LITHIUM KNOWLEDGE AMONG PATIENTS WITH BIPOLAR DISORDER – A STRUCTURED ASSESSMENT

Submitted By

Dr. R.SHREE AARTHI, MBBS.,

Dissertation submitted to

THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY, CHENNAI,

In partial fulfillment of the requirements for the degree of

DOCTOR OF MEDICINE IN PSYCHIATRY

Under the guidance of

Dr. G. RAGHUTHAMAN

Professor & Head of Department

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PSG INSTITUTE OF MEDICAL SCIENCES AND RESEARCH

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DECLARATION BY THE CANDIDATE

I hereby declare that this dissertation entitled **"Lithium Knowledge among patients with Bipolar Disorder- A Structured Assessment"** is a bonafide and genuine research work carried by me under the guidance of Dr. G. Raghuthaman, Professor and Head of Department, Department of Psychiatry, PSGIMS & R, Coimbatore.

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I dedicate this thesis to my Professor Dr.Raghuthaman, Head of Department of psychiatry and my family members, who guided me throughout my post graduation and were my source of inspiration in all stages of my life.

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Dear Dr Shree Aarthi,

Institutional Human Ethics Committee, PSG IMS&R reviewed and discussed your application dated 05.12.2014 to conduct the research study entitled "*A structured educational programme to improve the knowledge about lithium therapy among patients with bipolar disorder - A randomized control study*" during the IHEC meeting held on 19.01.2015.

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2. Study protocol
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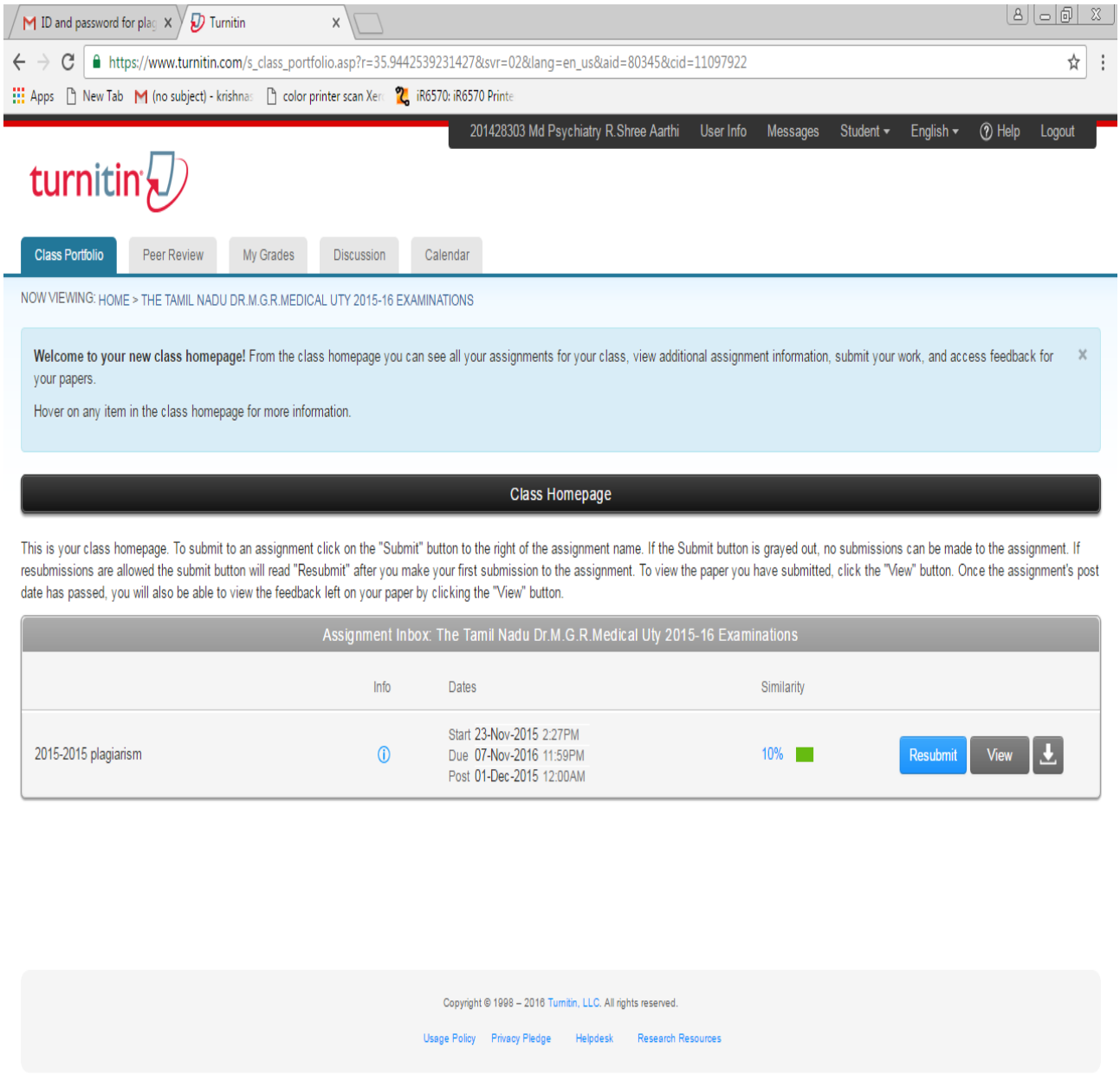
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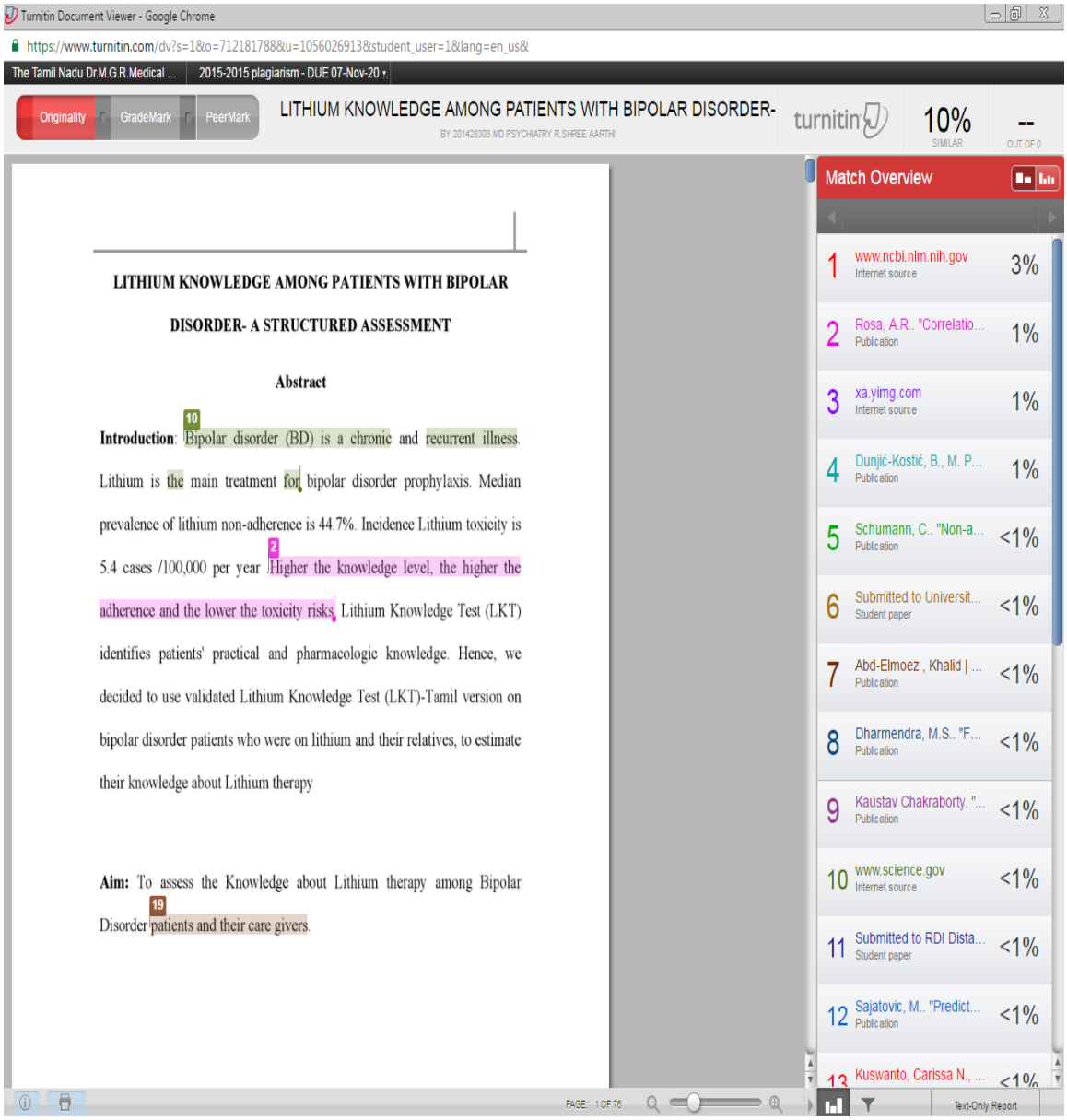
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LITHIUM KNOWLEDGE AMONG PATIENTS WITH BIPOLAR DISORDER- A STRUCTURED ASSESSMENT

Abstract

Introduction: Bipolar disorder (BD) is a chronic and recurrent illness. Lithium is the main treatment for bipolar disorder prophylaxis. Median prevalence of lithium non-adherence is 44.7%. Incidence Lithium toxicity is 5.4 cases /100,000 per year .Higher the knowledge level, the higher the adherence and the lower the toxicity risks. Lithium Knowledge Test (LKT) identifies patients' practical and pharmacologic knowledge. Hence, we decided to use validated Lithium Knowledge Test (LKT)-Tamil version on bipolar disorder patients who were on lithium and their relatives, to estimate their knowledge about Lithium therapy

Aim: To assess the Knowledge about Lithium therapy among Bipolar Disorder patients and their care givers.

Methodology: Patients and care givers were assessed for knowledge about lithium using validated Lithium knowledge questionnaire (Tamil version) and scores were obtained.

Result: Out of 39 patients, 36 participants were getting treatment for manic episode and 3 participants were getting treatment for depressive episode. The mean LKT scores of patient and relatives were 9.52 (SD=4.32) and 8.53 (SD=4.65) respectively. Negative Pearson's correlation was found between lithium knowledge score and age of the patient (p=0.033). Positive spearman's rho correlation was found between patient's knowledge and number of years of education (p=0.005). Negative spearman's rho correlation was found between patient's knowledge and age of onset of illness (p=0.039).Positive correlation was found between patient's lithium knowledge and number of episodes of illness (p=0.026).Positive correlation was also found between patient's knowledge and their care givers knowledge (p=0.013). Others factors like socioeconomic status, duration of illness, duration of lithium treatment and number of hospitalization had no influence on knowledge.

Conclusion: Knowledge about lithium therapy was inadequate among patients and care givers. Age of patient, number of years of education, age of onset of illness and number of episodes had correlation with patient's lithium knowledge. Good knowledge about lithium in care givers tends to influence knowledge of their patients.

Keywords: Lithium, Bipolar Affective disorder, Lithium Knowledge Test, Compliance, Relapse, Adherence

INTRODUCTION

Lithium is the first-line maintenance treatment of bipolar affective disorder according to recent NICE guidelines, 2014[1]. Lithium acts as a mood stabilizer and prevents recurrence of manic episodes and to lesser extent depressive episodes. Lithium is being used for more than fifty years in the treatment of Bipolar affective disorder. It also helps to prevent suicide in patients with mood disorders. It is also used to treat depressive episodes in bipolar disorder and as an augmenting agent to antidepressants for unipolar depression[2].It is used as high-dose monotherapy for euphoric mania. Lithium is equally efficacious in bipolar disorder compared to valproate for manic, depressive, or mixed episodes[3].

Mechanism of action

The mechanism of action of Lithium is not clearly understood. It acts at various signal transduction sites beyond neurotransmitter receptors (Figure1). This includes second messengers, such as the phosphatidyl inositol system, where lithium inhibits the enzyme inositol monophosphatase; modulates G proteins; and regulates gene expression for growth factors and neuronal plasticity by interaction with downstream signal

transduction cascades, including inhibition of GSK-3 (glycogen synthase kinase 3) and protein kinase C [3] . Other Literature shows that Lithium is an element which is similar to sodium in the body. Sodium is present everywhere in the human body and is involved in many biological processes. There is some evidence that people with bipolar illness have higher intracellular concentrations of sodium and calcium when compared with the controls. Lithium is said to reduce these levels [4].

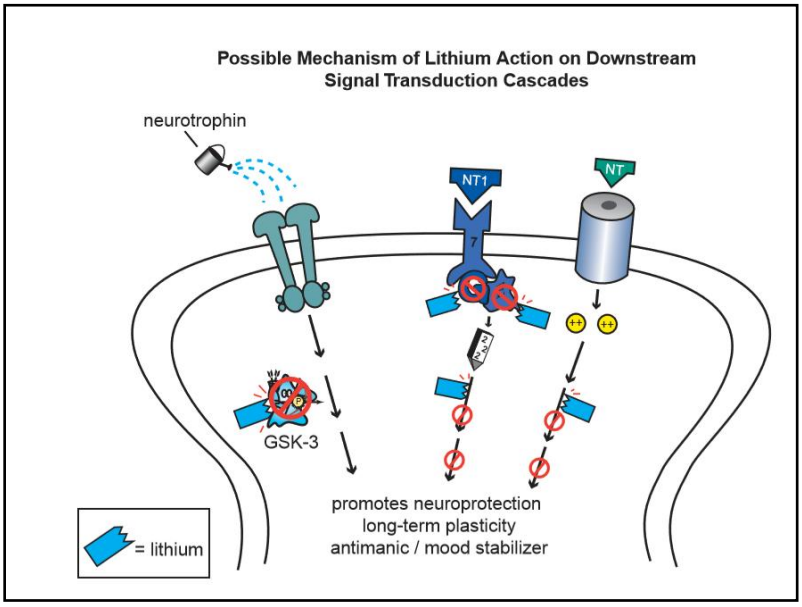


Figure 1: Mechanism of action of Lithium

Lithium enhances cognition

Another potential use of lithium is in cognition; inhibition of GSK-3 by lithium inhibits the phosphorylation of tau (τ) proteins and thus slows the formation of plaques and tangles in Alzheimer's disease. Few studies have shown that lithium can prevent progression from mild cognitive impairment to Alzheimer's disease. It also reduces phosphorylated τ levels, especially when it is given for a long duration (> 1 year), even at low doses[3]. Lithium has protective cognitive effects also through its effects on N-methyl-D-aspartate (NMDA) pathways[4]. It also has its effects on neuroprotective proteins like Bcl-2 and its actions on regulators of apoptosis and cellular resilience, such as GSK-3.[5]

Lithium and suicide

About 15% of people with bipolar affective disorder commit suicide [6]. Studies have shown that Lithium has reduced suicidal rate by 80 % in patients with bipolar illness[7].The mechanism of this protective effect of Lithium from suicide is unknown.

Adverse Effects

More than 80% of patient who are on treatment with Lithium experience side effects. Regular monitoring of Lithium blood levels becomes very important to minimize these adverse effects. The most common adverse effects of lithium include gastrointestinal symptoms such as dyspepsia, nausea, vomiting, and diarrhea. Other adverse effects are weight gain, hair loss, acne, tremor, sedation, decreased cognition, and incoordination. There are also long-term adverse effects on thyroid and kidney function.[8]

Lithium is also known to cause interaction with other drugs which are commonly used for other medical ailments, which results in either augmentation or minimization of the therapeutic action of Lithium thereby causing side effects.

