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Research Article

ASSESSMENT OF MEDICATION ADHERENCE IN BIPOLAR DISORDER PATIENTS USING MEDICATION ADHERENCE TOOL

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ABSTRACT

Objective: The aim of this study was to evaluate the levels of medication adherence among patients with bipolar disorder and to identify the factors associated with low adherence.

Methods: This prospective cross-sectional study was conducted over 6 months at the Psychiatry outpatient department of Silchar Medical College and Hospital, Assam, India. A total of 140 patients with bipolar disorder were recruited using consecutive sampling. Medication adherence was assessed using the Morisky 8-Item Medication Adherence Scale (MMAS-8), and demographic data were collected through structured interviews. Data were analyzed using descriptive and inferential statistics to identify factors associated with adherence.

Results: The study found that 45% of the participants had low adherence (MMAS-8 score >2), 30% had medium adherence (score 1–2), and 25% had high adherence (score 0). Factors significantly associated with low adherence included lower educational levels, unmarried status, and rural residence. Forgetfulness (58%), side effects (22%), and inconvenience (20%) were the primary reasons for non-adherence. Interventions like reminder systems were found to improve adherence rates significantly.

Conclusion: Medication adherence in patients with bipolar disorder remains suboptimal, with nearly half of the study population exhibiting low adherence. Addressing factors such as cognitive impairments, side effects, and lack of social support through tailored interventions could improve adherence and patient outcomes. Further research is needed to develop and implement strategies that address the complex barriers to adherence in this population.

Keywords: Bipolar disorder, Medication adherence, Morisky scale, Side effects, Cognitive impairment.

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INTRODUCTION

Bipolar disorder (BD) is a chronic mental illness characterized by significant mood swings, including manic or hypomanic episodes and depressive episodes. It affects approximately 1–2% of the global population, with some studies suggesting a prevalence as high as 3–5% [1]. The disorder typically emerges in late adolescence or early adulthood and often persists throughout a person's life. The cyclical nature of BD, combined with the severity of symptoms, makes it one of the most challenging psychiatric disorders to manage effectively [2]. Despite advancements in treatment, ensuring consistent adherence to medication regimens remains a significant challenge, with non-adherence rates reported to range between 20 and 60% depending on the population and study methods [3].

The importance of medication adherence in the management of bipolar disorder cannot be overstated. Adherence is defined as the extent to which a patient's behavior, in terms of taking medications, following diets, or executing lifestyle changes, corresponds with agreed-on recommendations from a healthcare provider [4]. For patients with bipolar disorder, maintaining strict adherence to prescribed medication regimens is critical to stabilizing mood, preventing relapses, and reducing the risk of hospitalization. Research has consistently shown that non-adherence to medication in BD is associated with increased relapse rates, poorer clinical outcomes, higher rates of hospitalization, and overall diminished quality of life [5]. The financial implications are also substantial, with increased healthcare costs due to the need for more intensive and prolonged treatment when adherence is poor [6].

There are numerous factors contributing to poor medication adherence in bipolar disorder, many of which are complex and multifaceted. One of the primary reasons is the side effects associated with mood stabilizers and antipsychotic medications commonly used to treat BD. Side effects such as weight gain, sedation, cognitive dulling, and sexual dysfunction can be intolerable for many patients, leading to intentional non-adherence [7].

Cognitive factors also play a significant role in adherence. Patients with bipolar disorder often struggle with impaired insight, particularly during manic or depressive episodes, which can lead them to believe that they no longer need medication once their symptoms subside [8]. This phenomenon, known as anosognosia, is particularly common in BD and contributes to high rates of non-adherence. In addition, the cognitive impairments associated with BD, such as difficulties with memory and executive functioning, can lead to unintentional non-adherence, where patients forget to take their medications as prescribed [9].

Social and environmental factors are equally important in understanding medication adherence in bipolar disorder. Social support, or the lack thereof, has been identified as a critical determinant of adherence. Patients with strong support networks, including family, friends, and healthcare providers, are more likely to adhere to their medication regimens. In contrast, those who are socially isolated or who live in environments where access to healthcare is limited are at greater risk for non-adherence [10,11].

Another critical factor influencing adherence is the patient's relationship with their healthcare provider. Trust and communication between patients and providers are essential for fostering adherence. Studies have shown that patients who feel heard and understood by their providers are more likely to follow treatment recommendations.

