8) | 3.4** | 0.011* |
| Intra-operative gradient (in mmHg) | 18.8 (5.8) | 2.0 (2.8) | 16.6*** | 17.1 (5.4) | 0.7 (1.2) | 11.7*** | 0.151 |
| Quality of life scores |                 |                 |                 |                 |                 |                 |
| PF                   | 33.5 (14.9)     | 93.9 (7.7)      | -24.4***         | 28.9 (14.6)     | 79.3 (24.2)     | -8.0***          | 0.011* |
| RP                   | 15.1 (25.0)     | 91.8 (12.4)     | -5.2***          | 11.2 (13.5)     | 78.1 (31.0)     | -3.2***          | 0.038* |
| BP                   | 57.0 (35.2)     | 76.0 (25.5)     | -3.9***          | 58.4 (35.7)     | 80.6 (23.8)     | -2.6*            | 0.704 |
| GH                   | 8.7 (13.8)      | 68.7 (23.8)     | -5.2***          | 11.4 (20.7)     | 51.2 (37.8)     | -3.0**           | 0.198 |
| VT                   | 20.8 (16.2)     | 62.8 (21.1)     | -9.0***          | 29.2 (18.1)     | 54.5 (20.0)     | -3.8***          | 0.995 |
| SF                   | 59.3 (37.3)     | 92.0 (17.7)     | -6.6***          | 43.7 (36.6)     | 80.6 (30.5)     | -2.8*            | 0.215 |
| RE                   | 55.7 (25.5)     | 87.0 (21.3)     | -5.5***          | 55.9 (31.1)     | 82.7 (24.8)     | -2.3*            | 0.647 |
| MH                   | 35.1 (20.1)     | 76.4 (23.4)     | -7.2***          | 39.3 (22.2)     | 71.4 (34.3)     | -3.9*            | 0.867 |
| PCS                  | 29.7 (6.5)      | 53.4 (5.1)      | -20.2***         | 28.6 (6.3)      | 48.2 (8.8)      | -9.3**           | 0.073 |
| MCS                  | 33.9 (11.9)     | 50.1 (12.0)     | -5.4***          | 35.4 (15.2)     | 47.5 (15.0)     | -2.2***          | 0.848 |

Values described as mean (SD). AF=atrial fibrillation, NSR=normal sinus rhythm, MVA : Mitral valve area, PF: Physicalfunctioning, RP: Role Limitation Physical, BP: Bodily pain, GH: General Health, VT: Vitality, SF: Social functioning, RE: Role Limitation Emotional, MH: Mental Health, PCS: Physical component summary, MCS: Mental component summary. *P<0.05; **P<0.01; ***P<0.001

*Paired t test or wilcoxon signedrank test to determine significance within the groups, Repeatedmeasures ANOVA for determine P between the groups.
better in patients with normal sinus rhythm compared to AF, whereas in the rest of QoL scores, improvement was not different.

**Differences among patients with and without psychiatric morbidity after balloon mitral valvotomy**

The effects of BMV on QoL in patients with and without psychiatric morbidity are described in Table 5. Analysis of QoL scores before and after BMV in patients with and without psychiatric morbidity showed significant improvement in all domains of QoL including physical, mental, and in component summary scores, except for BP in patients without psychiatric morbidity. The improvement in QoL was independent of the presence of psychiatric illness.

**DISCUSSION**

QoL is a broad-ranging concept affected in a complex way by the person’s physical health, psychological state and level of independence, social relationships, and personal beliefs and their relationship with salient features of their environment. Physical and MH are the major determinants of health-related QoL. The present study was conducted to understand the QoL and MH in chronically ill patients of severe MS, pre- and post-BMV.

Majority of patients were females in their third to fourth decade of life and belonged to lower socioeconomic status. Majority had NYHA Class II or III symptoms with orthopnea/paroxysmal nocturnal dyspnea/palpitations ranging from 3 to 94 months. Forty percentage of patients had a history of rheumatic fever. The clinicodemographic profile of the present study is similar to that of a number of previous studies.  

The study demonstrated poorer overall QoL scores (below average 50) and higher prevalence of psychiatric morbidity (38%) among chronically ill patients of MS subjected to BMV. Depression, anxiety syndrome, and somatoform disorders were the common ailments. This

### Table 5: Effects of balloon mitral valvotomy (BMV) on QoL in patients with and without psychiatric morbidity

| QoL scores | With Psychiatric morbidity (n=19) | Without Psychiatric morbidity (n=31) | P between the groups* |
|------------|----------------------------------|-------------------------------------|----------------------|
|            | PreBMV | Post BMV (3 months) | t/z# | PreBMV | Post BMV (3 months) | t/z# |
| PF         | 27.9 (12.5) | 89.7 (14.7) | -17.4*** | 34.8 (15.6) | 89.8 (16.3) | -15.9*** |
| RP         | 9.5 (13.5) | 91.1 (18.0) | -3.83*** | 16.7 (14.6) | 86.0 (21.9) | -15.8*** |
| BP         | 47.6 (32.5) | 76.5 (29.1) | -4.4*** | 63.4 (35.6) | 77.7 (22.5) | -1.9 |
| GH         | 5.8 (9.9) | 68.3 (29.7) | -3.82*** | 11.7 (18.4) | 61.0 (28.9) | -7.73*** |
| VT         | 20.1 (17.2) | 65.5 (22.2) | -7.2*** | 25.1 (17.2) | 57.5 (19.9) | -6.5*** |
| SF         | 36.8 (37.1) | 85.5 (27.4) | -4.5*** | 55.6 (35.9) | 90.7 (18.8) | -5.5*** |
| RE         | 45.6 (25.4) | 90.8 (18.6) | -5.2*** | 63.2 (25.8) | 82.8 (23.8) | -3.6*** |
| MH         | 27.6 (16.1) | 78.4 (28.6) | -7.0*** | 42.7 (21.0) | 72.9 (24.3) | -5.3*** |
| PCS        | 28.4 (4.7) | 52.1 (4.9) | -24.5*** | 29.9 (7.2) | 51.9 (7.6) | -13.*** |
| MCS        | 28.9 (11.2) | 51.4 (14.0) | -15.1*** | 37.6 (12.6) | 48.2 (12.0) | -3.5*** |