Lithium toxicity:

Lithium has a narrow therapeutic window, so regular monitoring of plasma drug levels is required[3]. The therapeutic levelof Lithium ranges from 0.8-1.2 mmol/L[8]. Lithium toxicity occurs at levels >1.5 mmol/L. The symptoms of Lithium toxicity are gastro-intestinal effects (anorexia, nausea and diarrhoea) and CNS effects (muscle weakness, drowsiness, ataxia,

course tremor and muscle twitching). At levels above 2 mmol/L, seizures and disorientation may occur, sometimes can progress to coma and death. A study has shown mortality rate of 9% and permanent neurological damage in 10% of patients secondary to Lithium intoxication[9]. In the presence of more severe symptoms, osmotic or forced alkaline diuresis should be used but not thiazide or loop diuretics as it can cause drug interaction with Lithium [3]. Education about toxicity symptoms and risk factors of toxicity should be given to patients who are taking Lithium. [10]

Drug Adherence

A marked difference has been noted between the efficacy of lithium in clinical trials and its effectiveness in day to day clinical practice. This difference is mainly attributed to poor treatment adherence[13]. Rates of lithium non-adherence are high, ranging from 18% to 52%, with a median prevalence of 44.7% [11]. Another study had shown non-adherence rate of medication in unipolar and bipolar disorders ranging from 10 to 60% (median 40%)[12].Even after the introduction of new drugs the prevalence of non-adherence is still remains the same. This shows that the attitudes and beliefs of patient and family members are more important factors contributing to adherence. There are very limited number of studies which

assesses the factors contributing to non-adherence and methods to overcome it.Non-adherence is associated with multiple risks like increase in relapse rate, rehospitalization and lengthier hospital stays.

A well done study showed that lithium knowledge was the main difference between adherent and non-adherent bipolar patients. Studies have shown that higher the knowledge level, the higher the adherence and the lower the toxicity risks [13, 14]. So knowledge about the illness and lithium therapy is important and it can influence the course of bipolar disorder and reduce the risk of toxicity[13].Several studies have shown that psychoeducation interventions are associated with high adherence rates, stabilization of plasma lithium levels, reduction of the total number of episodes and total number of patients needing to hospitalization.[15, 16]It also helps in early detection of prodromal signs followed by prompt drug intervention. Compliance also improves with psychoeducation. Education about lithium is important in the elderly. Refresher courses are advisable for those who have been on lithium for long term management. Interventions which modify attitudes and enhance the knowledge are likely to be helpful in promoting adherence.

Lithium Knowledge test Questionnaire:

Lithium Knowledge can be systematically assessed using scales like Lithium Attitudes Questionnaire (LAQ) and Lithium Knowledge Test (LKT)[13,17]. Lithium Knowledge Test (LKT) is a structured, validated scale that was developed to identify patients' practical and pharmacologic knowledge. One point is scored for each correct answer and one point is deducted for each wrong answer. Finally total Lithium Knowledge Score is calculated. Some items in questionnaire cover areas of potential hazards to patients on lithium. Scores of these items are added up separately to give a Lithium Hazard Score (LHS). The original English version has been validated in psychiatric population and has shown good reliability

Another study (reference)used Lithium Knowledge test questionnaire as a tool to assess Knowledge about Lithium. Thirty participants, who were attending lithium clinic, were giving written handouts and videotape lecture about Lithium. A parallel group with thirty patients served as a control group. This control group did not receive any health education programme. The group which received health education had significant increase in the Lithium Knowledge which was measured using Lithium Knowledge Test questionnaire. Even the patient’s attitude about Lithium improved after

educational programme which was measured using Lithium Attitudes Questionnaire.

We believe it is imperative that clinicians should estimate the knowledge of lithium among patients who are getting lithium therapy so that appropriate psychoeducation can be delivered. In our literature search, we did not find any published literature from India in this area. Hence, we decided to use validated Lithium Knowledge Test(LKT) questionnaire in our native language on patients with bipolar disorder who were on lithium, to estimate knowledge about Lithium therapy. As all our patients are being cared by their family, hence we had planned to estimate the knowledge of lithium therapy among primary care givers using the same scale.

RATIONALE OF OUR STUDY

There are studies done to assess Lithium knowledge in patients who have been taking Lithium, either newly initiated or have been on long term maintenance. Few studies have focused on elderly age group people as they are more vulnerable to the adverse effects of drug. These studies have used structured scales to measure Lithium knowledge.

- To our knowledge there are no studies done in India to assess the knowledge about Lithium in patients who are taking it for their bipolar illness.

- Similarly there are no studies done which assesses the lithium knowledge among primary care givers of patients who are on Lithium therapy

- We used Lithium Knowledge Test questionnaire which is adapted and validated in native language (Tamil) so that knowledge about Lithium can be assessed better.

So we planned to do this study to assess the knowledge about Lithium among Bipolar disorder patients and their primary care givers using **Lithium Knowledge Test questionnaire** in Tamil language.

REVIEW OF LITERATURE

Studies show that lifetime prevalence of Bipolar Affective disorder is 1%. But the prevalence increases to 8% when the concept of bipolar affective disorder is extended to include mania, hypomania, brief Hypomania and cyclothymia.[18]Several studies have shown that Lithium is the main treatment in prophylaxis of bipolar disorder and reduces the recurrence of another manic or depressive episode.[19]

This effectiveness is not seen in regular clinical practice when compared with monitored clinical trials. This may be because of poor compliance of the patient[14]. There are many reasons for the non-adherence to treatment. One of the studies analyzed the reason for non-compliance in long term Lithium management in38 bipolar, 21 unipolar and 17 schizoaffective patients which was diagnosed according to DSM-III-R. In their study 53.9% discontinued prophylaxis treatment during the follow up. In that about 43.2% of the discontinuations were within first 6 months. The main reason for non-adherence of drug in this study was resistance against long-term treatment. The non-adherent patients also showed significantly less acceptance to the prophylaxis than adherent patients. Even in multivariate analysis of various parameters, negative attitude to prophylaxis correlated significantly with non-adherence.[20]

Another study which was done to assess the Predictors of non-adherence in Bipolar affective disorder patients showed treatment non-adherent individuals had more negative attitudes towards medications, fewer reasons for adherence, reduced insight into illness, and more perceived reasons for non-adherence when compared with treatment adherent individuals. One of the important predictors for non-adherence in this study was difficulty with medication routines which had an odds ratio of 2.2 and another predictor was negative attitudes towards drugs in general with an odds ratio of 2.3. In this study even participants with co-morbid substance abuse had poor adherence.[21]

A study was done in thirty out-patient attending Lithium clinic for assessment of precursors of Lithium compliance. The Lithium knowledge and attitude was measured using Lithium knowledge test and Lithium attitude questionnaire respectively. Mean average score in Lithium knowledge test was attained by 52.6% of the participants. Mean average score in Lithium attitude questionnaire was achieved by 13.1%. Surprisingly in this study Lithium Knowledge, attitude and patients satisfaction did not have correlation with the lithium compliance. There was also negative correlation between age of patient and Lithium Knowledge, with a

significant p value < 0.01. The attitude of Lithium had a decreasing trend with increase in number of year on lithium (P<0.05).[22]

One study was conducted with fourteen studies involving 257 patients with a diagnosis of bipolar I disorder[23].This study analyzed patients who stopped taking Lithium. Relapse of new affective episode occurred in more than 50% of the study population within 10 weeks of stopping the medication. Mania occurred 5.2 times earlier when compared with depressive disorder. This study clearly showed that discontinuation of Lithium may result in high relapse rate. Another study also showed similar results which was conducted to assess why patient on lithium discontinue medication. This study shows a relapse rate of 20-75% after discontinuing lithium prophylaxis. [24]

A study which was done to assess the factors related to non-compliance of drugs in patients taking psychotropic medications showed an array of cause for non-compliance. This study was done in Indian population with 100 participants visiting out-patient clinic. About 56% had transport problems, 62% were related to disease characteristics, 52% due to drug side effects, 49% cultural myth, 55% due to poor mental health service, 48% due

to other social factors, 43% due to economic factors, 36% due to illiteracy and 31 % due to poor Knowledge and insight into illness.[25]

Dharmendra MS et al. (2003) studied various factors associated with knowledge about Lithium treatment in 742 patients. This study showed that patients who had positive attitude towards lithium had higher serum lithium levels ($p = 0.005$). These patients also had good compliance with a significant p value of <0.001. This study concluded that participants with high knowledge about Lithium had better adherence rate when compared with participants with poor knowledge. Another study which assessed the correlation of lithium treatment adherence and treatment attitudes with knowledge among bipolar affective disorder patients showed a positive correlation between Lithium Knowledge Test with plasma and red blood cell lithium. This study concluded that Lithium knowledge level directly correlates with treatment adherence and inversely correlates with patients' attitudes like opposition to prophylaxis, lower adherence, denial of therapeutic effectiveness, fear of side effects and illness severity[13].

Ali Sharifi et al., (2009) have also highlighted that as attitudes and beliefs are as important as side-effects of Lithium in predicting adherence rate in patients on Lithium.[26]

Adherence to medications is very important as it reduces the relapse rate and improves the quality of life. A 6-year naturalistic follow-up study which assessed non-adherence with long-term prophylaxis showed only the adherent patients having a significant reduction in the number and duration of admissions.[20]

The major concern while prescribing Lithium is its risk of toxicity. In a study which studied incidence, course and changes in renal function of Lithium intoxication by examining a cohort of patients on lithium from 1997 to 2013 showed that out of 1340 patients, 96 patients had at least one episode were their lithium levels was 1.5 mmol/L. The incidence of Lithium intoxication was 0.01 per patient-year[27]. Another study done by *Oruch, et al.* (2014) suggests that lithium poisoning frequently occurs, since it is used by individuals at high risk of taking an overdose. [28]

A study which reviewed Lithium toxicity in 130 cases followed over 5 years with biochemical lithium toxicity had incidence rate of 5.4 cases per 100,000 per year. In this study mean toxic level of lithium was 2.16 mmol/L. These patients presented mainly with neurological symptoms like tremor, ataxia, confusion and drowsiness. In their sample, 50% of patients were on medications that interact with lithium and 15% cases were on polypharmacy. Subsequently 70% were admitted in hospital and 11% required haemodialysis.[29]

A study done by *Enudi et al.,* (2014) showed Lithium toxicity had a mortality rate of 25% in an acute overdose. In maintenance therapy the mortality rate was 9% and 10% of them suffered from permanent neurologic damage[2]. Another study showed, out of 23 patients reported two died and two developed persisting neurological sequelae.[9]

Lithium neurotoxicity is common among the elderly at concentrations which are considered to be "therapeutic" in adult populations. This may be due to decrease in total body water as the age increases. Therefore, adult dosage of lithium in older individuals can result in higher lithium concentration and toxicity. Another factor is decrease in glomerular filtration rate as age advances. Lithium is a drug which is excreted by the kidney, so

in older age group individuals the elimination of lithium through kidneys may not be as effective as other general adult population which increases the risk of lithium toxicity in the elderly. Other factors include drug interaction with various others drugs with are commonly used for medical ailments in elderly. Also co-morbid medical illness results in electrolyte imbalance and decreased circulating volume[30]. The most common offending drugs which cause interaction with lithium are angiotensin-converting enzyme inhibitors, thiazide diuretics, and non steroidal anti-inflammatory drugs, which are commonly used in the elderly.[31]Also there are studies which have shown elderly age group people having less knowledge about Lithium when compared with younger people ($P<0.001$). [14]

A study done by *Oruch R, et al.*, (2014) analyzed etiology of Lithium intoxication. This study showed 9.9% of the cases of intoxication were due to infection, 12.1% cases were associated with starting of drugs which has risk of drug interaction with Lithium. Four (4.4%) of these episodes were associated with initiation of non-steroidal anti-inflammatory drugs (NSAID).Three (3.3%) episodes were associated with initiation of Thiazide and loop-diuretics. Seven (7.7%) episodes were accounted by ACE inhibitors, angiotensin receptor blockers or spironolactone.[28]

A study assessed correlation between psychoeducation and serum Lithium level[15]. This study showed Mean serum lithium levels were significantly higher and more stable in group who received psychoeducation when compared with group who did not receive any psychoeducation.

May studies have assessed Lithium Knowledge using validated questionnaire. A study done by *Harvey and Peet* (1991) showed that Lithium Knowledge can be assessed in patient taking Lithium using validated questionnaires like Lithium Knowledge Test (LKT)and Lithium Attitudes Questionnaire (LAQ) [17]. This study compared that Knowledge of Lithium among patients with concentration of lithium in red blood cells (RBC) as a method of measuring compliance. This study showed that increase in lithium knowledge was found to be associated with better compliance, which had a significant p value ($P<0.05$). It was also negatively correlated with serum lithium levels ($P< 0.02$). One another study done by *Adriane R Rosa, et al.,* (2006), also used Lithium Knowledge Test questionnaire to assess the Knowledge about Lithium[13]. Another study which was done to assess lithium Knowledge among elderly population also used Lithium Knowledge Test questionnaire[2]. These studies show that this

questionnaire is widely used in all age group population for assessment of Lithium Knowledge.

This Questionnaire has been adapted and validated in Tamil, which is the native language of our study population. This questionnaire is easy to understand as it is in simple language. It also has good sensitivity and specificity[33].

AIM

To assess the knowledge about Lithium therapy among patients with Bipolar Disorder and their care givers.

OBJECTIVES

Primary Objective:

Using Lithium Knowledge test questionnaire, to assess knowledge about Lithium Therapy in Bipolar Disorder patients and their care givers.

Secondary objective:

To assess whether the following factors would influence knowledge of lithium

- Sociodemographic variables: Age, Gender, Education, Marital status, substance abuse, occupation, socioeconomic status
- Clinical variables: Age of onset, duration of illness, duration on lithium treatment, number of episodes and number of hospitalization.
- Compare patient's knowledge with their care givers knowledge

METHODOLOGY

Study design:

This is a cross sectional and descriptive study.

Sample recruitment:

Patients admitted in the department of psychiatry with the diagnosis of Bipolar Affective Disorder (BPAD) meeting DSM IV TR criteria and who were initiated on Lithium therapy are our participants.

Inclusion criteria

All patients >18 years of age with a clinical diagnosis of bipolar disorder who received in-patient treatment with lithium during the period between May 2015 to August 2016 were screened. Patients, who qualify for DSM IV TR criteria of bipolar disorder when interviewed by SCID, were recruited for our study.

Exclusion criteria

1. Patients who have co-morbid substance dependence syndrome other than tobacco use are excluded.
2. Patients who are on other mood stabilizers (sodium valproate, carbamazepine, lamotrigine)

Materials used in the study:

I. Patient proforma

II. Hamilton Depression Rating Scale (HDRS)

III. Young Mania Rating Scale (YMRS)

IV. Lithium Knowledge Test Questionnaire (Tamil version)

I. Patient proforma:

In this proforma we collected the following details,

a) Socio-demographic profile of the patient.

b) Details of substance use.

c) Diagnosis

d) Clinical details- Age of onset of illness, No. of episodes, No. of Hospitalizations, duration of illness, duration on Lithium, Lithium dosage, Serum Lithium level.

e) Primary care giver and their educational qualification.

II. Hamilton Depression Rating Scale (HDRS)

The HDRS (also known as the Ham-D) is a clinician rating scale. It takes 20–30 minutes for its administration. It's mainly devised to assess severity, and change in depressive symptoms in adult population. The original version contains 17 items (HDRS17) pertaining to depressive symptoms experienced in the past week. A 21-item version (HDRS21) included extra 4 items, which is intended to subtype the depression. A limitation of this scale is, it does not assess atypical symptoms of depression (e.g., hypersomnia, hyperphagia).