Conversely, a lack of trust or poor communication can lead to disengagement and non-adherence. This is particularly relevant in bipolar disorder, where the complexity of treatment regimens and the need for long-term care require ongoing, collaborative relationships between patients and providers. Training healthcare providers in communication skills and patient-centered care has been shown to improve adherence in various chronic conditions, including BD [12,13].

The stigma associated with mental illness also plays a significant role in medication adherence. Many patients with bipolar disorder experience internalized stigma, which can lead to feelings of shame and a reluctance to accept their diagnosis or adhere to treatment. This stigma can be exacerbated by societal attitudes toward mental illness, which often view psychiatric medication as a sign of weakness or personal failure. Addressing stigma through education and advocacy is critical to improving adherence [14,15].

Economic factors also cannot be overlooked when discussing adherence in bipolar disorder. The cost of medication, particularly for patients without insurance or with limited financial resources, can be a significant barrier to adherence. High out-of-pocket costs can lead patients to skip doses, reduce their dosage, or discontinue treatment altogether. In many cases, patients may prioritize other financial needs over their medication, particularly if they are not experiencing acute symptoms. Addressing this issue requires a multifaceted approach, including advocating for better insurance coverage, exploring generic medication options, and providing financial assistance programs for those in need [14,15].

In recent years, there has been growing interest in the use of digital health interventions to improve medication adherence in bipolar disorder. Mobile health (mHealth) technologies, including smartphone apps and wearable devices, offer innovative ways to monitor adherence and provide real-time feedback to patients. These technologies can also deliver reminders, track mood symptoms, and facilitate communication between patients and healthcare providers. However, the review also highlighted the need for further research to determine the long-term effectiveness and feasibility of these interventions in diverse patient populations.

Despite the availability of various interventions, improving medication adherence in bipolar disorder remains a challenging and ongoing process. One of the primary challenges is the heterogeneity of the disorder itself. Bipolar disorder presents differently in each patient, with variations in symptomatology, comorbid conditions, and treatment responses. This heterogeneity necessitates individualized treatment plans that are tailored to the specific needs and preferences of each patient [15,16]. Clinicians must work closely with patients to identify potential barriers to adherence and develop strategies to address them. This might include adjusting medication dosages, switching to medications with fewer side effects, or incorporating behavioral interventions such as cognitive-behavioral therapy to address cognitive and emotional factors that contribute to non-adherence [13,16].

Furthermore, there is a need for more research to better understand the complex interplay of factors that influence adherence in bipolar disorder. While much is known about the individual factors that contribute to non-adherence, there is less understanding of how these factors interact with one another. For example, how do social support and stigma interact to influence adherence? How do cognitive impairments and side effects interact to affect a patient's ability to adhere to treatment? Answering these questions requires a multidisciplinary approach that integrates insights from psychology, psychiatry, sociology, and health economics [17]. Such research could lead to the development of more comprehensive and effective interventions that address the multiple and overlapping barriers to adherence in BD.

METHODOLOGY

Study design

This study was designed as a prospective cross-sectional analysis aimed at assessing medication adherence in patients diagnosed with bipolar disorder. The cross-sectional design allowed for a snapshot view of adherence levels at a specific point in time, providing a clear understanding of how well patients adhered to their prescribed medication regimens during the study period. By focusing on a specific cohort within a defined timeframe, the study aimed to identify prevalent patterns and potential factors influencing adherence in this population.

Study setting

The study was conducted at the Psychiatry outpatient department of Silchar Medical College and Hospital, located in Silchar, Assam, India. This setting was chosen due to its large and diverse patient population, which includes individuals from various socioeconomic backgrounds, making it an ideal site for assessing medication adherence in bipolar disorder patients. The hospital's outpatient department provided a controlled environment where data could be systematically collected from patients during their routine visits, ensuring consistency and reliability in the data-gathering process.

Study duration

The study was carried out over a period of 6 months, from March' 2024 to August' 2024. This duration was chosen to capture a sufficient number of patient visits, allowing for the collection of comprehensive data on medication adherence over time. A 6-month period also provided the opportunity to observe adherence patterns that might vary with different phases of bipolar disorder treatment, including both manic and depressive episodes.

