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STUDY OF QUALITY OF SLEEP IN PATIENTS WITH PSYCHIATRIC ILLNESS UNDER REMISSION IN RELATION TO QUALITY OF LIFE AND FUNCTIONAL DISABILITY

Siva Anoop Yella✉
Department of Psychiatry
ESIC Medical College and Hospital
Sanathnagar, Hyderabad, Telangana, India, 500038
anoop180@gmail.com

Ramasubba Reddy
Department of Psychiatry[1]

P. C. B. Gupta
Department of Psychiatry[1]

[1]*Institute of Mental Health*
Hyderabad, Telangana, India, 500038

✉**Corresponding author**

Abstract

Sleep is one of the essential biological rhythms of a human being. Sleep disturbances could precipitate psychiatric illnesses like schizophrenia, bipolar affective disorder, depression, anxiety disorders, substance use disorders, etc. Even when psychiatric disorders are successfully treated, sleep disturbances often fail to remit. The quality of sleep in such patients is badly affected and influences the daytime functioning and impairs the overall quality of life.

The aim of the study. To study quality of sleep of patients with psychiatric illness under remission in relation to quality of life and functional disability.

Material and methods. Patients attending the review outpatient department of Tertiary hospital are selected for the study. Patients diagnosed with bipolar affective disorder and schizophrenia according to ICD-10 criteria were taken. Patients meeting remission criteria for bipolar affective disorder i.e., YMRS score </= 8, MADRS score </= 10 and for schizophrenia – eight PANSS signs and symptoms score <3 are selected from them. Quality of sleep is compared with quality of life and functional disability.

Results: Mean age was found to be 36.59. Mean PSQI score is 8.35. The mean score of physical quality of life domain is 58.28, mean score of psychological quality of life domain is 56.63, mean score of social quality of life domain is 55.39, and mean score of environmental quality of life domain is 55.41. Mean score of functional disability score is 30.14.

Conclusion: Poor quality of sleep in Schizophrenia and BPAD needs to be addressed.

Keywords: psychiatric disorders, quality of sleep, quality of life, functional disability.

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1. Introduction

Sleep is a very important aspect of one's life and is one of the essential biological rhythms of a human being. A normal human sleep is on an average of eight hours per day. The duration of sleep is shortened as one's age progresses, older people having less sleep duration compared to younger people. Sleep is essential for normal functioning of a human body just like food, water and minerals are to the proper and adequate maintenance of the body. Sleep could be disturbed by change in regular lifestyle, food habits and also diseased conditions either physically or mentally. Some may have disturbed sleep due to bathroom usage several times, whereas some may either feel cold or hot during night which may interrupt their sleep, or some may have difficulty in breathing as in sleep apnea. It could be altered by substances like alcohol, caffeine and other drugs. Alteration in regular sleep patterns could cause disturbances in physical as well as mental health. Sleep disturbances could result due to high levels of stress in an individual causing difficulty in initiating

and maintaining sleep. Sleep disturbances could precipitate psychiatric illnesses in those who are more prone either genetically or physiologically and psychiatric illnesses could co-occur side by side. The co-morbidity of sleep disturbances is very high in psychiatric illnesses. Sleep disturbances play a vital role in the course of psychiatric illness and contribute to impaired function. This includes perceived difficulties and concerns with getting to sleep or staying asleep at night as well as perceptions of adequacy and satisfaction with sleep [1]. Sleep disturbances could be seen in mental illnesses like schizophrenia, bipolar affective disorder, depression, anxiety disorders, substance use disorders etc., and are found to be part of mental illnesses and a cause for relapse of the illness. Even prior to the onset of psychotic symptoms, sleep disturbances are highly present, and quality of sleep is found to be disturbed in such patients. It also affects the quality of life and leads to disability of the patient functionally.

According to ICD-10, bipolar disorder is characterized by repeated (i.e.at least two) episodes in which the patient's mood and activity levels are significantly disturbed, this disturbance consisting of some occasions of mood elevation and increased energy and activity which could be mania or hypomania and on other occasions were lowering of mood and decreased energy and activity could be seen which could be depression. Recovery is usually complete between the episodes, and the incidence in both genders is more nearly equal than in the other mood disorders [2]. Remission in bipolar disorder is defined as absence or minimal symptoms of both mania and depression for at least 1 week with YMRS score </= 8 and MADRS score </= 10 [3]. Sleep disturbance is a common feature of bipolar disorder. Within the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), sleep disturbance is listed as a diagnostic criterion of mania, depression, and mixed episodes [4, 5]. Sleep disturbance is an important domain of impairment during the interepisode phase, each contributing to functional impairment and reduced quality of life [6, 7].