This scale was used in our study to assess the symptom severity of depressive episode and we ascertained that patient had reached euthymic state if HDRS score is <8(Hamilton Depression Rating Scale–17).[42]

III. Young Mania Rating Scale (YMRS)

The Young Mania Rating Scale (YMRS) is used frequently to assess manic symptoms. This is a clinician rated scale. It takes 15-30 minutes for administration. The scale consists of 11 items. Some of the items are graded on a 0 to 8 scale (thought content, irritability, speech and disruptive/aggressive behaviour), while the remaining seven items are graded on a 0 to 4 scale.

This scale was used in our study to assess the symptom severity of manic episode and we ascertained that patient had reached euthymic state if YMRS score is <6.[43]

IV. Lithium Knowledge Test Questionnaire (Tamil version)

Peet and Harvey [17] devised Lithium knowledge test(LKT). Lithium Knowledge Test questionnaire is a brief questionnaire which identifies practical and pharmacological knowledge of patient which are very important in Lithium treatment if therapy is to be safe and effective. The original English version has been validated in psychiatric population and has shown good reliability. This scale has 20 questions, 1 point is added for every correct response and 1 point is deducted for every wrong response. The total score of this

questionnaire is 20 points. Original version of this questionnaire also calculated LKT Hazard score which identifies aspects of intoxication symptoms about lithium.

This scale has been adapted and validated in Tamil[8], which can easily assess the knowledge of Lithium among patients in their native language. [33]

Adaptation of LKT:

In original English version most of the questions (5/7) had more than four options. One question had 11 options. All the questions had multiple correct responses. This original LKT was assessed by 6 psychiatrists (Professors: 3, Associate Professor: 1, Assistant Professors: 2). Face and content validity was assessed. Suggestions to improve the content to assess wide range of Lithium Knowledge among bipolar patient were obtained to improve its content validity. The following changes were made in the scale, as suggested by the group:

- Technical terms and medical jargons were replaced with simple language, which was easy to understand by lay people

- Areas like efficacy, side-effects, toxicity and pregnancy were covered.
- The format of questions was reframed. Each question had four options with one correct response among them.
- Two questions eliciting adverse effects and toxicity symptoms alone had multiple correct responses.
- One mark was given to each correct response.
- The negative scoring for a wrong response was removed.

This modified Lithium Knowledge Test was translated into Tamil and back translated into English and this process was repeated until the questions in both the versions resulted in optimal word equivalence.

Validation of modified LKT:

This modified version was given to

1) Postgraduates in Psychiatry

2) Nurses working in the psychiatry ward and

3) Bipolar disorder patients on Lithium who are in euthymic state

It was assumed that postgraduates in psychiatry would have better knowledge about lithium than nurses and bipolar disorder patients. This scale was able to discriminate these 3 groups based on their lithium knowledge. Better Knowledge was seen among postgraduates in psychiatry (mean LKT=18.75, SD=1.91) followed by nurses working in psychiatry ward (mean LKT=10.73, SD=3.72) then bipolar disorder patients (mean LKT=5.83, SD=3.31).

The Lithium Knowledge Test questionnaire Tamil version has 14 items reflecting patient's knowledge about Lithium therapy (treatment duration, effectiveness, monitoring). The last 2 questions have multiple correct responses which assesses knowledge about side effect and toxicity symptoms. Score was calculated by adding one point for every correct response. The maximum score is 21.

After getting written informed consent, we administered Adapted Tamil version of Lithium Knowledge Test to patients (once they reached euthymic state as measured by HDRS/YMRS) and their primary care givers.

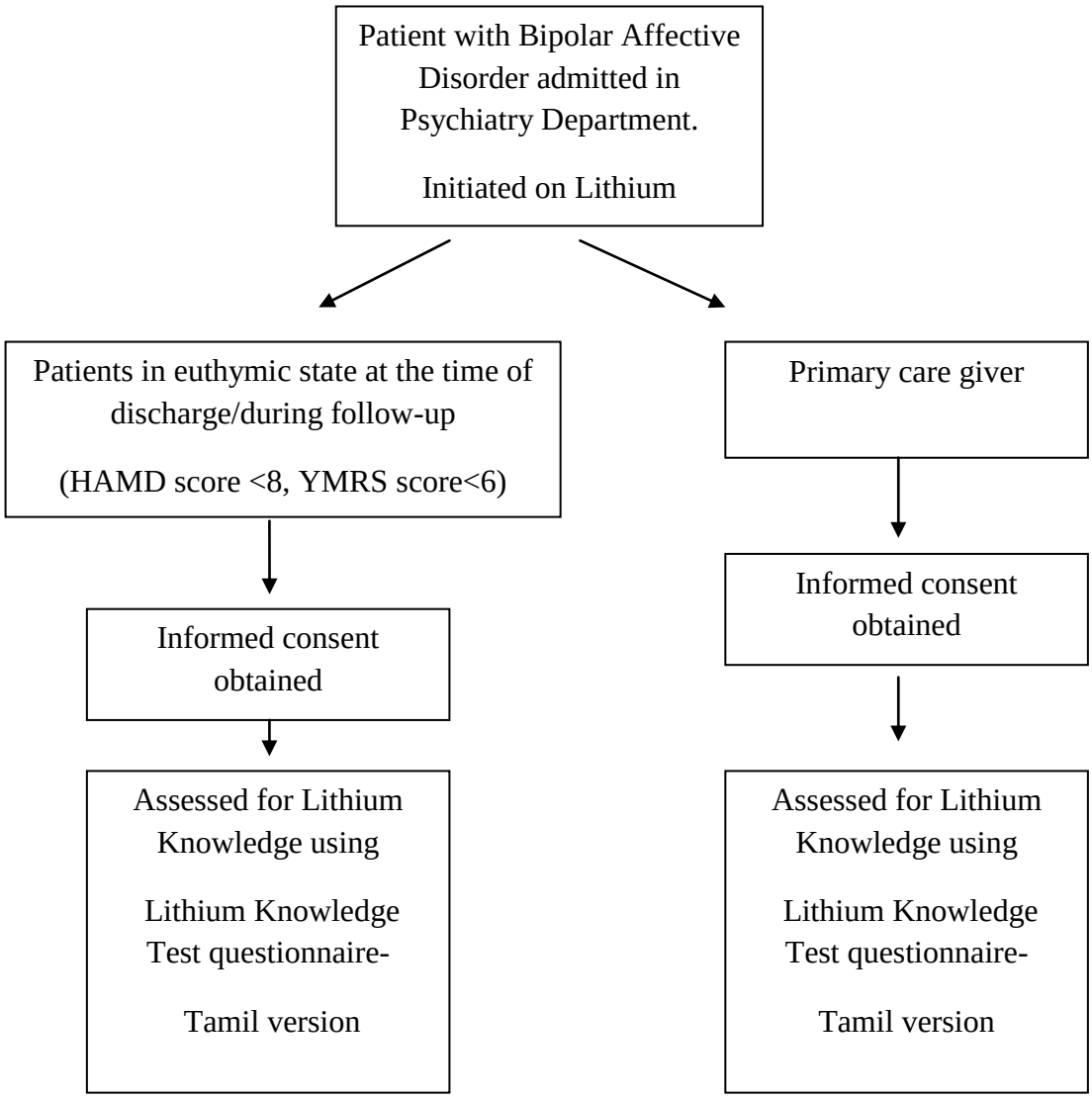


Figure 2: Methodology

STATISTICS

We carried out the statistical analysis using the software SPSS (IBM SPSS - Statistical Product and Service Solutions, version 19.0). We tested for normality of continuous variables using Shapiro-Wilks test. We used descriptive statistics to get the mean and standard deviation of variables like age, gender, education; occupation, income, marital status, substance abuse, family history, primary care giver and diagnosis of the participants. The mean age of onset, duration of illness, duration on lithium, number of episodes and number of hospitalizations were obtained.

We estimated the mean LKT score for the patient group and care givers group separately. The percentages of individual items in the questionnaire were also calculated. We used ANOVA to test whether there was any difference in LKT scores between different categories of occupation, marital status and socio-economic status. Student t test was used to find out any difference in the mean LKT score between the 2 genders. Using Pearson correlation coefficient, we estimated the relationship between LKT score and age of the patient.

Relationship between LKT scores and Duration of illness, Duration of Lithium therapy, number of hospitalizations, number of episodes, age of onset of illness and number of years of education were assessed using spearman's rho correlation.

We also used Pearson correlation coefficient to study the relationship between LKT scores of patient group and relative group. We did Multivariate linear regression analysis keeping LKT score as dependent variable and age of patient, number of years of education, age of onset of illness, number of episodes and care givers LKT score as independent variables.

RESULT

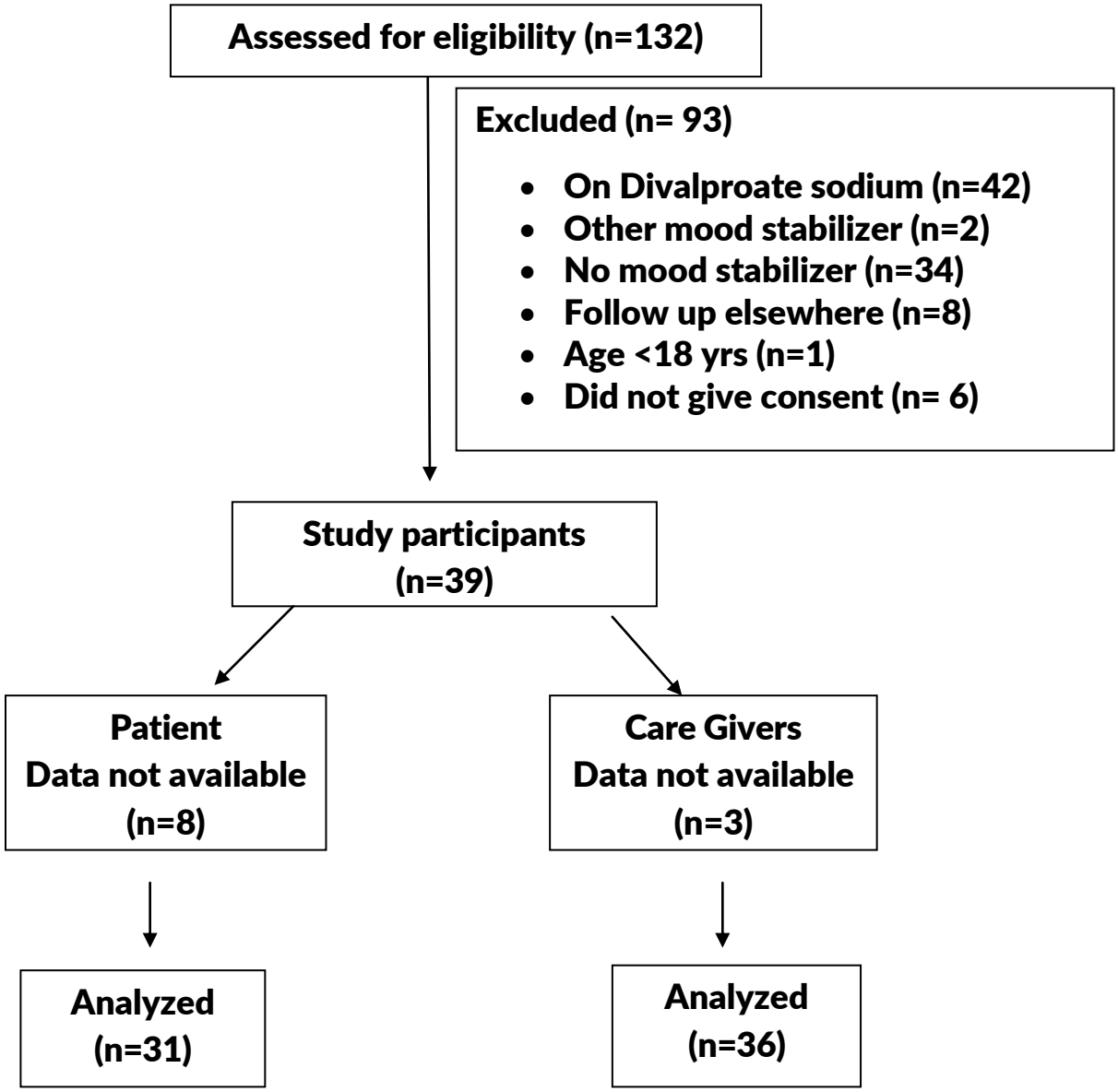


Figure 3:CONSORT flow diagram

During our study period from May 2015 to August 2016 period 132 bipolar disorder patients were admitted in the ward. Among them 93 were excluded according to the exclusion criteria. The remaining 39 patients on Lithium and their primary care givers were included in the study. Eight patients who were recruited did not come for follow up and hence their knowledge about lithium was not assessed. Three care givers did not consent for their assessment of Lithium Knowledge, but the corresponding patients consented for assessment and their data has been included for analysis.

Table 1: Sociodemographic profile

Variable	Number Mean (n=39)(SD)	Percentage (%)
Age	34.85 (12.33)	
Gender		
Male	22	56.4
Female	17	43.6
Education		
Primary	4	10.3
High school	11	28.2
Higher secondary	7	17.9
Graduate	17	43.6
Marital Status		
Unmarried	15	38.5
Married	22	56.4
Separated	2	5.1

Substance Abuse		
Alcohol	2	5.1
Smoking	3	7.7
Alcohol + smoking	4	10.3
Cannabis	3	7.7
None	27	69.2
Occupation		
Unskilled	8	20.5
Skilled	18	46.2
Unemployed	5	12.8
Homemaker	6	15.4
Student	2	5.1
Income		
Upper	6	15.4
Middle	24	61.5
Lower	9	23.1
Family history		
Present	8	20.5
Absent	31	79.5

Table 1 sets out the sociodemographic profile of these patients. Among these 39 patients 56.4% were males and 43.6% were females. The mean age of participants was 34.85(SD- 12.33). Most of the participants in our study were graduate 43.6% (n=17). Among the participants 30.8% (n=12) had history of substance use.

Only 12.8% (n=5) were unemployed, the rest of the participants were employed in a skilled (n=18) or unskilled work (n=8), some were students (n=2) and others were functioning well as a home makers (n=6).

Participants belonged to all Socioeconomic status- 15.4% were in upper, 61.5% were in middle and 23.1% were belonging to lower socio-economic status.

Family history of Psychiatry illness was present in 20.5% (n=8) and absent in remaining 79.5% (n=31).

Table 2: Care Givers of the participants

Variable	Number (n=39)	Percentage (%)
Primary Caregiver		
Mother	8	20.5
Father	10	25.6
Sibling	3	7.7
Spouse	11	28.3
Children	7	17.9
Caregivers Education		
Primary	12	30.8
High school	7	17.9
Higher secondary	12	30.8
Graduate	8	20.5

Most of the primary care givers were parents – mother 20.5% (n=8) and father 25.6% (n=10) followed by children in 17.9% (n=7) of the participants.

Table 3: Diagnosis of the participants

Diagnosis	Total Number of patients (n=39)	Percentage (%)
Current episode		
Mania	36	92.3
Depression	3	7.7
Psychotic symptoms		
Present	14	35.9
Absent	25	64.1

Out of 39 patients 92.3% (n=36) participants had mania and 7.7% (n=3) participants had depression. Fourteen patients had psychotic symptoms in their mood episodes and twenty five patients had no psychotic symptoms (Table 3).