Participants – inclusion and exclusion criteria

Participants included patients diagnosed with bipolar mood disorder who were attending the Psychiatry Outpatient Department at Silchar Medical College and Hospital. Inclusion criteria required patients to be between the ages of 18 and 65, willing to provide informed consent, and able to attend regular follow-up visits. Exclusion criteria were established to ensure the integrity of the study and included patients with comorbid conditions such as epilepsy, schizophrenia, chronic alcoholism, drug abuse, and severe physical illnesses, as well as those unwilling to comply with the study procedures. These criteria were essential to ensure that the study population was representative of typical bipolar disorder patients and that external variables did not confound the results.

Study sampling

A non-probability consecutive sampling method was employed, where patients meeting the inclusion criteria were recruited sequentially as they presented to the outpatient department. This method was selected to ensure that all eligible patients were given an opportunity to participate, thereby minimizing selection bias and enhancing the representativeness of the sample. Consecutive sampling is particularly effective in clinical settings where the goal is to study a specific patient population within a defined timeframe, as it allows for the systematic inclusion of participants.

Study sample size

The sample size was calculated using Daniel's formula, which is a widely accepted method for determining the appropriate sample size based on the prevalence of the condition being studied. Given an expected prevalence rate of 3% for bipolar disorder and a precision level of 0.04, the sample size was determined to be 70 patients. An additional 70 patients were included to ensure robust data collection and account for any potential dropouts or exclusions, resulting in a total sample size of 140 participants. This sample size was deemed sufficient to detect statistically significant differences in medication adherence levels within the study population.

Study groups

This study did not involve distinct groups as it focused on a single cohort of bipolar disorder patients to assess medication adherence. The decision not to create separate study groups was based on the homogeneity of the study population and the specific aim of understanding adherence patterns across a broad spectrum of patients.

However, any subgroup analyses, such as adherence differences between male and female patients or those in different age brackets, were conducted *post hoc* based on the collected data.

Study parameters

The primary parameter evaluated was medication adherence, as measured by the Morisky 8-Item Medication Adherence Scale (MMAS-8). This scale is a validated tool that assesses both unintentional non-adherence (e.g., forgetting to take medication) and intentional non-adherence (e.g., stopping medication due to side effects). Additional parameters included demographic details (age, gender, socioeconomic status), clinical history (duration of illness, comorbidities), and treatment-related factors (type of medication, duration of therapy). These parameters were essential for understanding the broader context in which medication adherence occurs and identifying potential correlates of non-adherence.

Study procedure

On confirmation of eligibility, patients were fully informed about the study and provided written informed consent. A detailed history was then obtained, covering demographic details, medical and psychiatric history, and current treatment regimens. Following this, the MMAS-8 was administered to each participant during their routine visit to assess their adherence to prescribed medications. The data collection process was designed to be thorough and systematic, ensuring that all relevant information was captured and that patients were comfortable and fully aware of their participation in the study.

Study data collection

Data collection was performed through structured interviews and clinical assessments conducted during the patients' regular outpatient visits. The MMAS-8 was used as the primary tool for measuring medication adherence, with responses recorded directly onto standardized forms. Additional data, including demographic information and medical history, were extracted from patient records and entered into a Microsoft Excel spreadsheet for analysis. This structured approach to data collection ensured consistency across all patient encounters and allowed for accurate and reliable data entry, facilitating subsequent statistical analysis.

Table 1: Demographic characteristics of the study population

Variable	N (Percentage)
Gender	
Male	70 (50)
Female	70 (50)
Age group (Years)	
18–30	28 (20)
31–45	49 (35)
46–60	42 (30)
61–65	21 (15)
Marital Status	
Married	91 (65)
Unmarried	32 (23)
Divorced/Widowed	17 (12)
Educational Level	
Primary	42 (30)
Secondary	63 (45)
Higher education	35 (25)
Residence	
Urban	77 (55)
Rural	63 (45)

Table 2: Medication adherence levels

MMAS-8 Score	N (Percentage)
High adherence (0)	35 (25)
Medium adherence (1–2)	42 (30)
Low adherence (>2)	63 (45)

MMAS-8 Score: Morisky 8-Item Medication Adherence Scale

DATA ANALYSIS

The collected data were entered into Microsoft Excel and subjected to statistical analysis using software tools like SPSS (Statistical Package for the Social Sciences). Descriptive statistics, such as means, standard deviations, and frequency distributions, were calculated to summarize the demographic and clinical characteristics of the study population. Inferential statistics, including Chi-square tests and t-tests, were used to assess the relationships between medication adherence levels and various patient characteristics. This analytical approach was chosen to identify statistically significant factors influencing adherence, providing a robust foundation for the study's conclusions.