Schizophrenia and related disorders are characterized by fundamental and characteristic distortions of thinking and perception, and by inappropriate or blunted affect. Consciousness and intellectual capacity are maintained, although certain cognitive deficits may evolve in the course of time as the disorder progresses or could be due to medications too. The disturbance involves areas of most basic functions that give the normal person a feeling of individuality and uniqueness [2]. Although not always cited as a core symptom of psychotic illnesses, sleep disturbance is present in up to 80 % of people with schizophrenia. Sleep disturbance is highly prevalent in the early course of the condition prior to the emergence of psychotic symptoms, and often persists after other symptoms have been treated [8, 9]. The Consensus Group for Schizophrenia importantly put forward a component of remission. They recommend that for remission to be considered achieved, all eight symptoms and signs in PANSS scale should rate 3 or less for a period of 6 months, namely delusions, unusual thought content, hallucinatory behavior, conceptual dis-organization, mannerisms/posturing, blunted affect, social withdrawal, lack of spontaneity [10].

According to WHO, Quality of life is defined as individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, standards, and concerns. This definition given by WHO, reflects the view that quality of life refers to a subjective evaluation which is embedded in a cultural, social and environmental background. Because this definition of quality of life focuses upon respondents' perceived quality of life, it is not expected to provide a means of measuring in any detailed symptoms, diseases, or conditions, but rather the effects of disease and health interventions on the quality of life. As such, quality of life cannot be compared equally with the such terms as health status, lifestyle, life satisfaction, mental state or well-being [11].

Even when psychiatric disorders are successfully treated or stabilized, sleep disturbances often fail to remit and are not treated properly. The quality of sleep in such patients is badly affected and influences the daytime functioning and impairs the overall quality of life. Therefore, there is a need to study how the quality of life and functional impairment occurs in patients with sleep disturbances in patients with mental illness who are under remission, so that we could help in improving the co-morbidity. Many of the previous studies according to the literature have done research in patients with schizophrenia and bipolar disorders who are not in remission. Many studies have been done in this area where sleep quality is impaired during the illness. They have also shown how poor sleep quality has affected quality of life and functional disability.

1. 1. Review of literature

Hirschfeld, Calabrese, Frye, et al. defined Remission in bipolar disorder as absence or minimal symptoms of both mania and depression for at least 1 week with YMRS score </= 8 and MADRS score </= 10 [3]. Andreasen NC, Carpenter WT, Kane JM, et al (2005) – The Consensus Group for Schizophrenia importantly put forward a component of remission. They recommend that for remission to be considered achieved, all eight symptoms and signs in PANSS scale should rate 3 or less for a period of 6 months [10]. Van Os J et al also proposed remission criteria for schizophrenia in their study validation of remission criteria for schizophrenia [12]. David Yeomans, Mark Taylor, Alan Currie, et.al, also used the remission criteria for schizophrenia with eight PANSS score in their study resolution and remission of schizophrenia [13].

Kanady JC et al., and Grandner MA et al, compared how sleep disturbances are affecting quality of life and functional impairment in the inter-episode phase of bipolar disorder. 47 participants with bipolar affective disorder who had comorbid insomnia and 19 participants with bipolar affective disorder without comorbid insomnia in the last six months which is the control group participated in the study and observed that presence of sleep disturbances affected their quality of life and impairment was seen in the cases when compared to the control group [6]. Soehner AM et al., in their study showed that comorbidity of Sleep disturbances is very high in psychiatric illnesses which exert a detrimental influence on the course of psychiatric illness and contribute to impaired function [1]. A cross-sectional study done by Tharoor H et. al. 2008, done in 40 patients with bipolar affective disorder and recurrent depressive disorders to compare the quality of life and disability, show that persons with bipolar affective disorder without medical comorbidity had significantly higher disability in 'overall behavior' and 'social roles'. They also found that medical comorbidities have increased disability in mental illnesses but had no impact on the quality of life. [14] Similar findings were seen in studies done by Yatham L. N. et. al. [15] and Gershon E. S. et. al. [16]. A study of 49 participants with bipolar I and bipolar II in inter-episodic period, 34 adults with insomnia and 52 healthy adults with no history of psychiatric or sleep disorders was done by Talbot et al 2012. This study provided evidence that in both inter-episodic bipolar disorder and insomnia, sleep was disturbed significantly, heightened negative mood was present, and a relationship between negative mood and subsequent sleep disturbance was observed [17].

In a study which was conducted by Royuela AMJ et. al. in 2002 in a sample of 44 schizophrenic patients in the adult age group reported poor sleep quality at a rate of 52 % using the Pittsburgh Sleep Quality Index [18].

A substantial number of studies conducted by Benca R. M. et. al. in 1992, Haffmans P. M. et. al. in 1994 and Palmese L. B. et. al. in 2011 have reported that sleep continuity disturbances and poor sleep quality detrimentally affect quality of life in patients with schizophrenia even while on stable medication regimens [19–21].