Table 4: Clinical Features of the Participants

Variable	Mean	Standard deviation
Age of onset	27.69	9.18
Duration of illness (in months)	82.9	92.61
Duration on Lithium (in months)	20.59	20.32
No. Of Episodes	3.05	1.48
No. of Hospitalization (in months)	2.67	1.4

The mean age of onset of the participants in our study was 27.69 years. 50% of our participants had illness before 25 years (Median = 25). The age of onset ranged between 14 years to 53 years.

More than 50% of the participants had duration of illness less than 5yrs (median = 54 months). The mean duration of illness was 82.9 months. About 50% of participants were on Lithium for a period of one year(median= 12 months). The mean duration of Lithium was 20 months.

Number of episodes ranged from 1 to 8, with the mean number of episodes 3.05. The number of hospitalizations varied between 1 and 7. The mean no. of hospitalization was 2.67.

The mean lithium knowledge test score of **patients was 9.5** (SD=4.32). Among the relatives the mean lithium knowledge test score was 8.5 (SD=4.65).

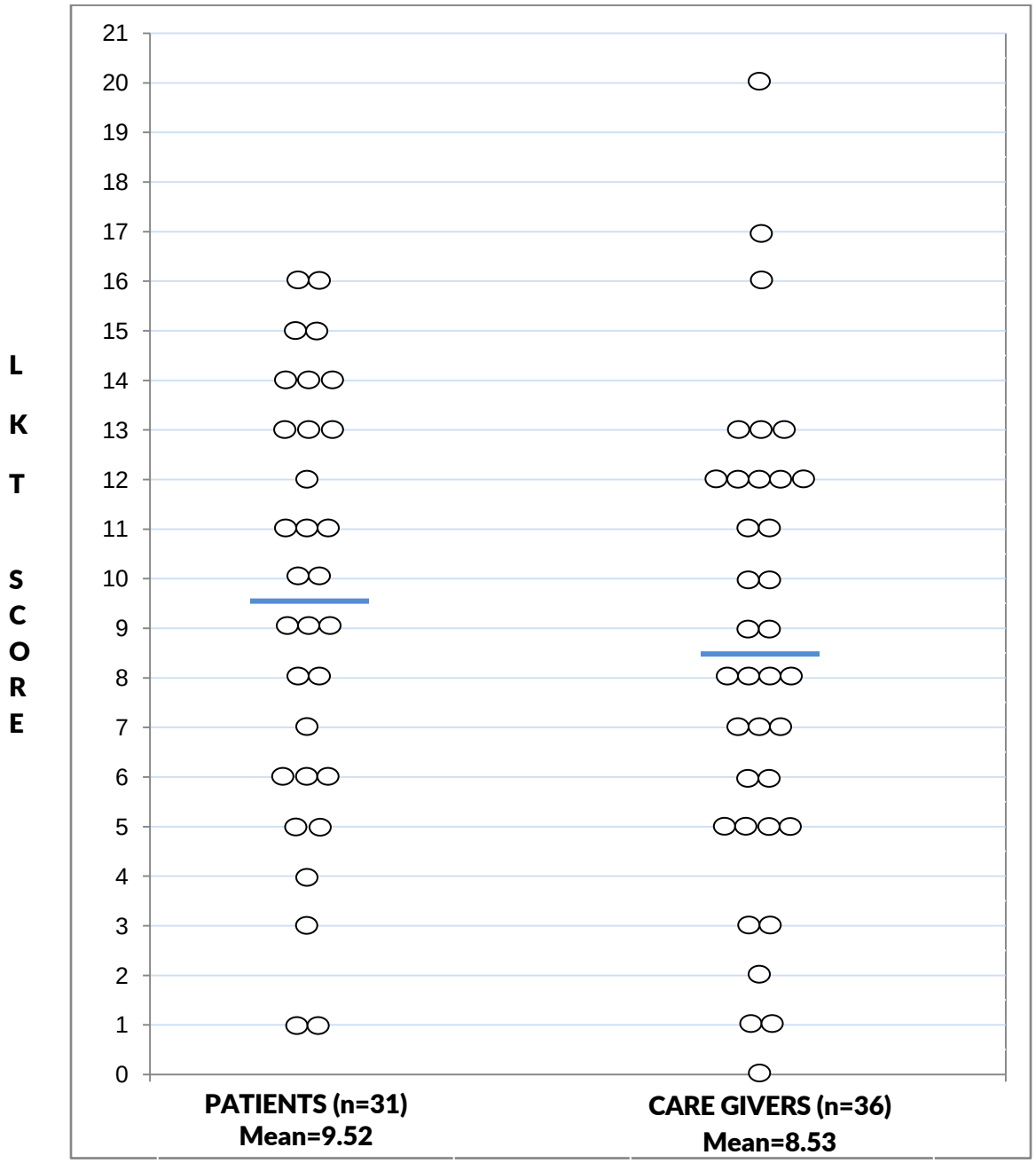


Figure 4: Lithium knowledge test scores of patients and care givers

Table 5: Items in Lithium Knowledge Test Questionnaire and no. of participants giving correct responses:

Items in Questionnaire	Patients Knowledge		Care givers Knowledge	
	n=31	(%)	n=36	(%)
Acts as a mood stabilizer	11	28.2	14	35.9
Drugs to avoid	23	59	22	56.4
Avoid Lithium during diarrhoea and vomiting	17	43.6	22	56.4
Monitor thyroid & kidney function	19	48.7	17	43.6
S.Lithium 12 hrs after last dose	22	56.4	21	53.8
Plan pregnancy after consulting with doctor	8	20.5	4	10.3
Therapeutic level	13	33.3	14	35.9
Duration of treatment	10	25.6	4	10.3
Need for regular blood test	19	48.7	20	51.3
Cannot conclude Lithium ineffective if relapse	15	38.5	19	48.7
Lithium had been used for many years	15	38.5	12	30.8
Avoid reduced salt intake and fasting	5	12.8	5	12.8

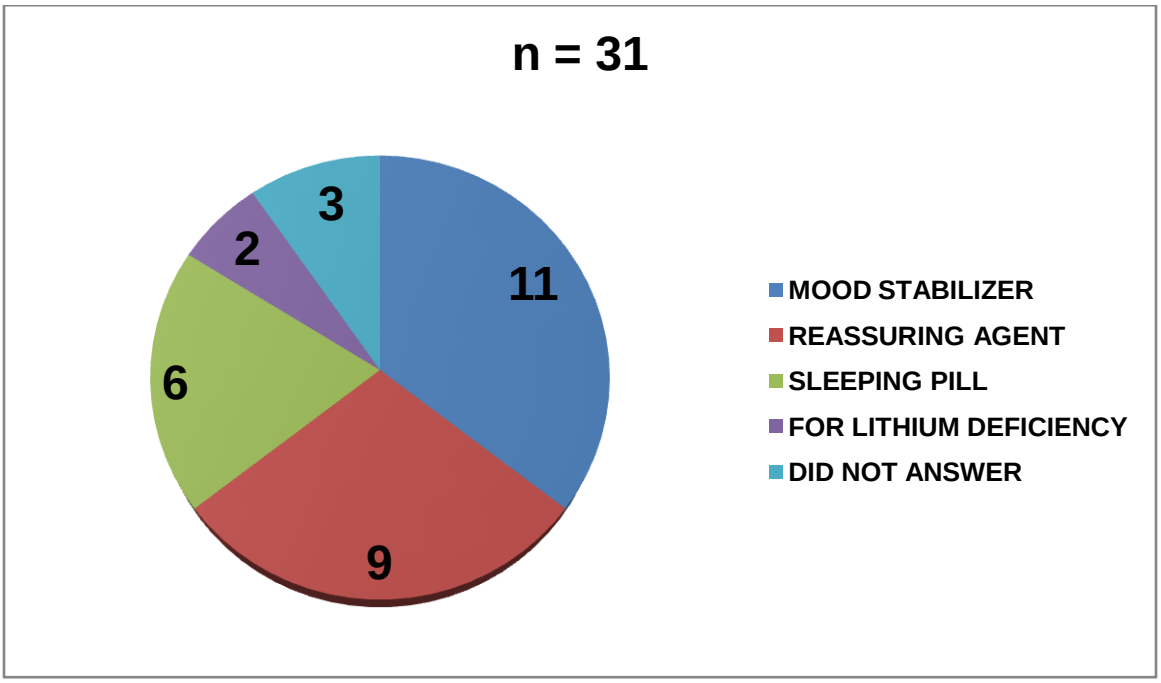
About 59% (n=23) of the patients and56.4% (n=22) of the care givers knew that diuretics and certain painkillers like Aspirin, ibuprofen and diclofenac sodium should be avoided while taking Lithium.

Around 50% of the participants knew about regular blood investigations to be done while taking Lithium. About 56.4% (n=22) of patients and 53.8% (n=21) of care givers knew that serum lithium test should be done 12 hrs after the last dose. Nineteen patients, 48.7% and seventeen caregivers, 43.6% care givers knew that thyroid and renal functions should be monitored during the course of Lithium. Nineteen patients, 48.7% and 20 patients, 51.3% care givers knew that serum lithium level should be monitored regularly. But only 33.3% (n=3) of patients knew that lithium is not effective when the blood level is low & has toxic effect when blood level is high.

Very less number of participants 20.5% (n=8) and care givers 10.3% (n=3) knew that women taking lithium should consult their treating psychiatrist before planning for pregnancy.

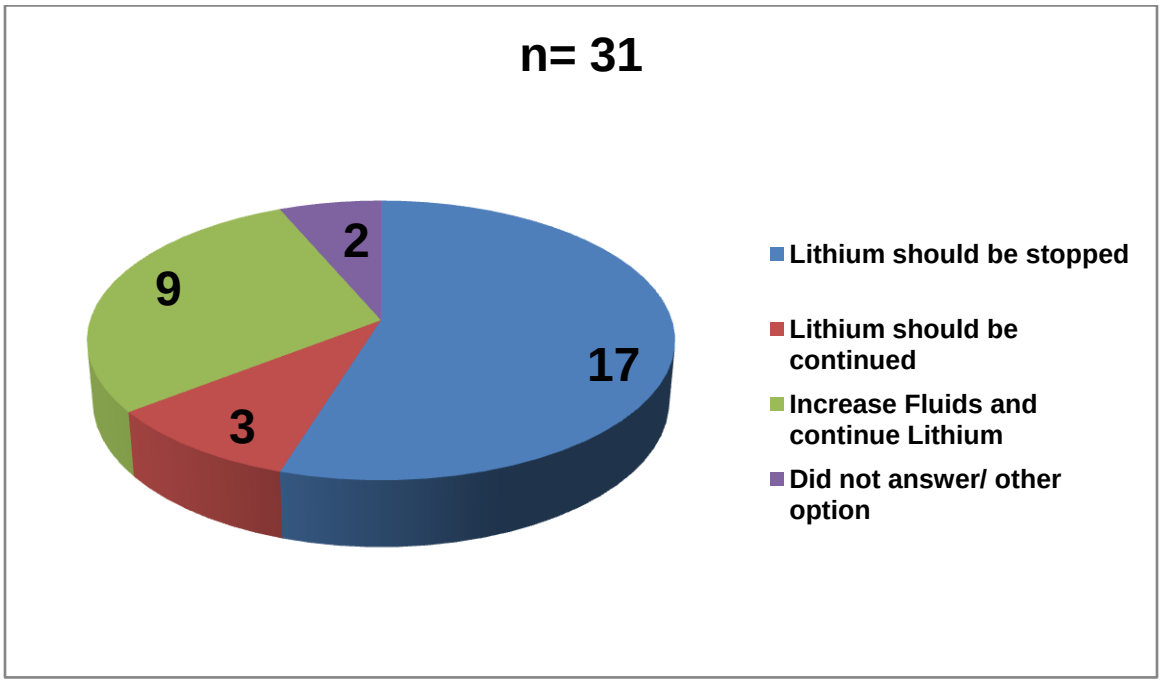
Only 28.2% (n=11) participants and 35.9% (n=14) care givers identified lithium as a mood stabilizer. Nine of the participant identified Lithium as a reassuring agent, 6 of them said Lithium is a sleeping pill and 2 participants said Lithium is used to treat Lithium deficiency.

Figure5: Lithium Knowledge Test Questionnaire: Patients knowledge about mode of action of Lithium



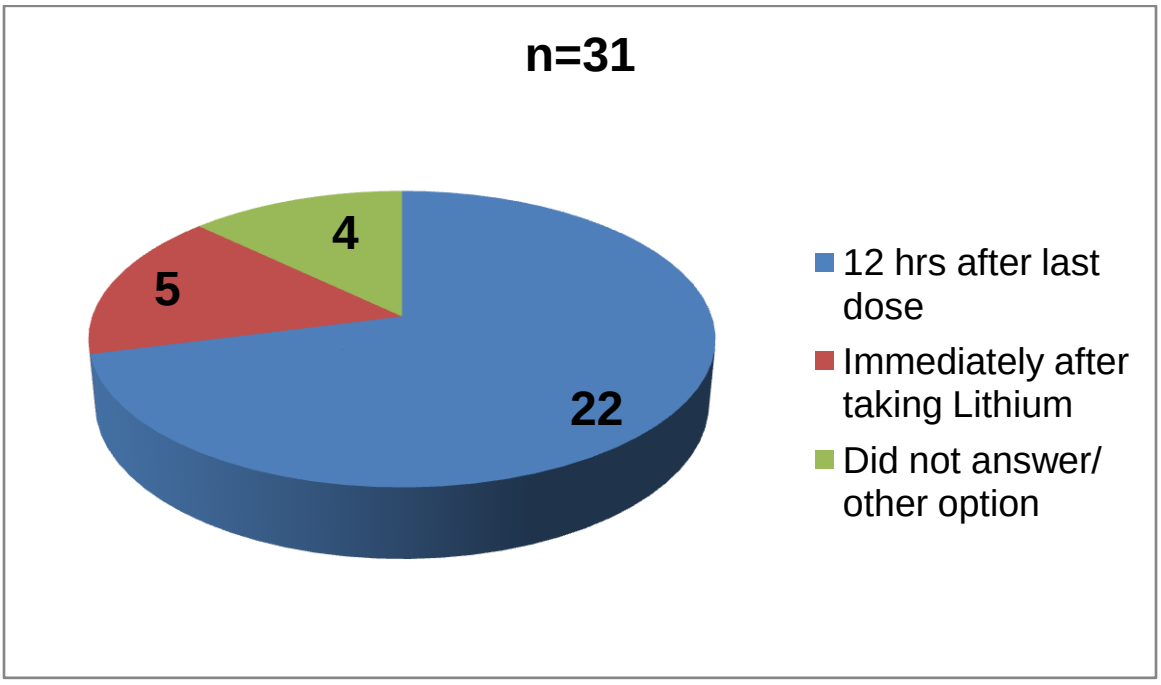
Only 43.6% (n=17) of the patients knew that Lithium should be stopped immediately and treating psychiatrist should be consulted during diarrhoea and vomiting. Three patients have said that Lithium should be continued in the same dose and nine patients have said fluids should be increased and Lithium should be continued in the same dose.