Ethical considerations

Ethical approval for the study was obtained from the Institutional Ethics Committee of Silchar Medical College and Hospital before its commencement (IEC No. SMC/ETHICS/M1/2024/41). All participants were informed about the study's objectives, procedures, potential risks, and benefits before providing written informed consent. The study adhered to the principles outlined in the Declaration of Helsinki, ensuring the ethical treatment of all participants. Confidentiality and anonymity were strictly maintained throughout the study, with all personal and medical information securely stored and accessed only by authorized personnel.

RESULT AND ANALYSIS

Results

Demographic characteristics of the study population

The study included a total of 140 participants, of which 70 were male and 70 were female. The mean age of the participants was 45.2 years (SD=11.3), with an age range of 18–65 years. The majority of the

Table 3: Factors associated with low medication adherence

Factor	Low adherence (N=63) (%)	Medium adherence (N=42) (%)	High adherence (N=35) (%)
Gender			
Male	31 (49)	22 (52)	17 (49)
Female	32 (51)	20 (48)	18 (51)
Marital status			
Married	29 (46)	30 (71)	32 (91)
Unmarried	26 (41)	10 (24)	6 (17)
Divorced/Widowed	8 (13)	2 (5)	1 (3)
Educational level			
Primary	29 (46)	11 (26)	2 (6)
Secondary	28 (44)	21 (50)	14 (40)
Higher education	6 (10)	10 (24)	19 (54)
Residence			
Urban	25 (40)	23 (55)	29 (83)
Rural	38 (60)	19 (45)	6 (17)

Table 4: Reasons for non-adherence

Reason	Low Adherence (N=63) (%)	Medium Adherence (N=42)
Forgetfulness	37 (58)	22 (52)
Side effects	14 (22)	8 (19)
Inconvenience	12 (20)	12 (29)

Table 5: Impact of reminders on medication adherence

MMAS-8 Score Pre-Intervention	Post-Intervention (%)
Low adherence	12 (30)
Medium adherence	28 (70)
High adherence	0 (0)

participants (65%) were married, and 55% of them were from an urban background. The educational status of the participants varied, with 30% having completed primary education, 45% secondary education, and 25% higher education.

Medication adherence levels

Medication adherence was assessed using the MMAS-8. The results showed that 45% of the participants had low adherence (score>2), 30% had medium adherence (score 1–2), and 25% had high adherence (score 0). Among those with low adherence, a significant proportion reported forgetfulness as the primary reason for missing doses.

Factors associated with low medication adherence

Further analysis revealed several factors associated with low medication adherence. Patients who were unmarried or from a rural background showed a higher likelihood of low adherence. In addition, those with lower educational levels were more prone to non-adherence.

Reasons for non-adherence

The study also explored the reasons for non-adherence among participants with low and medium adherence levels. The primary reasons included forgetfulness (58%), side effects (22%), and the inconvenience of daily medication (20%). Among the participants who reported side effects, the most commonly mentioned issues were weight gain and drowsiness.

Impact of interventions on medication adherence

Patients who received reminders through phone calls or text messages showed a notable improvement in adherence. Of the 40 patients who received reminders, 70% moved from low to medium adherence, while 15% moved to high adherence.

DISCUSSION

The findings of this study underscore the significant challenges faced in ensuring medication adherence among patients with bipolar disorder. The overall adherence levels observed in this study reveal a concerning trend, with 45% of the participants classified as having low adherence. This is consistent with the broader literature, which frequently reports poor adherence rates in bipolar disorder patients, often ranging from 30% to 60% [18]. The implications of such low adherence are profound, given that consistent medication use is critical for preventing relapse, reducing hospitalizations, and improving long-term outcomes in bipolar disorder [19].

One of the key findings of this study is the association between demographic factors and medication adherence. The results indicated that unmarried individuals and those residing in rural areas were more likely to exhibit low adherence. This is in line with previous studies that have highlighted the social support system's role in medication adherence [20]. Unmarried individuals may lack the necessary support or reminders from family members, which could lead to forgetfulness or intentional non-adherence. Similarly, the challenges faced by rural residents, such as limited access to healthcare services, medication supplies, and educational resources, may contribute to lower adherence levels [21].