A study conducted by Michael Ritsner et al 2004, also differentiated between good sleepers and poor sleepers and also compared the quality of sleep with quality of life [22]. In a meta-analysis study done by Chan M. S. et. al. in 2016 involving 35 studies, medication-naïve patients were shown to have disrupted sleep, but no abnormality in sleep architecture, when compared to healthy controls. It was also found that both continuity of sleep and architecture of sleep were disturbed in patients who were withdrawn from medications, but for medicated patients, they had longer sleep onset latency, stage 2 and less REM sleep [23].

A study done by Cohrs S. in 2008, comparing the sleep-wake habits of medicated patients with schizophrenia and healthy controls over one month found that sleep onset latency was significantly longer in schizophrenia, suggested that it is due to circadian rhythm disturbances [24].

In a study done by Krishna Pushpa, Shwetha S in 2008, on 67 medical students aimed to analyze the quality of sleep in medical students using the Pittsburgh Sleep Quality Index scale and to relate sleep with blood pressure, body mass index and academic performance. This study showed the high prevalence of poor sleep quality and underlined the close association of sleep with BP, BMI and academic performance among medical students [25].

Yogesh et. al. 2014, in a case-control study, assessed the usage of mobile phones among 100 medical students and to find correlation between usage patterns and quality of sleep using

Pittsburgh sleep quality index. They found a significant association between sleep indices and phone usage. They also found out that sleep deprivation and daytime sleepiness affects cognitive and learning abilities of medical students [26].

In a meta analytic study done by Fortier et. al., 2012, where 24 studies were analyzed for a total of 639 individual with insomnia and 558 normal sleepers, to observe how insomnia is affecting daytime cognitive performance in terms of episodic memory, working memory, problem solving. They found out that individuals with insomnia exhibit performance impairments for several cognitive functions, including working memory, episodic memory and some aspects of executive functioning [27].

In a study done by Morin C. et. al. in 2002, studied the dysfunctional beliefs and attitudes about sleep where they have studied in 78 participants with 47 women and 31 men,who had average duration of insomnia of 17.0 years, 64 % of participants had mixed difficulties initiating sleep and 25 % had difficulty in maintaining sleep, whereas 6.9 % had sleep onset difficulties only. Prospective subjects underwent clinical interviewing with DSM-III-R and self-report measures including dysfunctional beliefs and attitudes about sleep. These subjects were given sleep diaries to be completed during the whole duration of study and three consecutive nights of polysomnography at baseline and also post-treatment assessment was done. These subjects were given Cognitive Behavioral therapy, pharmacotherapy, combined CBT and pharmacotherapy and medication placebo. Results obtained were assessed for response at the end of the study [28].

Gruber et al in 2009 studied sleep functioning in relation to mood, quality of life and function at entry into Systematic treatment enhancement program for Bipolar disorder in 2024 bipolar patients. Their analysis implied that there were 32 % short sleepers, 38 % normal sleepers and 23 % long sleepers. They used DSM-IV criteria for diagnosing bipolar disorder, clinical status was measured using the clinical monitoring form to find out symptomatic, subthreshold and asymptomatic clinical status categories. Global assessment of functioning was used to assess the global functioning, whereas perceived life satisfaction was determined by Quality of life enjoyment and satisfaction short form questionnaire. Results showed that short sleepers had greater mood elevation, earlier age at onset, and longer illness duration compared to both normal and long sleepers. Both short and long sleepers had greater depressive symptoms, poor life functioning, and quality of life compared to that of normal sleepers [29].

A study consisting of 142 participants done by Cotrena et al in 2016 where they studied quality of life, functioning and cognition in bipolar disorder and major depression. Participants were diagnosed using DSM-V criteria, neuropsychological assessment was done using Measurement and Treatment Research to Improve Cognition in Schizophrenia (MATRICS) consensus battery which can also be used for bipolar disorder. The presence of manic and depressive symptoms were assessed using HAM-D and YMRS. Functional capacity and quality of life were evaluated using the World Health Organization Disability Assessment Schedule, which assesses five domains of functioning (cognition, mobility, self-care, social relationships, occupational activity and participation), and the World Health Organization Quality of Life Assessment which evaluates four domains of quality of life (physical health, psychological health, social relationships and environment). They investigated to try and identify profiles of functioning and quality of life in populations with mood disorders, and to investigate the association between these factors and patients' clinical, demographic and cognitive characteristics [30].