Figure6: Lithium Knowledge Test Questionnaire: Patients knowledge about what should be done during diarrhoea and vomiting while taking Lithium



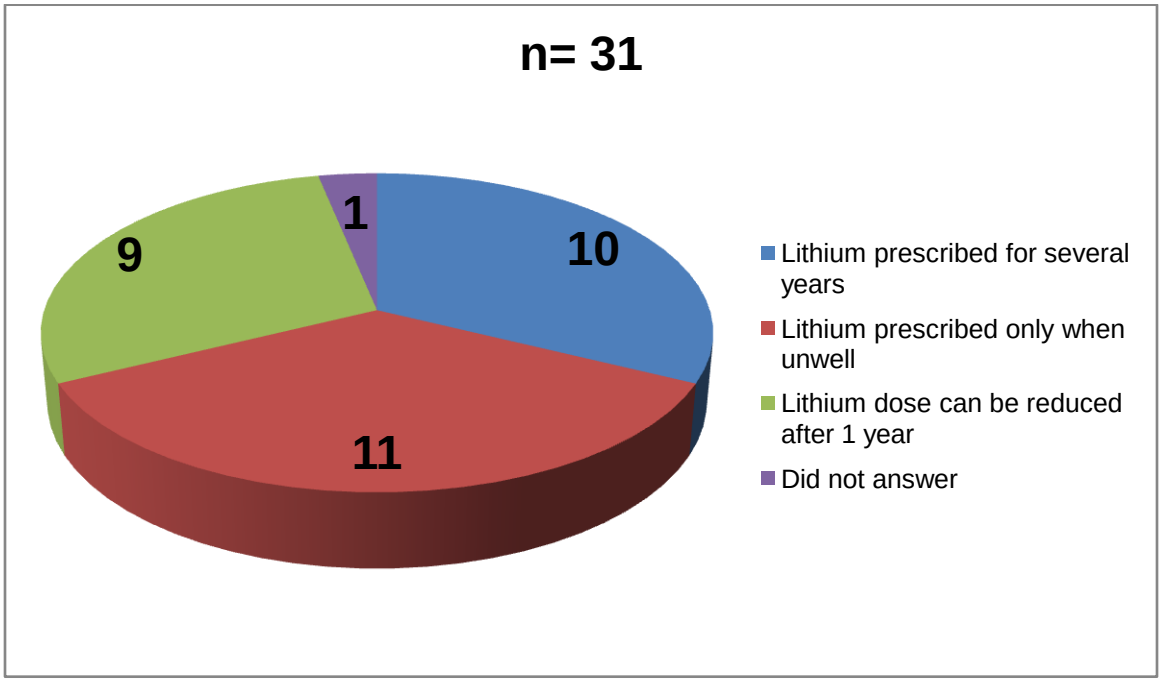
Out of 31 participants 22 of them knew that serum Lithium test should be done 12 hrs after the last dose. Five of the patients wrongly said serum lithium levels should be done immediately after taking lithium.

Figure7: Lithium Knowledge Test Questionnaire: Timing of blood investigation to check serum Lithium Level.



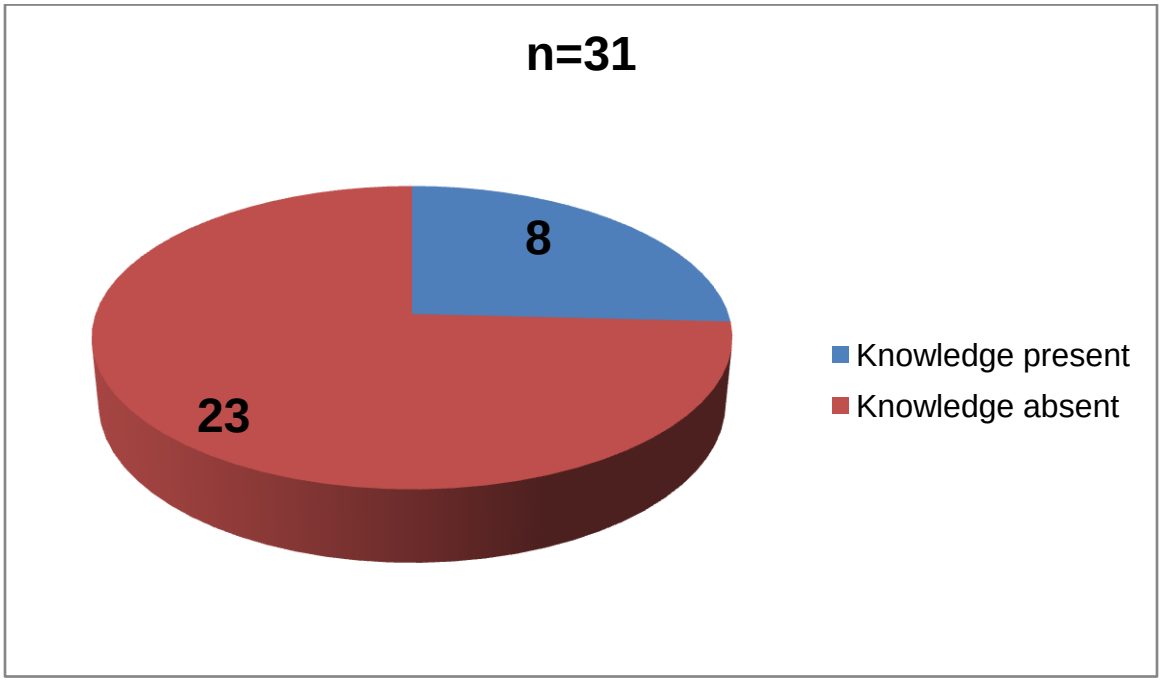
Ten patient (25.6%) and only four (10.3%) care givers said that Lithium is prescribed for several years. Eleven patients said that Lithium is prescribed only when psychologically unwell. Nine patients had said that the dose of lithium can be reduced after one year of symptom free period.

Figure8: Lithium Knowledge Test Questionnaire: Patients knowledge Duration of Lithium Intake



Only 8 of the patients knew that women on Lithium should consult the treating psychiatrist before planning for pregnancy

Figure 9: Lithium Knowledge Test Questionnaire: Patients knowledge about Lithium and Pregnancy



Nineteen patients identified that regular Lithium Test should be done to measure the amount of serum lithium level. Four patient wrongly said to check for anemia and 6 patients said to verify recurrence of disease.

Figure10: Lithium Knowledge Test Questionnaire: Patients knowledge about the need for regular blood test

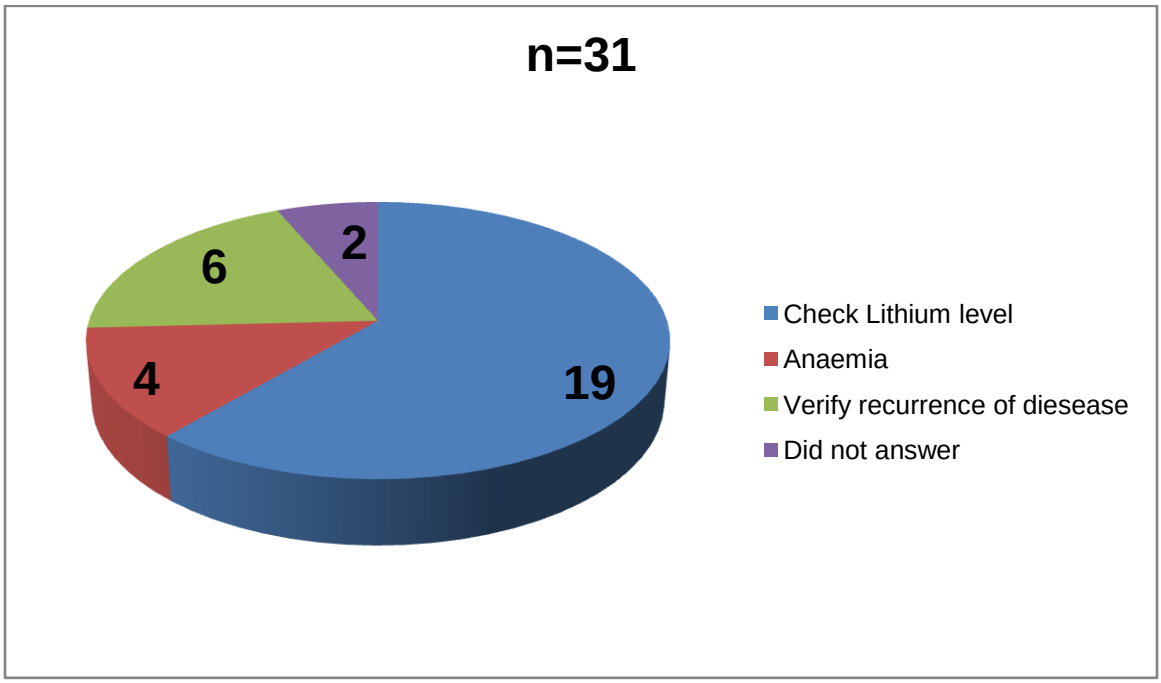
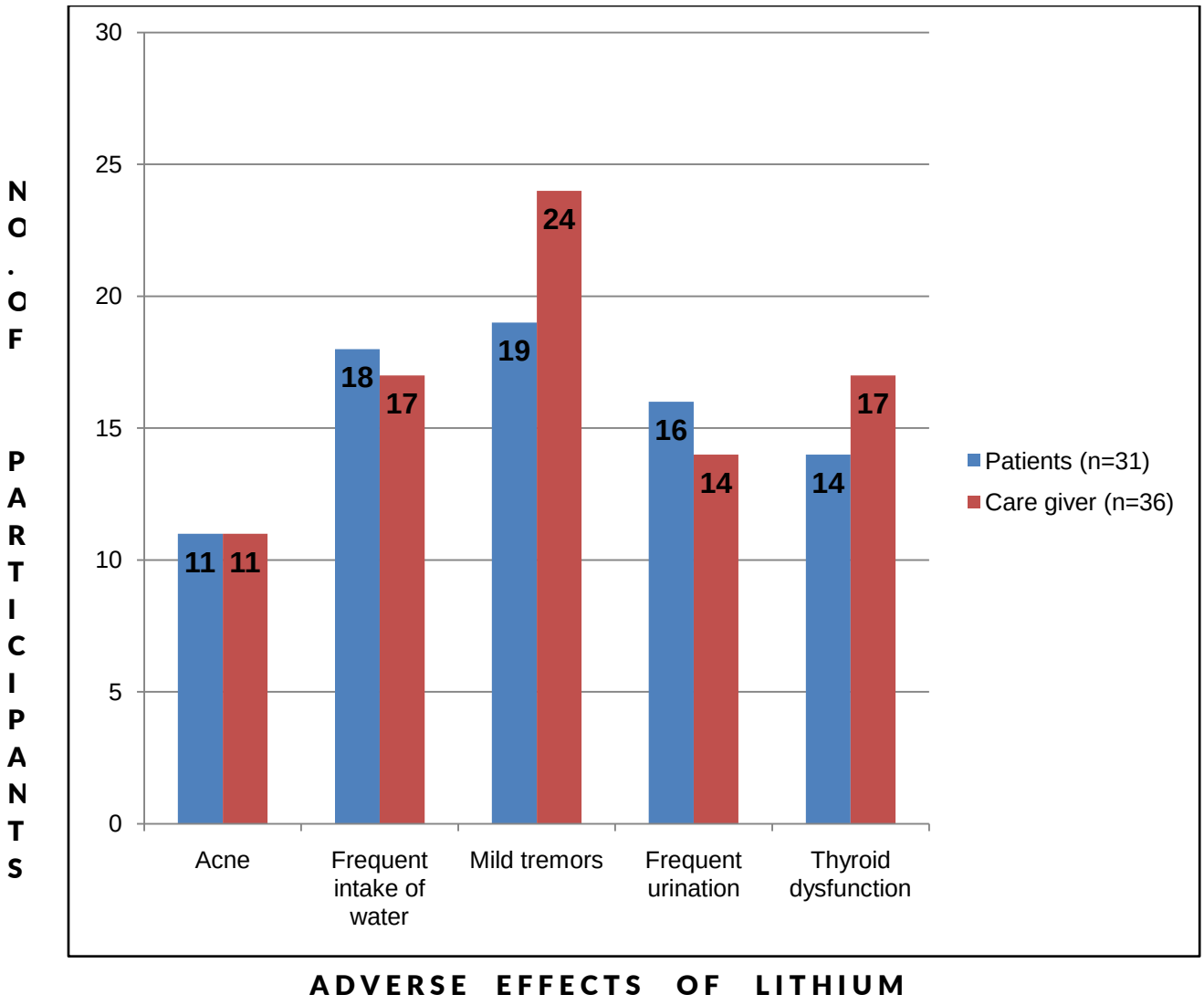


Table 6: **Items in Lithium Knowledge Test Questionnaire- (Adverse Effects and toxicity symptoms) and no. of participants giving correct response:**

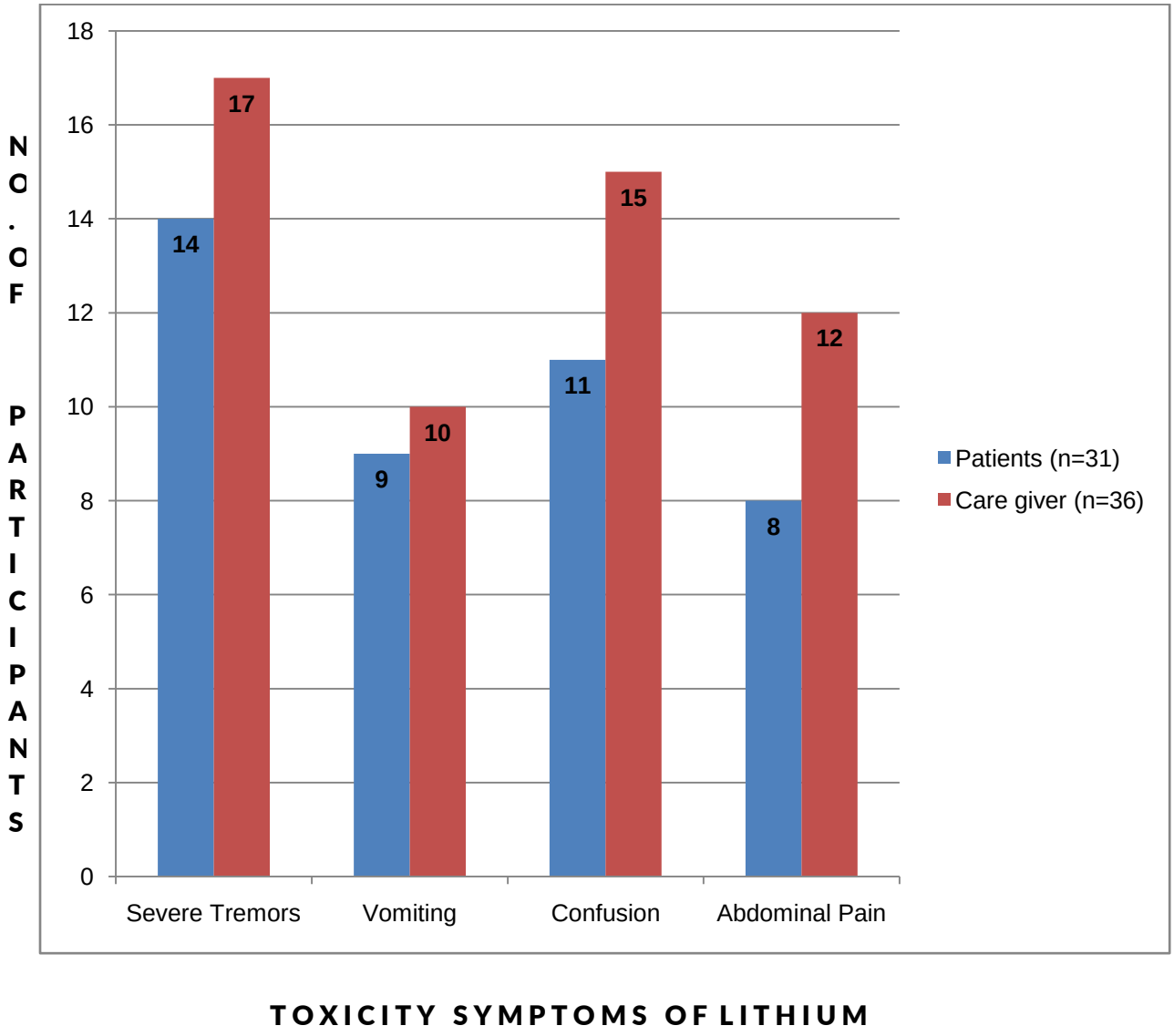
Items in Questionnaire	Patients Knowledge n=31	(%)	Care givers Knowledge n=36	(%)
Adverse Effects				
Acne	11	28.2	11	28.2
Frequent intake of water	18	46.2	17	43.6
Mild tremors	19	48.7	24	61.5
Frequent urination	16	41	14	35.9
Thyroid function suppression	14	35.9	17	43.6
Lithium Toxicity Symptoms				
Severe tremors	14	35.9	17	43.6
Vomiting	9	23.1	10	25.6
Confusion	11	28.2	15	38.5
Abdominal pain	8	20.5	12	30.8

Figure 11: Lithium Knowledge Test questionnaire – Knowledge about adverse effects of Lithium



Only less than 50 % of the patients and care givers knew about the toxicity symptoms of Lithium. But about 48.7% (n=19) of patients and 61.5% (n=24) care givers knew that Lithium can cause mild tremors.