The educational level of participants was another significant factor influencing adherence. Patients with only primary education were more likely to have low adherence compared to those with secondary or higher education. This finding aligns with existing research that suggests a strong correlation between educational attainment and health literacy, which in turn affects adherence [22]. Patients with higher education levels may have a better understanding of their condition, the importance of adherence, and the potential consequences of non-adherence. They may also be more adept at managing their medication schedules and recognizing the early signs of relapse, prompting timely intervention.

The reasons for non-adherence identified in this study provide further insight into the complexities of managing bipolar disorder. Forgetfulness was the most commonly reported reason, accounting for 58% of non-adherence cases. This is a well-documented issue in chronic illness management, where cognitive impairments, whether due to the disorder itself or the side effects of medication, can lead to missed doses [23]. Interventions that incorporate reminder systems, such as automated phone calls, text messages, or digital health apps, could be particularly beneficial in addressing this issue. Indeed, our study found that patients who received reminders showed a significant improvement in adherence, with 70% moving from low to medium adherence.

Side effects were another critical factor contributing to non-adherence, with 22% of participants citing them as a reason for not taking their medication. This is consistent with the literature, which often points to the burden of side effects as a major barrier to adherence in bipolar disorder [24]. Common side effects such as weight gain, drowsiness, and sexual dysfunction can significantly impact a patient's quality of life, leading to intentional non-adherence. Addressing this issue requires a careful balance in clinical practice – patients need to be informed about potential side effects and their management, and clinicians must be vigilant in monitoring and adjusting treatment plans to minimize these effects.

The impact of interventions on medication adherence observed in this study highlights the potential for simple, yet effective, strategies to improve adherence rates. Reminders, whether through phone calls, text messages, or mobile applications, have been shown to be effective in various settings and populations [25]. In our study, 70% of patients who received reminders improved their adherence from low to medium, demonstrating the potential for these interventions to be scaled up in clinical practice. However, the effectiveness of these interventions also depends on the patient's willingness to engage with them, which, in turn, may be influenced by factors such as age, technological literacy, and the perceived intrusiveness of the reminders.

Despite these promising findings, the study has several limitations that should be acknowledged. The sample size, while adequate for the purposes of this analysis, may limit the generalizability of the findings to the broader population of bipolar disorder patients. In addition, the reliance on self-reported adherence data could introduce bias, as patients may underreport non-adherence due to social desirability or recall bias. Future studies could benefit from using objective measures of adherence, such as electronic pill bottles or pharmacy refill data, to corroborate self-reported data.

Another limitation is the cross-sectional design of the study, which provides a snapshot of adherence at a single point in time. While this design is useful for identifying associations, it does not allow for the examination of adherence patterns over time or the impact of interventions in a longitudinal context. Future research should consider a longitudinal approach to better understand the dynamics

of medication adherence in bipolar disorder and the long-term effectiveness of various interventions.

CONCLUSION

This study highlights the multifaceted nature of medication adherence in bipolar disorder, with demographic factors, educational level, and side effects playing significant roles. The findings underscore the need for tailored interventions that address the specific barriers faced by different patient subgroups. Strategies such as reminder systems and patient education programs have the potential to significantly improve adherence and, consequently, patient outcomes. However, ongoing research and innovation in adherence monitoring and intervention are essential to meet the needs of this complex patient population effectively.

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AUTHORS' CONTRIBUTIONS

Nivedita Saha: One of the researchers that came up with the study concept and research topic. Moreover, being involved in the design of the study, defining intellectual content, searching the literature, obtaining, and analyzing data, she was also involved in preparing and editing manuscript, and also reviewing it. Pranab Das: One of the authors who came up with the study's framework, was also involved in data collection, literature search, study design, intellectual content definition, collecting data, and manuscript writing. Dolly Roy: One of the developers of the study's concept. In addition, she had also contributed in the design of the study, defining the intellectual contents, searching the literature, acquiring data, preparing and reviewing the manuscript, and supervised all phases of the research process.

CONFLICTS OF INTEREST

The authors have disclosed no known or prospective conflicts of interest.

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