In a study of 32 participants done by Kleinman et. al. in 2013, which describes research conducted with patients with clinical diagnoses of insomnia and focused on the development of a framework and end-point model which identifies a hierarchy and interrelationships of potential outcomes in insomnia studies. Focus groups were convened to discuss how patients experience insomnia and to generate items for patient-reported questionnaires on insomnia and associated daytime consequences. Results for the focus groups produced two conceptual frameworks of which one is for sleep and one is for daytime impairment. Approximately 50 % of the participants reported consistent sleep difficulties from night to night, whereas the remainder noted that they could not identify any trends in their insomnia. Participants could describe the characteristics of their sleep

on a good night as well as a bad night. Each framework consists of hypothesized domains and items in each domain were based on the patient's language which was taken from the focus group. Based on the two conceptual frameworks, they were able to develop an endpoint model for insomnia. The endpoint model was developed based on objective (quantitative) measures of insomnia used in most trials of insomnia medication and the qualitative subjective information elicited from patients during the focus groups. The endpoint model describes the relationships among the qualitative data obtained in the focus group, clinical measures of insomnia, and PRO measures within the context of treatment for insomnia [31].

In a study done by Bastien et al, they validated an instrument for measuring insomnia severity in 145 patients and also in a second study where 78 patients participated and concluded that it is a sensitive measure to detect insomnia severity [32].

In a study done by Buy see et. al. in 2010, One thousand nine hundred ninety-three adults recruited from an Internet polling sample and 259 adults recruited from medical, psychiatric, and sleep clinics were used for the development and validation of patient reported outcomes measures for sleep disturbances and sleep related impairments. Self-reported item banks were developed through a process of searching the literature and reviewing them, collecting and sorting them, expert content review, and qualitative patient research. Internal consistency, convergent validity, and confirmatory factor analysis were examined in the resulting item banks. Factor analyses identified 2 preliminary item banks, sleep disturbance and sleep related impairments. Item response theory analyses and expert content review has narrowed the item banks to 27 and 16 items, respectively in their study. The item banks were valid with moderate to high correlations with the scales and also by significant differences in sleep disturbances and sleep related impairment scores between participants with and without sleep disorders [33].

In a cohort research study of sleep disturbances in euthymic bipolar patients done by Sylvia et al in 2012, 483 individuals with bipolar I and II disorder were drawn from STEP_BD cohort, 15 % of the euthymic individuals i. e, 73 of them reported mild sleep disturbances. The presence of sleep disturbance was not associated with gender, age, race, marital status, bipolar subtype, rapid cycling in the prior year, or comorbid axis I anxiety or substance abuse disorder. Sleep disturbance was less prevalent in individuals with a history of psychosis, but more prevalent in those with a history of suicide attempts and hypomanic or manic symptoms. No association was found between sleep disturbances and pharmacotherapy. In the survival analysis, they found that the presence of sleep disturbance was significantly associated with greater risk for mood episode recurrence. This study found that residual sleep disturbance among euthymic bipolar I and II patients was associated with risk of recurrence of subsequent mood episodes. Sleep disturbance was also associated with a history of psychosis, number of previous suicide attempts, and the use of anticonvulsants, but not with other medications [34].

In a review study done by Plante et al in 2008 they observed that impaired sleep can induce and predict manic episodes. Similarly, treatment of sleep disturbance may serve as target of treatment and also a measure of response in mania. The depressive phase of bipolar disorder illness is marked by sleep disturbances that may be attended by using somatic therapies that target sleep and circadian rhythms. Residual insomnia in the euthymic period may represent a vulnerability to affective relapse in susceptible patients [35].

A study involving 190 bipolar patients done by Giglio et al in 2009 diagnosed by application of Structured Clinician Interview for DSM-IV Disorders (SCID), were distributed in two groups based on absence or presence of sleep disorders. Quality of life, disability, and global dysfunction were evaluated using the Health Organization's Quality of Life instrument (WHOQOL-Brief), the Sheehan Disability Scale, and the Global Assessment of Functioning (GAF), respectively. Patients with sleep problems showed worse quality of life scores in all domains. They also observed that the score of physical and psychological domains presented worse impairment than social and environmental domains. Sheehan disability scales verify impairment in tree domains: work social comportment and familial, since bipolar patients with sleep alteration presented high scores in every domain, indicating functional impairment in these patients. Patients with both bipolar disorder and sleep disturbance showed lower quality of life than bipolar patients that did

not experience insomnia. Bipolar patients with impaired sleep might feel especially exhausted with need for more time in bed which could explain the physical disability. Furthermore, the poor quality of sleep promotes difficulties in concentration, learning, and memory. Although a body of evidence reported that quality of life was inversely correlated with the level of depression, a comparison study between bipolar and unipolar patients suggested that the level of depression did not fully explain the lower quality of life within patients with Bipolar disorder. They also demonstrated that the sleep alteration was another factor that contributes to low quality of life experienced by bipolar patients. They concluded that experimentally induced sleep deprivation is associated with the onset of hypomania and mania in a considerable proportion of patients. In a systematic review of studies of patients with bipolar disorder, sleep disturbance was the most common prodrome of mania and the sixth most common prodrome of bipolar depression. Lastly, they observed that the sleep-wake cycle has been a component of theoretical conceptualizations of bipolar disorder [36].