Figure 12: Lithium Knowledge Test questionnaire – Knowledge about Toxicity symptoms of Lithium



Only less than 50% of the participants knew about the toxicity symptoms of Lithium. The following number of patients knew about toxicity symptoms-

- 35.9% (n=14) knew about severe tremors;
- 23.1% (n=9) knew about vomiting;
- 28.2% (n=11) knew about confusion and
- 20.5% (n=8) patients knew that abdominal pain is one of the symptom of Lithium toxicity.

Table 7: Correlation of LKT score with Sociodemographic profile

Patient's LKT score compared with	Mean of LKT scores	df	p value
Age of the patient		**Pearson correlation=-0.384 p=0.033**	
Gender			
Male	8.83(4.35)	t =-1.035	29 0.309
Female	10.46(4.27)		
No. of years of Education		**Spearman's rho correlation= 0.487 p=0.005**	
Occupation			
Unskilled	7.67(3.32)		
Skilled	9.44(4.44)	F=0.598	4 0.668
Unemployed	9.67(7.50)		
Homemaker	11(3.91)		
Student	12.5(2.12)		
Marital Status			
Unmarried	9.85(4.27)		
Married	8.63(4.30)	F=1.794	2 0.185
Separated	14.5(0.70)		

Socioeconomic status				
Upper	11.4(4.72)	F=1.213	2	0.312
Middle	9.6(4.1)			
Lower	7.2(4.7)			

Lithium Knowledge test scores were compared with various sociodemographic variables. Lithium Knowledge test scores were negatively correlated with age which was statistically significant, p=0.033 (younger patients had higher scores than elderly patients).

Gender did not have any statistical difference in the LKT scores. The means LKT score among males were 8.83 and female were 10.46.

Number of years of education positively correlated with the LKT scores and the p value was significant (p=0.005).

Occupational and marital status did not have any correlation with the Lithium Knowledge. The mean values of LKT scores were increasing as the socioeconomic status increased (Upper SES- 11.4, Middle SES- 9.6, Lower SES- 7.2) but it was not statistically significant(p=0.312).

Table 8: Correlation of LKT scores with other variables

Patient's LKT score compared with	Correlation coefficient	P value
Age of onset	Spearman's rho correlation= - 0.373	**0.039**
Duration of illness	Spearman's rho correlation= 0.26	0.89
Duration on Lithium	Spearman's rho correlation= 0.31	0.091
No. of Hospitalization	Spearman's rho correlation= 0.332	0.068
No. of Episodes	Spearman's rho correlation= 0.39	**0.026**

Age of onset of Bipolar illness had a positive correlation with the mean Lithium Knowledge test score (p=0.039).Lithium Knowledge test score was more in participants who had more number of episodes when compared with participants with less number of episodes. P value was significant at 0.026.

Other variables like duration of illness, duration on Lithium and number of hospitalization did not have significant correlation with lithium knowledge test scores.

Table 9: Correlation of patient's LKT score with care givers LKT score

Patient's score compared with	Pearson correlation
Care givers score	**0.465** **p=0.013**

When patients lithium Knowledge test scores were compared with care givers score, there was a positive correlation which was statistically significant (p=0.013).

Table 10: Multivariate Linear Regression analysis

Variable	B	Standard Error	T	P value
Age of patient	-0.201	0.103	-1.953	0.064
No. of years of Education	0.165	0.214	0.773	0.448
Age of Onset	0.106	0.122	0.865	0.396
No. Of Episodes	1.482	0.662	2.238	**0.036**
Care giver LKT score	0.217	0.163	1.328	0.198

Linear Regression analysis was done between lithium Knowledge test score and variables like Age of patient, number of years of Education, Age of Onset of illness, number of episodes and Care giver LKT score. In this multivariate analysis of various parameters, only Number of episodes was statistically (p=0.036) significant with the LKT scores.

DISCUSSION

In our study most of the patients had a diagnosis of Mania 92.3% (n=36) when compared to depression 7.7% (n= 3). This may be because we included only patients who got admitted in the ward. Knowledge about lithium therapy among patients and their caregivers was below average in our study. The mean of lithium knowledge test score of patients was 9.5 (SD=4.32) and care givers was 8.5 (SD=4.65) when the maximum that can be scored on Lithium Knowledge test is 21.

Mean age of the patients and mean age of onset of illness had a negative correlation with the Lithium Knowledge test score. Number of years of education and number of episodes had a positive correlation with the Lithium Knowledge Test scores. Mean Lithium Knowledge test scores of patients and their care givers score were positively correlated.

The mean of Lithium Knowledge test scores among patients and their care givers was less than 50% of the total score of 21 (patients = 9.5 and care givers = 8.5) . Though these patients were on Lithium for many years their knowledge was far from adequate. A similar study which used German

Translation of Lithium Knowledge test questionnaire for assessing Lithium Knowledge also showed poor knowledge among patients taking Lithium[34].

Another study which was done using Portuguese version of Lithium Knowledge test questionnaire in one hundred six patients with diagnosis of bipolar disorder I or bipolar disorder II according to DSM-IV criteria and on lithium treatment (for at least one month) also reflected poor knowledge about Lithium. The mean of total score LKT of bipolar patients in that study was 9.0 (SD=0.75) for men and 8.74 (SD=0.44) for women[35]. Literature shows patients as well as their family members had little knowledge about the medications prescribed to patients, which limits their ability to maintain therapeutic drug levels which is mandatory in Lithium therapy[36]

When we analyzed each items in the questionnaire. Only 28.2% (n=11) of patients and 35.9% (n=14) of care givers identified Lithium as mood stabilizers. Nine of the participant identified Lithium as a reassuring agent, six of them said Lithium is a sleeping pill and two participants said Lithium is used to treat Lithium deficiency. More than 50% of patients and care givers were aware about the drugs (pain killer and diuretics) to be avoided while taking Lithium (Patients=59%, Care givers=56.4%).

Only 43.6% (n=17) of patients knew that Lithium should not be taken during diarrhoea and vomiting. Three patients have said that Lithium should be continued in the same dose and nine patients have said fluids should be increased and Lithium should be continued in the same dose. This finding was alarming because more than 50% of participants were not aware about what to do during diarrhoea and vomiting which is a common medical ailment, which can lead to fluid loss in body and ultimately can result in Lithium toxicity.

About 56.4% (n= 22) of patients and 53.8% (n=21) of care givers were aware that serum lithium test should be done 12 hours after the last dose, which may be due to repeated serum Lithium level monitoring. But only 48.7% patient knew that blood investigations were done to monitor Thyroid function, Kidney function and Lithium level in blood. Only 33.3% (n=13) of participant and 35.9% (n=14) of care givers knew that Lithium is not effective when Lithium blood levels is too low and has toxic effects when blood level is too high.

Ten patient (25.6%) and only four (10.3%) care givers said that Lithium is prescribed for several years. Eleven patients said that Lithium is prescribed only when psychologically unwell. Nine patients had said that the dose of lithium can be reduced after one year of symptom free period. This poor knowledge about the duration of Lithium treatment can result in poor compliance among patients and relapse of symptoms.

Very less number of patients 20.5% (n=8) and care givers 10.3% (n=4) knew that women on Lithium should consult the treating Psychiatrist before planning pregnancy. Less than 50% of patients and care givers were aware about adverse effects and symptoms of toxicity of lithium. This lack of Knowledge can increase the risk of toxicity, particularly with a drug like lithium, which has a narrow therapeutic range and severe toxic effects. The relationship between lack of knowledge and risk of toxicity with Lithium therapy has also been highlighted in American psychiatry association guidelines. [37]

We studied the association of age compared with their Lithium Knowledge Test scores. Results showed that age of the patient had a negative correlation with the Lithium Knowledge Test scores with a significant p value of 0.033. This finding reflects that Lithium Knowledge was less among elderly age group patient. In a study which studied patients' Knowledge about Lithium Therapy in the Elderly showed mean Lithium Knowledge test score of 4.45.This study also looked for mean LKT hazard score which was also less 5.85, which was suggestive of potentially hazardous lack of knowledge about Lithium. There was also a significant negative correlation between the LKT score and Lithium hazard score ($r = -0.65$, $P < .01$ [1-tailed]) in that study.[2]These findings suggest poor knowledge about lithium therapy among elderly age group which is in accordance with our study. This poor knowledge of lithium could also contribute to lithium toxicity.

Another study done by *Schaub, et al*.,(2001) also showed age had inverse association with the lithium Knowledge[34]. There are many trials which had studied about the effects of Lithium in elderly which was prescribed for treatment-resistant depression. All these trials have highlighted consistently that elderly age group are at high risk for

neurotoxicity when compared with young adults[38, 39, 40]. Less knowledge of Lithium among elderly increases the risk of neurotoxicity even more.

Sociodemographic variables like gender, occupational status and marital status did not have any correlation with the lithium Knowledge Test scores. Another study which was done to determine the knowledge level of Lithium in patient who are taking it and factors which were associated with the Lithium Knowledge among 123 lithium out-patient clinic, also showed no association between Lithium Knowledge and gender of patients[34]. Also there were no association of Lithium Knowledge with duration of treatment, education and diagnosis in that study.

Though the mean LKT scores showed an increasing trend from lower to upper socioeconomic status (Upper SES - 11.4, Middle SES - 9.6, Lower SES - 7.2) the p value was not significant p=0.312. Number of years of education had a significant positive correlation (p= 0.005) with Lithium Knowledge Test scores in our study. This may contribute to better treatment adherence and less relapse rate among educated patients. A study done by *Colom, et al.*,(2003) showed educated patient with bipolar affective disorder patients showed lower relapses rates, lower number of hospitalizations.[15]

Age of onset of illness had a significant Spearman's rho correlation with the Lithium Knowledge Test scores, p value was 0.039. Patients with more number of episodes of illness had better Knowledge about Lithium therapy than the patient with less number of episodes. The p value was also significant 0.026. But the number of hospitalization did not have any correlation with the Lithium knowledge. In our study, the duration on lithium did not have any correlation with Lithium Knowledge test score (p=0.091). This means, knowledge about lithium did not differ between patients who were on lithium for 1 month and 60 months.

In patients who had high Lithium Knowledge Test scores also had higher LKT scores in their care givers. There is a direct correlation between patient's knowledge and care givers knowledge, and p value was 0.013 which is significant. Ours was the first study which also assessed for Lithium Knowledge among primary care givers. In our country the role of primary care giver is enormous in various treatment phases like acute and maintenance treatment. So the knowledge of the primary care giver is also equally important as the patients to prevent further relapse. Our study showed a significant positive correlation between patient's knowledge and

their care giver's knowledge. The clinical implication is by improving the knowledge about illness and treatment among relatives, patients' knowledge can also improve and vice versa. So when patient is acutely ill relatives can be given structured educational program regarding the illness and lithium therapy which can improve their Lithium knowledge and there by compliance of patient.

Structured questionnaire which can assess various domains of lithium knowledge may be useful in clinical practice. One such questionnaire is Lithium Knowledge test Questionnaire (LKT). LKT is a rapid and reliable instrument which is as effective as a lengthier standard interview scale. It has a high level of acceptability among lithium patients.[41] This Lithium knowledge test questionnaire which is used in our study is a self-administered questionnaire which can be easily administered. It takes less than 10 minutes for administration. The questions are in simple language so it can be easily understood and answered by the patients and their care givers. The LKT scale assesses knowledge about lithium interactions, food and lithium, risks of intoxication, necessity of measuring lithium levels, continuation of the lithium dosages, side effects and toxicity symptoms of

lithium pharmacology[11]. This questionnaire can be used in regular basis to assess Lithium Knowledge among bipolar patients in a structured way.

Lithium Knowledge Test questionnaire can aid the clinician for better understanding of the difficulties that bipolar affective disorder patients have, and offer specific information during clinical consultations. Identification of problems about lithium treatment and bipolar disorder can contribute to good treatment outcome. One of the good predictor of the adherence rates in bipolar patients is their knowledge level which is in accordance with past studies.[13]

Our study results highlight the need for structured assessment about lithium knowledge among patient on Lithium and their care givers to find out the lacunae in knowledge. Appropriate educational program about action of lithium, duration of treatment, blood parameters to be monitored, lithium and pregnancy, drug to avoid when taking lithium, adverse effects and toxicity symptoms should be given for patients who are initiated on lithium and their care givers. This education should be repeated at regular intervals for patients on long term Lithium. Literature shows that patients who have

been on lithium for a long time did not receive education about lithium therapy when compared with patients who are newly commenced on Lithium treatment[14].Past studies have highlighted that the number of relapses, recurrences, number and length of hospitalizations per patient was significantly less in psychoeducation group when compared with patients who did not receive any psychoeducation program[15]. Psychoeducation not only provides information to patients but also has shown to stabilize lithium plasma levels by improving pharmacological treatment adherence. [15]

STRENGTHS

- This is the first study done in India assessing Lithium Knowledge among Bipolar disorder patients.
- We also estimated the knowledge of lithium therapy among primary care givers using the same scale as the role of care givers plays an important role in maintaining euthymic state among the patients.
- We used our validated and locally adapted Tamil version of Lithium Knowledge test questionnaire.
- We assessed whether various sociodemographic variables like Age, Gender, Education, Marital status, substance abuse, occupation, and socioeconomic status can influence the knowledge of lithium. Other clinical variable like Age of onset, duration of illness, duration on lithium treatment, number of episodes and number of hospitalization were also assessed for correlation with lithium knowledge test scores.

LIMITATIONS

- The sample size was small in our study. Future study can be done with larger sample size to look for correlation between various sociodemographic and clinical variables.

CONCLUSION

Our study highlights various important finding about the knowledge on Lithium therapy among patients with bipolar disorder:

- Knowledge about lithium among bipolar patients and their care givers is far from adequate. The mean score was less than 50% of the total score
- Age of the patient was negatively correlated with the Lithium Knowledge level.
- Number of years of education had significant positive correlation with the lithium knowledge.
- Patients with early age of onset of illness had better lithium knowledge when compared with patients with later age of onset.
- Lithium Knowledge was better among patients with more number of episodes than in patients with lesser number of episodes.

- Socioeconomic status, duration of illness, duration on lithium and number of hospitalization had no influence on the knowledge.
- Good knowledge about lithium in care givers seems to influence knowledge among patients.