Values described as mean (SD). PF: Physical functioning, RP: role limitation physical, BP: bodily pain, GH: General Health, VT: Vitality, SF: social functioning, RE: role-limitation emotional, MH: Mental Health, PCS: Physical component summary, MCS: Mental component summary. #paired t test or wilcoxon signed rank test to determine significance within the groups, *Repeated measures ANOVA to determine P between the groups. *P<0.05, **P<0.01, ***P<0.001

Figure 1: Change in mean quality of life scores before and after BMV (3 months) in patients with severe mitral stenosis. PF : physical functioning (P<0.001), RP: role limitation physical (P<0.001), BP: bodily pain (P<0.001), SF: social functioning (P<0.001), RE: role-limitation emotional (P<0.0001), PCS: physical component summary (P<0.001) and MCS: mental component summary (P<0.001) were significantly improved after balloon mitral valvotomy (BMV).

Figure 2: Change in psychiatric morbidity before and after BMV (3 months) in patients with severe mitral stenosis. Somatoform disorder, any depressive disorder, major depressive disorder, other depressive syndrome, and other anxiety syndrome were reduced after balloon mitral valvotomy (P<0.05) in patients with severe mitral stenosis.
could be due to prolonged ill state and poor socioeconomic status of such patients. This study also demonstrated the impact of psychiatric morbidity on QoL of these patients, especially poorer scores in social, mental, and emotional scales.

BMV significantly improved cardiac parameters, QoL, and psychiatric morbidity among the studied patients. BMV is known to improve symptoms in chronically ill patients of MS. Kritayaphong et al. demonstrated improvement in QoL on physical and mental scales following BMV. It also improved NYHA functional class and mitral valve area, whereas there was no significant difference of BMV in patient subgroup of sinus rhythm and AF. Shuldham et al. demonstrated that females with RHD experienced greater limitations in their functional abilities compared to healthy controls, and there was no clear effect on MH. Here, we demonstrated no difference in diseased male or female counterparts. We also demonstrated improvement in mean scores in all areas of physical and mental subscales of QoL including mean comprehensive scores of PCS and MCS after BMV. Improvement in QoL among patients with sinus rhythm and AF was largely comparable except in the domains of PF and RP, where there was better improvement in sinus rhythm group. Compared to the findings of previous studies on improved QoL after cardiac valve surgery, the extent of improvement in the present study was of similar magnitude.

The prevalence of mental disorders in the general population as published by the WHO has been classified as follows: somatoform disorder in 0.2%–2%, depressive disorder in 3%–3.5%, and anxiety disorder in 2.4%–18.2%. In general clinical practice, physicians encounter various mental disorders such as somatoform disorder (16%–30%), depressive disorder (6%–26%), and anxiety disorder (4%–18%). Patients with acute rheumatic fever or Sydenham’s chorea have higher prevalence of neuropsychiatric disorders such as obsessive-compulsive disorder, anxiety and depressive disorder, and attention-deficit hyperactive disorder. However, data revealing the associations of psychiatric morbidity in chronic RHD patients are scarce. Shuldham et al. studied anxiety and depression among twenty elderly females with RHD and concluded that these females experienced more severe anxiety and depression than their healthy counterparts. The present study revealed higher prevalence of somatoform disorder (12%), depression (32%), and anxiety disorder (16%) among chronic RHD patients. Patients with somatoform disorder and anxiety syndrome improved following BMV, while the prevalence of depressive disorder reduced from 32% to 8%. None of the patients had new-onset somatoform or depressive or other psychiatric disorder at follow-up. These data suggest the need for screening the patients of RHD for psychiatric ailments and treatment under psychiatry services for optimal care.

Although the present study had demonstrated a short-term improvement in QoL and psychiatric ailments, a long-term follow-up study is warranted as it may have different outcomes. A small sample size and use of screening instrument instead of psychiatrist’s evaluation for psychiatric illness are other limitations of the present study.

**CONCLUSIONS**

Chronically ill patients of MS have poor QoL scores in all domains of physical and mental subscales. There is higher prevalence of psychiatric morbidity among these patients; majority of which corresponded to depressive, anxiety, and somatoform disorders. Psychiatric morbidity strongly affects the QoL of such patients. There is significant improvement in QoL and psychiatric morbidity after BMV. Screening for psychiatric ailments and consultation under psychiatry services are necessary for the optimal care of such patients.

**Highlights**

1. QoL is of paramount importance in chronically ill patients of RHD-MS
2. Depression, anxiety, and somatoform disorders should be searched for in patients with MS
3. The presence of psychiatric ailments poorly affects the QoL
4. BMV improves the QoL and psychiatric comorbidities in patients with MS.

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**Conflicts of interest**

There are no conflicts of interest.

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