Hypothesis of the study:

1) Quality of sleep does not affect the quality of life and functional disability in patients who are under remission.

2) No correlation is present between the quality of sleep and quality of life.

3) No correlation is present between the quality of sleep and functional disability.

Aim of the study was to study quality of sleep in patients with psychiatric illness under remission in relation to quality of life and functional disability.

2. Materials and Methods

Source of Data. Patients attending review outpatient department of Institute of Mental Health, Hyderabad.

Type of Study: Cross sectional study.

Duration of study: November 2017 to October 2019.

Sample size: 50 remitted patients of Bipolar Affective Disorder and 50 remitted patients of Schizophrenia.

Inclusion criteria:

1) Patients giving written informed consent.

2) Patients meeting remission criteria for bipolar affective disorder i. e., YMRS </= 8, MADRS </= 10 for 1 week and for schizophrenia-eight PANSS signs and symptoms score <3 for 6 months.

3) Age-18–65 years.

4) Gender-Male and Female.

5) Those who are well versed in English

Exclusion criteria:

1) Comorbid Substance Use and Dependence patients.

2) End stage medical illnesses.

Study Procedure: Approval of Ethics committee of Osmania Medical College (ECR/300/Inst/AP/2013/RR-16) was taken. Patients attending the review outpatient department of Tertiary hospital-Institute of Mental Health are selected for the study. Convenience sampling technique is used for selection of samples. Subjects were given participation information sheets which were used to explain the need and procedure of the study and written informed consent was taken from them .Socio Demographic profile of the patients is taken. Patients who were diagnosed with bipolar affective disorder and schizophrenia according to ICD-10 criteria were taken. Patients meeting remission criteria for bipolar affective disorder i. e., YMRS score </= 8, MADRS score </= 10 and for schizophrenia-eight PANSS signs and symptoms score <3 are selected from them. Quality of sleep is assessed with the help of Pittsburgh sleep quality index in these groups of patients. Quality of life is assessed with WHO-QOL BREF questionnaire and Functional disability is assessed using WHODAS 2.0. The effect of poor sleep quality on the quality of life and functional disability is studied in these patients.

ICD-10 criteria for diagnosis of Schizophrenia and Bipolar affective disorder [2].

Young Mania Rating Scale. The Young Mania Rating Scale (YMRS) which was developed by Young RC et al (1978) is one of the most frequently utilized rating scales to assess manic symptoms. The scale has 11 items which is based on the patient's subjective report of his or her clinical condition over the last 48 hours. Additional information is based upon the clinical observations made during the course of the clinical interview by the interviewer. The items are selected based upon descriptions of the core symptoms of mania. There are four questions which are graded on a 0 to 8 scale which are irritability, speech, thought content, and disruptive/aggressive behavior, while the remaining seven items are graded on a 0 to 4 scale. Strengths of the YMRS include its widely accepted usage, and ease of administration. The scale is generally done by a clinician or otherwise trained rater with expertise with manic patients and takes around 15–30 minutes to complete [37].

Montgomery Asberg Depression Rating Scale: It was developed by Montgomery SA in 1979. The scale consists of 10 items evaluating core symptoms of depression. Nine of the items are based upon patient reports, and one is on the rater's observation during the rating interview. The items are rated on a 0–6 continuum (where 0 = no abnormality, 6 = severe). Inter-rater reliability on the MADRS with different pairs of raters has been reported to be 0.89–0.97 [38].

Eight PANSS signs and symptoms scoring: The Consensus Group for Schizophrenia importantly put forward a component of remission. Developed by Andreasen in 2005. They recommend that for remission to be considered achieved, all eight symptoms and signs in PANSS scale should rate 3 or less for a period of 6 months [10].

Pittsburgh Sleep Quality Index: The PSQI is an effective instrument used to measure the quality and patterns of sleep. It was developed by Buysee et al in 1989. It differentiates poor from good sleep by measuring seven subscales: Subjective Sleep Quality, Sleep Duration, Sleep Latency,Sleep Efficiency, Sleep Disturbances, Use of Sleep Medication, and Daytime Dysfunction over the last month. The client self-rates each of the seven areas of sleep by answering nine questions. Scoring of answers is based on a zero to three scale, and a score of three reflects the negative extreme on the Likert Scale. A total sum of 5 or greater indicates a poor sleeper. The PSQI has internal consistency and a liability coefficient (Cronbach's Alpha) of 0.83 for its seven components. Numerous studies using the PSQI have supported high validity and reliability [39].