FUTURE DIRECTIONS

- To continue the study with larger sample size.
- To include educational program along with regular routine clinical check-ups and education by the primary treating psychiatrist and assess whether extra educational program can
  - Increase the knowledge about lithium
  - Increase the drug compliance
  - Decrease the relapse and recurrence rate
  - Decrease the number of hospitalization
  - Increases the duration of euthymic period

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ANNEXURE

PATIENT PROFORMA

S.no:

Name: IP No:

Age: Sex: OP No:

Education: Illiterate / Primary / Secondary / Higher secondary/ Graduate

Marital Status: Unmarried / Married / Divorced / Widow / Not legally separated

Substance use: Alcohol / Smoking / Others

Occupation: Unskilled/ Skilled/ professional/ homemaker/ Not Employed

Total Monthly Income: Upper (>5357) / Middle / Lower (<811)

Primary care giver:

Family History:

Past history: Age of onset-

Diagnosis-

Psychotic symptoms-

Duration of illness-

No. of hospitalization-

No. of Episodes-

Baseline HAMD/YMRS score current episode:

Duration on Lithium: Dose at discharge:

Lithium level at discharge:

Current episode:

LITHIUM KNOWLEDGE TEST

Mark the right answer for the following questions.

1) **In your opinion, lithium acts**
   a. As a reassuring agent.
   b. As a mood stabilizer.
   c. As a sleeping pill.
   d. As a treatment for lithium deficiency.

2) **What you should not do while taking lithium?**
   a. Taking medications for cough.
   b. Taking diuretics and certain painkillers like Aspirin, Diclofenac sodium , Ibuprofen.
   c. Exposure to very cold climates.
   d. Taking antibiotics for infections.

3) **If you suffer from acute diarrhoea and vomiting, what would you do?**
   a. Stop taking lithium immediately and consult your doctor.
   b. Increase lithium dosage.
   c. Continue lithium as it is.
   d. Take fluids, but don't stop lithium.

4) **While on lithium, it is necessary to monitor:**
   a. Gallbladder function.
   b. Frequent blood glucose level.
   c. Thyroid gland and kidney function.
   d. Cardiac function.

5) **Which of the following statement is true?**
   a. Blood for lithium test should be given immediately after taking lithium.
   b. Lithium predisposes to urinary tract infection.
   c. Serum lithium test should be done 12hrs after the last dose.
   d. If you feel good, you can skip few doses of lithium.

6) **Women on lithium:**
   a. May experience menstrual irregularities.
   b. Should get pregnant after consulting your doctor.
   c. May experience headache during menstruation.
   d. Can have delayed menopause.

7) **Which of the following statement is true?**
   a. If you have sleep disturbance, you can increase the dosage of lithium.
   b. Lithium is not effective when the blood level is too low and has toxic effects when blood level is too high.
   c. Lithium increases the energy of the body and mind.
   d. Extra doses of lithium should be taken if you feel depressed.

8) **Which of the following statement is correct?**
   a. Lithium is prescribed only when you are psychologically unwell.
   b. Often, lithium is prescribed for several years.
   c. Dose of lithium can be reduced after one year of symptom free period.
   d. Lithium has been replaced by modern and effective drugs.

9) **Why regular blood tests are needed?**
   a. To measure the amount of lithium in blood.
   b. To check for anaemia.
   c. To check lipid level.
   d. To verify the recurrence of the disease.

10) **True about lithium:**
   a. We can't conclude that lithium is not effective for the individual if a relapse happens while on lithium.
   b. Patients with diabetes should not take lithium.
   c. Lithium causes vitamin deficiency .
   d. Lithium predisposes to excessive tears.

11) **Which among the following is correct?**
   a. Lithium is the newly available drug in market as a mood stabilizer.
   b. Lithium has been tried & tested for many years.
   c. Elderly patients are not sensitive to develop side effects.
   d. Lithium is not freely available in India.

12) **When you are taking lithium, which should be avoided in your diet?**
   a. Butter and ghee.
   b. Reduced salt intake and fasting.
   c. Coffee & tea.
   d. Spicy items.

NOTE: The following 2 questions have more correct answers. Tick all the correct answers

13) Which are all the side effects of lithium?

a. Pimples.
b. Sleeplessness.
c. Constipation.
d. Frequent intake of water.
e. Mild tremors.
f. Excessive salivation.
g. Giddiness.
h. Frequent urination.
i. Thyroid function suppression.

14) Which are all lithium toxicity symptoms?

a. Severe tremors.
b. Headache.
c. Vomiting.
d. Palpitations.
e. Confusion.
f. Chest pain.
g. Abdominal pain.

ஒப்புதல் படிவம்

தேதி:

டாக்டர். ஸ்ரீ ஆர்த்தி ஆகிய நான் பி.எஸ்.ஐ மருத்துவக் கல்லூரியின் மனநல மருத்துவத் துறையின் கீழ் ‘‘மனத்தளர்ச்சி மனஎழுச்சி நோயாளிகளுக்கு லித்தியம் சிகிச்சை பற்றிய தகவல் வழங்குதல்’’ தொடர்பான மருத்துவ ஆராய்ச்சி மேற்கொள்ள உள்ளேன்.

ஏன் ஆய்வு வழிகாட்டி : டாக்டர். கோ. ரகுத்தமன், பேராசிரியர் மற்றும் துறைத் தலைவர்

ஆய்வின் நோக்கம் :

முதன்மை நோக்கம் :

மனத்தளர்ச்சி மனஎழுச்சி நோயாளிகளும் அவர்களுடைய குடும்ப உறுப்பினர்களும் லித்தியம் சிகிச்சை பற்றிய விவரங்களை எந்த அளவு அறிந்துள்ளார்கள் என்பதை மதிப்பிடுதல்.

இதன் மூலம் நோயாளிகள் சிகிச்சைக்கு தவறாமல் வருவதையும், நோய் திரும்ப வராமல் தடுப்பதற்கும், லித்தியம் மாத்திரையின் பக்கவிளைவுகளை தவிர்ப்பதை பற்றியும் மதிப்பிடுதல்.

பரிசோதனை எண்ணிக்கை ˙: 40 நபர்கள்

18 வயதுக்கு மேல் இருக்கும் மனத்தளர்ச்சி மனஎழுச்சி நோயாளிகள் இதில் சேர்க்கப்படுவார்கள்.

ஆய்வு மேற்கொள்ளும் இடம் :

பி.எஸ்.ஐ மருத்துவமனை. கோயம்புத்தூர்

நேர் கானல் : 20 நிமிடங்கள்

ஆய்வின் பலன்கள் :

லித்தியம் சிகிச்சை பற்றி தகவல் அறிதல் மற்றும் அவர்களது வாழ்க்கை தரத்தை மேற்படுத்துதல்.

இந்த ஆய்வின் மூலம் எந்த ஒரு பாதகமோ, அபாயமோ ஏற்படாது.

இந்த ஆய்வில் கிடைக்கும் தகவல்கள் ஐந்து வருடங்கள் பாதுகாக்கப்படும். இவை வேறு எந்த ஆய்விற்கும் பயன்படுத்தப்பட மாட்டாது. ஏந்த நிலையிலும் உங்களைப் பற்றிய தகவல்கள் யாருக்கும் தெரிவிக்கப்படமாட்டாது. அவை இரகசியமாக வைக்கப்படும்.

ஆய்விலிருந்து விலகிக்கொள்வதால் உங்களுக்கு அளிக்கப்படும் சிகிச்சையில் எந்த வித மாற்றமும் இருக்காது.

இந்த ஆராய்ச்சிக்காக உங்களிடம் சில கேள்விகள் கேட்கப்படும். மேலும் இந்த ஆய்வில் பங்கு கொள்வது உங்கள் சொந்த விருப்பம். இதில் எந்த விதக் கட்டாயமும் இல்லை. நீங்கள் விருப்பப்பட்டால் இந்த ஆய்வின் முடிவுகள் உங்களுக்குத் தெரியப்படுத்தப்படும்.

ஆய்வாளரின் கையொப்பம் :
தேதி :

ஆய்வுக்குட்படுபவரின் ஒப்புதல் :

நான் இந்த ஆராய்ச்சியின் நோக்கம் மற்றும் அதன் பயன்பாட்டினைப் பற்றி தெளிவாகவும். விளக்கமாகவும் தெரியப்படுத்தப்படடுள்ளேன். இந்த ஆராய்ச்சியில் பங்கு கொள்ளவும். இந்த ஆராய்ச்சியின் மருக்துவ ரீதியான குறிப்புகளை வரும் காலத்திலும் உபயோகபடபடுத்திக் கொள்ளவும் முழு மனதுடன் சம்மதிக்கிறேன்.

ஆய்வுக்குட்படுபவரின் பெயர். முகவரி :

கையொப்பம் :

தேதி :

உடனிருப்பவரின் கையொப்பம் :

தேதி :

ஆய்வாளரின் தொலைபேசி எண் :

நெறிமுறை குழு அலுவலக தொலைபேசி எண் : 0422 – 2570170 உள்தொடர்பு எண் : 5818

லித்தியம் புலமை தேர்வு

கீழ்கண்ட வினாக்களுக்கு சரியான விடையை அளிக்கவும்

1 உங்கள் கருத்தின்படி லித்தியம் எப்படி வேலை செய்கிறது?

1. மனநிலையை உறுதிபடுத்துகிறது
2. மனநிலையை நிலைப்படுத்துவது (சமன்செய்வது)
3. தூக்கம் வரவைத்தல்
4. லித்தியம் குறைபாட்டை சரிசெய்கிறது

2 லித்தியம் உட்கொள்ளும்பொழுது எவற்றை செய்யக்கூடாது?

1. இருமல் மருந்துகள் எடுக்கக்கூடாது
2. டையூரட்டிக் மற்றும் சில வலிமாத்திரைகள் உட்கொள்ளுதல் (Aspirin, Diclofenac Sodium, Ibuprofen)
3. குளிர்காலங்களில் வெளியே செல்லுதல்
4. ஆன்டிபயாட்டிக் (antibiotics) உட்கொள்ளுதல்

3 வாந்தி மற்றும் வயிற்றுப்போக்கு ஏற்பட்டால் என்ன செய்வீர்கள்?

1. லித்தியம் மாத்திரையை உடனடியாக நிறுத்திவிட்டு மருத்துவரை அணுகுதல்
2. லித்தியம் அளவை அதிகப்படுத்துதல்
3. லித்தியம் மாத்திரையை அப்படியே தொடர்ந்து உட்கொள்ளுதல்
4. லித்தியத்தை நிறுத்தாமல் அதிக நீர் ஆகாரங்கள் உட்கொள்ளுதல்.

4. லித்தியம் உட்கொள்ளும் போது கண்காணிக்க வேண்டியவை

1. பித்தப்பை செயல்பாடு
2. இரத்தத்தில் சர்க்கரை அளவு
3. தைராய்டு மற்றும் சிறுநீரகம் செயல்பாடு
4. இருதய செயல்பாடு

5. இவற்றில் எந்த வாக்கியம் உண்மையானது?

1. லித்தியம் அளவு சோதனைக்கு லித்தியம் உட்கொண்டவுடன் இரத்தம் கொடுக்க வேண்டும்
2. லித்தியம் சிறுநீர்ப்பாதையில் கிறுமிகள் மூலம் ஏற்படும் பாதிப்பை உண்டாக்கலாம்
3. லித்தியம் உட்கொண்ட 12 மணி நேரமத்திற்கு பிறகு இரத்தத்தில் லித்தியம் அளவை சோதனை செய்ய வேண்டும்
4. மனநிலை நன்றாக இருந்தால் அவ்வப்போது லித்தியம் உட்கொள்ளுதலை நிறுத்திக்கொள்ளலாம்

6 பெண்கள் லித்தியம் உட்கொள்ளும் பொழுது

1. மாதவிடாய் கோளாறுகள் ஏற்படலாம்
2. மருத்துவருடன் கலந்தாலோசிக்காமல் கர்பமாவதை தவிர்த்தல்
3. மாதவிடாயின் பொழுது தலைவலி ஏற்படலாம்
4. மாதவிலக்கு நிற்றல் தள்ளிப்போகலாம்

7 இவற்றில் எவை உண்மை?

1. தூக்கம் பாதித்தால் லித்தியம் அளவை அதிகப்படுத்தலாம்
2. லித்தியம் இரத்தத்தில் குறைவாக இருந்தால் பயன் இருக்காது ; அதிகம் இருந்தால் நச்சுத்தன்மை ஏற்பட்டுவிடும்
3. லித்தியம் உடல் மற்றும் மனதின் சக்தியை அதிகப்படுத்துகிறது
4. மனச்சோர்வின் பொழுது லித்தியம் அதிக அளவில் உட்கொள்ளலாம்

8 இவற்றில் உண்மை வாக்கியம் எது?

1. லித்தியம் மனநிலை சரியில்லாத போது மட்டும் உட்கொள்ள வேண்டும்
2. லித்தியம் மாத்திரை பல வருடங்களுக்கு உட்கொள்ள வேண்டும்
3. ஒரு வருடத்திற்கு நோய் அறிகுறி இல்லையென்றால் லித்தியம் அளவை குறைக்கலாம்
4. லித்தியம் மாத்திரையை விட புதிய பயனுள்ள மருந்துகள் உள்ளன

9 இரத்தப் பரிசோதனை ஏன் தேவை?

1. லித்தியம் மாத்திரை அளவை கண்டறிய
2. இரத்தசோகை கண்டறிய
3. கொழுப்புசத்து அகிகமாவதை அறிய
4. நோய் மீண்டும் வந்துள்ளதா என்று கண்டறிய

10 இவற்றில் உண்மை வாக்கியம் எது?

1. லித்தியம் உட்கொள்ளும் போது நோய் மீண்டும் ஏற்பட்டால் லித்தியம் வேலை செய்யவில்லை என்று உறுதியாக கூறமுடியாது
2. சர்க்கரை நோய் உள்ளவர்கள் லித்தியம் எடுக்கக்கூடாது
3. லித்தியம் விட்டமின் (vitamin) குறைபாடுகளை ஏற்படுத்தும்
4. லித்தியம் கண்ணில் அதிகநீர் வடிதலை உண்டாக்கும்

11 இவற்றில் உண்மை வாக்கியம் எது?

1. லித்தியம் புதிதாக அறிமுகம் செய்யப்பட்ட மருந்து
2. லித்தியம் பல ஆண்டுகளாக இந்நோய்க்கு கொடுக்கப்பட்டு வரும் மருந்து
3 வயதானவர்களுக்கு லித்தியம் மாத்திரையின் பக்கவிளைவு வராது
4 லித்தியம் இந்தியாவில் பல இடங்களில் கிடைப்பதில்லை

12 லித்தியம் உட்கொள்வோர் சேர்க்ககூடாத உணவுகள்

1. நெய் வெண்ணெய்
2. குறைவான அளவு உப்பு உட்கொள்ளுதல் மற்றும் விரதம் இருத்தல்
3. காபி மற்றும் தேநீர்
4. காரமான உணவுகள்

(கீழ்கண்ட கேள்விகளில் ஒன்றுக்கும் அதிகமான விடைகள் உள்ளன சரியான விடைகள் அனைத்தையும் குறிப்பிடுக)

13 லித்தியம் மாத்திரையின் பக்கவிளைவுகள்

1 முகப்பருக்கள்

2. தூக்கம் பாதித்தல்

3. மலச்சிக்கல்

4. தாகம்

5. உடல் கை நடுக்கம் (லேசான)

6. அதிக எச்சில் ஊறுதல்

7 தலைசுற்றல்

8. அடிக்கடி சிறுநீர் கழித்தல்

9 தைராய்டு பிரச்சினைகள்

14 லித்தியம் நச்சுத்தன்மையின் அறிகுறிகள்

1. உடல் நடுக்கம்

2. தலைவலி

3. வாந்தி

4. படபடப்பு

5. குழப்பம்

6. நெஞ்சுவலி

7 வயிற்றுவலி

Patient Name:_____ **Date**:_____

Hamilton Rating Scale for Depression (17-items)

Instructions: For each item select the "cue" which best characterizes the patient during the past week.