WHO Quality of Life-BREF Questionnaire: It was drafted by Alison Harper which consists of 26 questions and produces a quality of life profile. It is obtained in four domains namely Physical, Psychological, Social relationships and environmental domains respectively. Higher scores imply higher quality of life. Physical quality of life domain includes areas like activities of daily living, depending on medicinal substances and medical aids, energy and fatigue, mobility, pain, sleep, work capacity. Psychological domain consists of areas like bodily image and appearance, negative feelings, positive feelings, self-esteem, spirituality/religion/personal beliefs, thinking, learning, memory and concentration. Social relationships quality of life domain consists of personal relationships, social support, and sexual activity. Environmental quality of life domain consists of financial resources, freedom, physical safety and security, health and social care: accessibility and quality, home environment, opportunities for acquiring new information and skills, participation in activities and opportunities for recreation/leisure activities, physical environment (like pollution or noise or traffic or climate), and transport. It is reproduced with permission from WHO [11].

WHODAS 2.0 for functional disability: This questionnaire asks about difficulties due to health conditions. Health conditions can include diseases or illnesses, other health related problems that may be short or long lasting, injuries, mental or emotional problems, and also problems with alcohol or drugs. This scale covers 6 domains of functioning like Cognition, Mobility, self-care, Getting along-interacting with people, life activities, and participation in community activities. The scores which are assigned to each of these items – «none» (1), «mild» (2) «moderate» (3), «severe» (4) and «extreme» (5) – are added up and a total score is obtained. It is reproduced after obtaining permission from WHO [40].

Statistical Analysis: SPSS software version 22 is used to analyze the data. Descriptive statistics showing frequencies and % ages are obtained. Means and standard deviations of different variables are also obtained using statistical analysis with significant p-values of <0.01. Graphs using histogram, pie-chart and box and whisker's plot diagrams are obtained. Student t-test is done

for comparing the quality of life and functional disability in subjects with good sleep quality and without good sleep quality where p-value is significant with <0.01. Pearson correlation coefficient was used to obtain co-relations between Quality of sleep and functional disability, Quality of sleep and various Quality of life domains. χ^2 tests were done to see the significance between different variables and also to check the null hypothesis.

3. Results

Many results were obtained from this study. Mean age (N = 100) was found to be 36.59. Significant p-value of <0.01 was present. **Table 1** shows the socio-demographic profile of the patients. According to the table shown, males were 64 % and females were 36 %. Participants hailing from urban populations are 63 % whereas 37 % belonged to the rural population. 57 % of the subjects belonged to the nuclear family, 32 % belonged to the joint family and 11 % belonged to the broken families. 66 % of the subjects are Hindus, 17 % being Muslims and remaining 17 % are Christians. 13 % of the subjects who participated are graduates or post graduates, 18 % are educated up to intermediate or post-diploma, 38 % are high school, 29 % are middle school, 2 % are primary school. 6 % are professionals by occupation, 4 % are semi-professionals, 8 % are shop keepers or clerical or farmers by occupation, 58 % are skilled workers, 10 % are semi-skilled, 14 % are unskilled workers. 18 % of the participants are unmarried or single, whereas 68 % are married and 14 % are separated or divorced. Lastly, BPAD-mania subjects are 46 %, BPAD-depression subjects are 4 % and Schizophrenia are 50 %.

Table 1

Socio-demographic profile

Socio-Demographic parameters	Sub-divisions	Frequency	Percentage
Gender	Male	64	64
	Female	36	36
Domicile	Urban	63	63
	Rural	37	37
Family	Nuclear	57	57
	Joint	32	32
	Broken	11	11
Religion	Hindu	66	66
	Muslim	17	17
	Christian	17	17
Education	Graduates or Post graduates	13	13
	Intermediate or Post school diploma	18	18
	High school	38	38
	Middle school	29	29
	Primary school	2	2
Occupation	Professional	6	6
	Semi Professional	4	4
	Clerical, shop owner, farmer	8	8
	Skilled worker	58	58
	Semiskilled worker	10	10
	Unskilled worker	14	14
Marital status	Single/Unmarried	18	18
	Married	68	68
	Separated/Divorced	14	14
Diagnosis	BPAD- Mania	46	46
	BPAD- Depression	4	4
	Schizophrenia	50	50

Fig. 1 shows scatter plot diagram for age and different diagnosis. From the graph it implies that majority of the BPAD and schizophrenics were middle aged ranging from 25 to 40. **Fig.2** shows pie graph of different occupations, majority of them being skilled workers. **Fig.3** is a Box and whisker's plot diagram showing Gender, Education and Diagnosis of the participants.

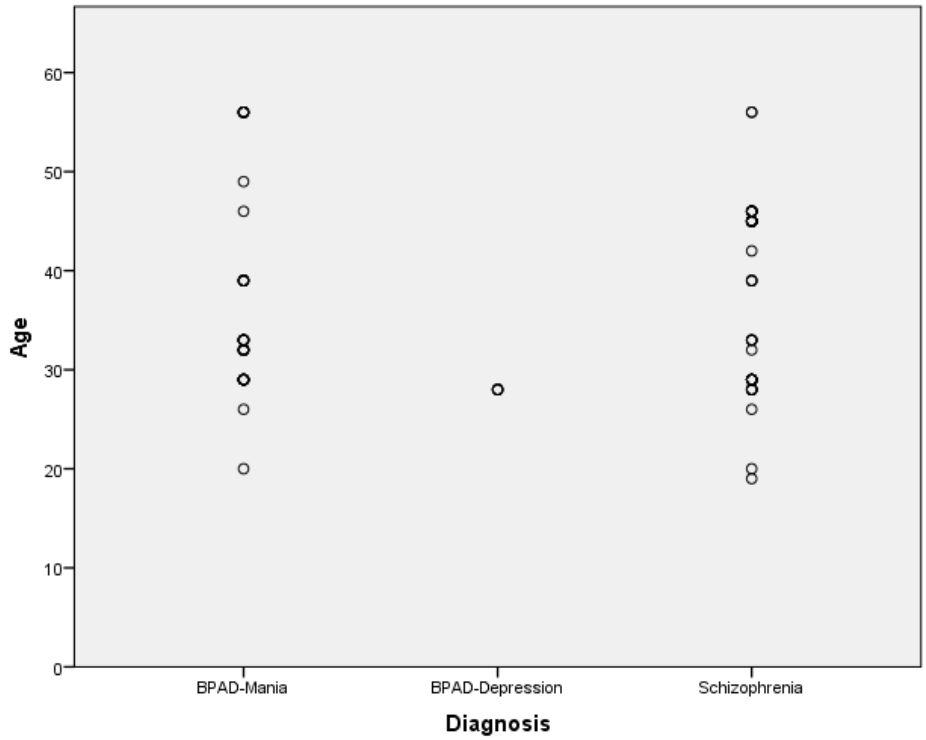

Fig. 1. Scatter diagram showing Age vs Diagnosis

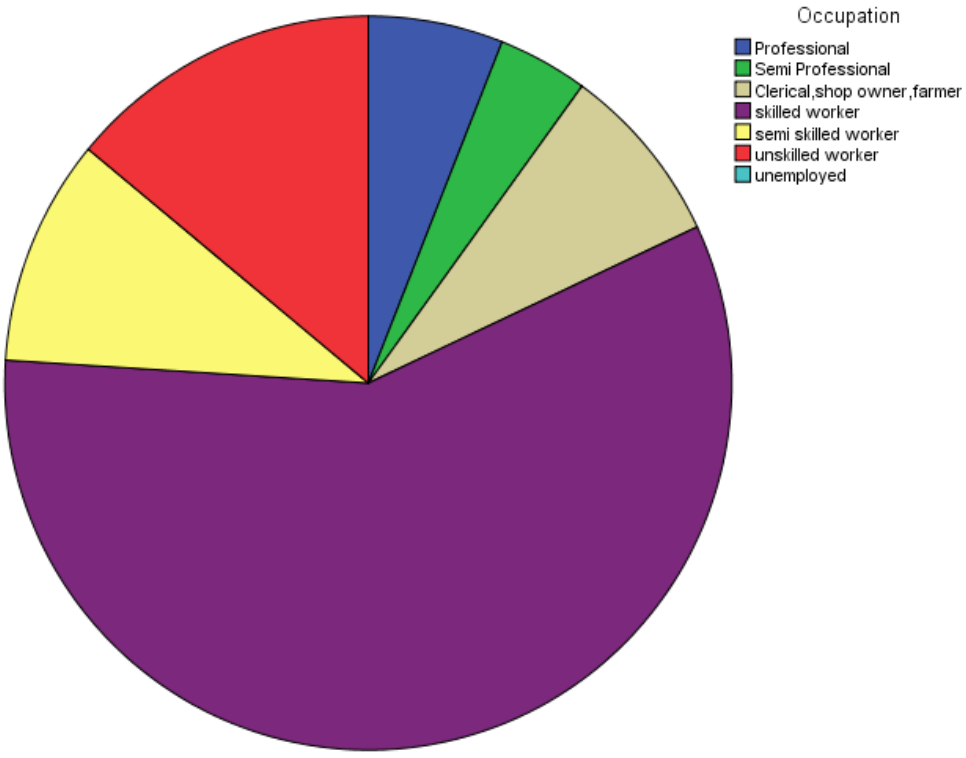

Fig. 2. Pie graph showing different occupations

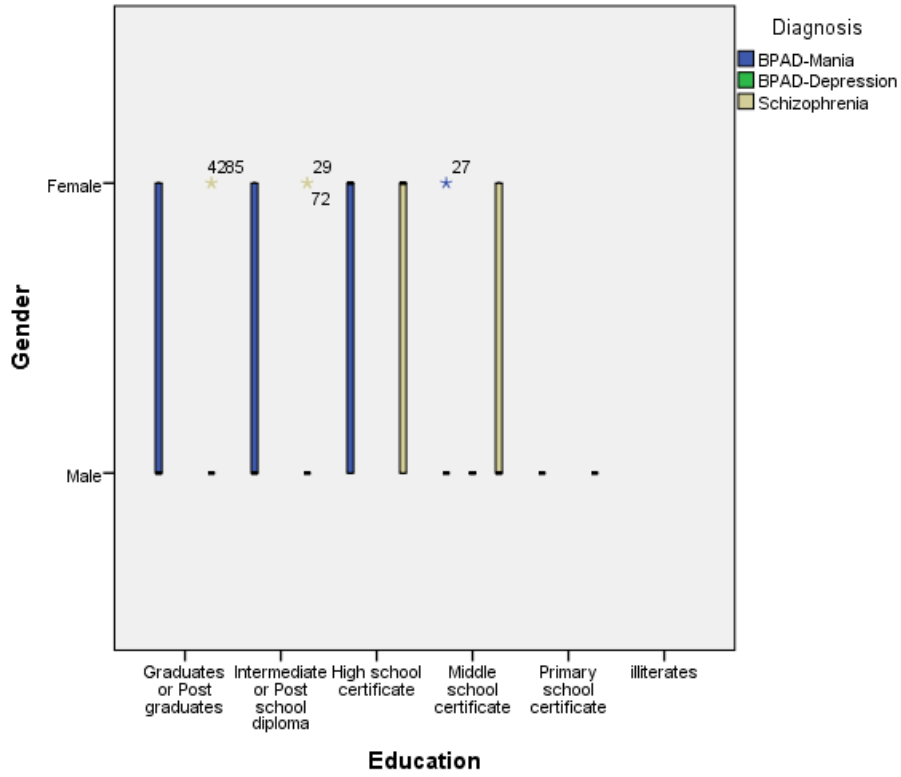

Fig. 3. Box and whisker's plot graph showing Gender, education with diagnosis

Table 2 shows means and standard deviations of quality of life domains, functional disability and quality of sleep scores.

The mean and standard deviation of Physical Quality of life domain are 58.28 and 23.285 respectively, mean and standard deviation of Psychological Quality of life domain are 56.63 and 24.176 respectively, mean and standard deviation of Social Quality of life domain are 55.39 and 27.418 respectively, mean and standard deviation of Environmental Quality of life domain are 55.41 and 28.569 respectively. Mean and standard deviation of Functional disability score are 30.14 and 29.749 respectively. Mean and standard deviation of Quality of Sleep are 8.35 and 4.001 respectively.

Table 2

Means and standard deviations for Quality of life domains, disability scores and quality of sleep scores