1. **Depressed Mood**
(sadness, hopeless, helpless, worthless)
0 Absent
1 These feeling states indicated only on questioning
2 These feeling states spontaneously reported verbally
3 Communicates feeling states nonverbally, i.e., through facial expression, posture, voice and tendency to weep
4 Patient reports VIRTUALLY ONLY these feeling states in his spontaneous verbal and nonverbal communication

2. **Feelings of Guilt**
0 Absent
1 Self-reproach, feels he has let people down
2 Ideas of guilt or rumination over past errors or sinful deeds
3 Present illness is a punishment. Delusions of guilt
4 Hears accusatory or denunciatory voices and/or experiences threatening visual hallucinations

3. **Suicide**
0 Absent
1 Feels life is not worth living
2 Wishes he were dead or any thoughts of possible death to self
3 Suicide ideas or gesture
4 Attempts at suicide (any serious attempt rates 4)

4. **Insomnia - Early**
0 No difficulty falling asleep
1 Complains of occasional difficulty falling asleep i.e., more than ½ hour
2 Complains of nightly difficulty falling asleep

5. **Insomnia - Middle**
0 No difficulty
1 Patient complains of being restless and disturbed during the night
2 Waking during the night – any getting out of bed rates 2 (except for purposes of voiding)

6. **Insomnia - Late**
0 No difficulty
1 Waking in early hours of the morning but goes back to sleep
2 Unable to fall asleep again if gets out of bed

7. **Work and Activities**
0 No difficulty
1 Thoughts and feelings of incapacity, fatigue or weakness related to activities; work or hobbies
2 Loss of interest in activity; hobbies or work – either directly reported by patient, or indirect in listlessness, indecision and vacillation (feels he has to push self to work or activities)
3 Decrease in actual time spent in activities or decrease in productivity. In hospital, rate 3 if patient does not spend at least three hours a day in activities (hospital job or hobbies) exclusive of ward chores.
4 Stopped working because of present illness. In hospital, rate 4 if patient engages in no activities except ward chores, or if patient fails to perform ward chores unassisted.

8. **Retardation**
(slowness of thought and speech; impaired ability to concentrate; decreased motor activity)
0 Normal speech and thought
1 Slight retardation at interview
2 Obvious retardation at interview
3 Interview difficult
4 Complete stupor

9. **Agitation**
0 None
1 "Playing with" hand, hair, etc.
2 Hand-wringing, nail-biting, biting of lips

10. **Anxiety - Psychic**
0 No difficulty
1 Subjective tension and irritability
2 Worrying about minor matters
3 Apprehensive attitude apparent in face or speech
4 Fears expressed without questioning

11. **Anxiety - Somatic**
0 Absent
1 Mild
2 Moderate
3 Severe
4 Incapacitating
Physiological concomitants of anxiety such as:
Gastrointestinal - dry mouth, wind, indigestion, diarrhea, cramps, belching
Cardiovascular – palpitations, headaches
Respiratory - hyperventilation, sighing
Urinary frequency
Sweating

12. **Somatic Symptoms - Gastrointestinal**
0 None
1 Loss of appetite but eating without staff encouragement. Heavy feelings in abdomen.
2 Difficulty eating without staff urging. Requests or requires laxatives or medications for bowels or medication for G.I. symptoms.

13. **Somatic Symptoms - General**
0 None
1 Heaviness in limbs, back or head, backaches, headache, muscle aches, loss of energy and fatigability
2 Any clear-cut symptom rates 2

14. **Genital Symptoms**
0 Absent
1 Mild
2 Severe
0 Not ascertained
Symptoms such as: loss of libido, menstrual disturbances

15. **Hypochondriasis**
0 Not present
1 Self-absorption (bodily)
2 Preoccupation with health
3 Frequent complaints, requests for help, etc.
4 Hypochondriacal delusions

16. **Loss of Weight**
A. When Rating by History:
0 No weight loss
1 Probable weight loss associated with present illness
2 Definite (according to patient) weight loss

B. On Weekly Ratings by Ward Psychiatrist, When Actual Changes are Measured:
0 Less than 1 lb. weight loss in week
1 Greater than 1 lb. weight loss in week
2 Greater than 2 lb. weight loss in week

17. **Insight**
0 Acknowledges being depressed and ill
1 Acknowledges illness but attributes cause to bad food, climate, overwork, virus, need for rest, etc.
2 Denies being ill at all

Total Score:

Young Mania Rating Scale (YMRS)

Guide for Scoring Items – The purpose of each item is to rate the severity of that abnormality in the patient. When several keys are given for a particular grade of severity, the presence of only one is required to qualify for that rating.

The keys provided are guides. One can ignore the keys if that is necessary to indicate severity, although this should be the exception rather than the rule.

Scoring between the points given (whole or half points) is possible and encouraged after experience with the scale is acquired. This is particularly useful when severity of a particular item in a patient does not follow the progression indicated by the keys.

1. *Elevated Mood*
   - 0 Absent
   - 1 Mildly or possibly increased on questioning
   - 2 Definite subjective elevation; optimistic, self-confident; cheerful; appropriate to content
   - 3 Elevated, inappropriate to content; humorous
   - 4 Euphoric; inappropriate to content; singing

2. *Increased Motor Activity – Energy*
   - 0 Absent
   - 1 Subjectively increased
   - 2 Animated; gestures increased
   - 3 Excessive energy; hyperactive at times; restless (can be calmed)
   - 4 Motor excitement; continuous hyperactivity (cannot be calmed)

3. *Sexual Interest*
   - 0 Normal; not increased
   - 1 Mildly or possibly increased
   - 2 Definitive subjective increase on questioning
   - 3 Spontaneous sexual content; elaborates on sexual matters; hypersexual by self-report
   - 4 Overt sexual acts (towards patients, staff, or interviewer)

4. *Sleep*
   - 0 Reports no decrease in sleep
   - 1 Sleeping less than normal amount by up to one hour
   - 2 Sleeping less than normal by more than one hour
   - 3 Reports decreased need for sleep
   - 4 Denies need for sleep

5. *Irritability*
   - 0 Absent
   - 2 Subjectively increased
   - 4 Irritable at times during interview; recent episodes of anger or annoyance on ward
   - 6 Frequently irritable during interview; short, curt throughout
   - 8 Hostile, uncooperative; interview impossible

6. *Speech (Rate and Amount)*
   - 0 No increase
   - 2 Feels talkative
   - 4 Increased rate or amount at times, verbose at times
   - 6 Push; consistently increased rate and amount; difficult to interrupt
   - 8 Pressured; uninterruptible, continuous speech

7. *Language – Thought Disorder*
   - 0 Absent
   - 1 Circumstantial; mild distractibility; quick thoughts
   - 2 Distractible; loses goal of thought; changes topics frequently; racing thoughts
   - 3 Flight of ideas; tangentiality; difficult to follow; rhyming; echolalia
   - 4 Incoherent; communication impossible

8. *Content*
   - 0 Normal
   - 2 Questionable plans, new interests
   - 4 Special project(s); hyperreligious
   - 6 Grandiose or paranoid ideas; ideas of reference
   - 8 Delusions; hallucinations

9. *Disruptive – Aggressive Behavior*
   - 0 Absent; cooperative
   - 2 Sarcastic; loud at times; guarded
   - 4 Demanding; threats on ward
   - 6 Threatens interviewer; shouting; interview difficult
   - 8 Assaultive; destructive; interview impossible

10. *Appearance*
    - 0 Appropriate dress and grooming
    - 1 Minimally unkempt
    - 2 Poorly groomed; moderately disheveled; overdressed
    - 3 Disheveled; partly clothed; garish makeup
    - 4 Completely unkempt; decorated; bizarre garb

11. *Insight*
    - 0 Present; admits illness; agrees with need for treatment
    - 1 Possibly ill
    - 2 Admits behavior change, but denies illness
    - 3 Admits possible change in behavior, but denies illness
    - 4 Denies any behavior changes

Name: _____

Rater: _____

Date: _____

Score: _____

S.no	Age	Sex	No.of Years of educatic	Education	Marital Status	Substance Use	Occupation	Income	primary care giver	care giver education	Family History
1	23	Male	Graduate	15	Unmarried	smoking	Skilled	Middle	Sibling	Graduate	Absent
2	36	Male	Secondary	8	Married	both	Unskilled	Middle	Spouse	Higher Secondary	Absent
3	26	Female	Graduate	15	Unmarried	Absent	Skilled	Middle	Mother	Higher Secondary	Absent
4	24	Female	Graduate	15	Unmarried	Absent	Skilled	Lower	Father	Primary	Present
5	36	Male	Secondary	7	Married	Alcohol	Skilled	Middle	Spouse	Secondary	Absent
6	23	Female	Graduate	15	Married	Absent	Not Employed	Middle	Father	Secondary	Absent
7	46	Male	Secondary	6	Married	Absent	Unskilled	Lower	Children	Higher Secondary	Absent
8	37	Male	Higher Secondary	11	Married	Absent	Skilled	Lower	Spouse	Primary	Absent
9	51	Male	Higher Secondary	8	Married	smoking	Unskilled	Lower	Children	Graduate	Absent
10	25	Male	Graduate	15	Unmarried	smoking	Skilled	Upper	Father	Primary	Present
11	26	Male	Graduate	15	Unmarried	others	Skilled	Middle	Mother	Primary	Absent
12	52	Female	Higher Secondary	12	Married	Absent	Skilled	Middle	Children	Higher Secondary	Absent
13	23	Male	Higher Secondary	11	Unmarried	Absent	Not Employed	Middle	Mother	Graduate	Absent
14	23	Female	Graduate	15	Divorced	Absent	Not Employed	Middle	Father	Primary	Absent
15	43	Female	Graduate	15	Divorced	Absent	Home Maker	Upper	Father	Higher Secondary	Absent
16	20	Male	Secondary	8	Unmarried	Absent	Unskilled	Middle	Father	Primary	Absent
17	33	Female	Graduate	15	Unmarried	Absent	Skilled	Middle	Mother	Higher Secondary	Present
18	25	Male	Graduate	15	Unmarried	Absent	Skilled	Upper	Sibling	Secondary	Absent
19	34	Female	Post Graduate	18	Married	Absent	Not Employed	Middle	Spouse	Post Graduate	Absent
20	28	Female	Graduate	15	Married	Absent	Skilled	Middle	Mother	Primary	Absent
21	35	Female	Graduate	15	Married	Absent	Home Maker	Lower	Spouse	Secondary	Absent
22	60	Male	Graduate	17	Married	Absent	Skilled	Upper	Children	Graduate	Present
23	40	Male	Secondary	8	Married	both	Unskilled	Lower	Spouse	Higher Secondary	Absent
24	18	Male	Higher Secondary	12	Unmarried	Absent	Student	Middle	Mother	Higher Secondary	Absent
25	42	Male	Graduate	15	Married	both	Skilled	Upper	Spouse	Graduate	Absent
26	23	Female	Secondary	7	Married	Absent	Home Maker	Lower	Mother	Primary	Present
27	18	Male	Graduate	15	Unmarried	Absent	Unskilled	Middle	Mother	Secondary	Absent
28	23	Male	Secondary	7	Unmarried	Absent	Skilled	Middle	Father	Primary	Absent
29	36	Male	Primary	4	Unmarried	Absent	Unskilled	Lower	Sibling	Primary	Absent
30	55	Female	Primary	3	Married	Absent	Not Employed	Lower	Children	Graduate	Present
31	59	Female	Primary	5	Married	Absent	Home Maker	Middle	Spouse	Higher Secondary	Absent
32	27	Male	Secondary	9	Married	others	Skilled	Middle	Spouse	Higher Secondary	Absent
33	25	Male	Higher Secondary	12	Unmarried	Alcohol	Skilled	Upper	Father	Higher Secondary	Present
34	52	Female	Higher Secondary	12	Married	Absent	Home Maker	Middle	Children	Graduate	Absent
35	50	Female	Secondary	6	Married	Absent	Unskilled	Middle	Spouse	Higher Secondary	Absent
36	42	Male	Secondary	7	Married	both	Skilled	Middle	Spouse	Primary	Absent
37	25	Female	Post Graduate	16	Unmarried	Absent	Student	Middle	Father	Secondary	Present
38	51	Female	Primary	2	Married	Absent	Home Maker	Middle	Children	Secondary	Absent
39	44	Male	Secondary	8	Married	others	Skilled	Middle	Father	Primary	Absent

Age of onset	Duration of illness	No.Of Hospitalization	Duration on Lithium	No.Of Episodes	Dose at discharge	Lithium level	Current episode	psychotic symtoms	P - BL	R - BL
23	12	2	3	10	1000	0.56	Depression	Absent	15	13
30	72	3	3	36	1200	0.78	Mania	Absent	11	9
20	72	3	3	36	1000	0.96	Mania	Absent	12	12
24	12	2	2	10	1000	1.02	Mania	Absent		12
32	54	3	3	48	1200	1.05	Mania	Absent	13	8
20	36	2	2	9	1100	0.83	Mania	Absent	14	5
40	72	3	4	6	900	0.78	Mania	Absent		16
35	24	2	2	7	1000	0.78	Mania	Present	8	5
45	72	2	2	7	1000	0.91	Mania	Absent		13
22	36	3	4	12	1000	0.79	Mania	Absent	16	
22	48	3	3	5	1200	0.65	Mania	Present	11	8
30	132	5	5	36	1200	1	Mania	Absent	6	17
21	36	2	3	6	1000	0.78	Mania	Absent		10
21	36	2	2	4	1400	0.75	Mania	Present	14	12
30	156	6	6	12	1200	0.85	Mania	Absent	15	13
20	3	1	2	1	1200	0.9	Mania	Present	9	11
23	120	3	3	60	1000	0.78	Mania	Absent	9	20
25	2	1	1	1	1200	0.8	Mania	Absent	5	5
29	60	3	3	36	1400	1.1	Mania	Absent		10
24	48	3	3	12	1500	1.1	Mania	Absent	16	8
23	144	5	6	60	1800	0.83	Mania	Absent	13	7
40	240	4	4	60	1200	0.79	Mania	Absent		6
35	60	3	3	48	1200	1.07	Mania	Absent	10	7
14	48	3	3	24	1200	0.97	Mania	Present	14	12
32	120	3	3	24	1200	0.85	Mania	Absent	8	9
20	36	2	2	6	800	0.91	Mania	Absent		11
17	12	2	2	4	1000	1.2	Depression	Present	3	3
23	6	1	2	2	1200	0.9	Mania	Present	6	2
31	60	4	4	48	2000	1	Depression	Present	4	8
53	24	2	1	1	1000		Mania	Present	1	3
20	468	2	5	48	1200		Mania	Absent	10	12
26	12	1	1	48	1200		Mania	Present	7	1
15	120	4	5	48	1200	0.9	Mania	Absent	13	5
28	288	7	8	12	800		Mania	Present	6	
48	12	1	2	1	1200		Mania	Present	9	7
25	204	1	2	1	1200		Mania	Present	5	0
22	36	1	2	12	1200		Mania	Absent	11	
45	60	3	3	1	1000		Mania	Present		6
27	180	1	2	1	800		Mania	Absent	1	1