Mean and Standard Deviation	QOL domain 1	QOL domain 2	QOL domain 3	QOL domain 4	Disability score	PSQI score
Mean	**58.28**	**56.63**	**55.39**	**55.41**	**30.14**	**8.35**
N	**100**	**100**	**100**	**100**	**100**	**100**
Std. Deviation	**23.285**	**24.176**	**27.418**	**28.569**	**29.749**	**4.001**

Note: Significant at the 0.01 level

Table 3 shows sleep latency scores that is time taken for the person for initiation of sleep. Sleep latency was better in 32 people, good in 35 people, bad in 19 and 14 people had worse sleep latency.

Table 4 gives the sleep efficiency scores, which is the ratio of total sleep time to total bed time.

Fig. 4 shows Histogram of Quality of sleep scores and functional disability scores.

Table 3

Table showing Sleep Latency scores

Sleep Parameter		Diagnosis			Total
		BPAD-Mania	BPAD-Depression	Schizophrenia	
Sleep Latency	0	12	2	18	32
	1	17	1	17	35
	2	9	0	10	19
	3	8	1	5	14
Total		46	4	50	100

Table 4

Table showing Sleep Efficacy scores

Sleep Parameter		Diagnosis			Total
		BPAD-Mania	BPAD-Depression	Schizophrenia	
Sleep Efficacy	0	6	0	5	11
	3	40	4	45	89
Total		46	4	50	100

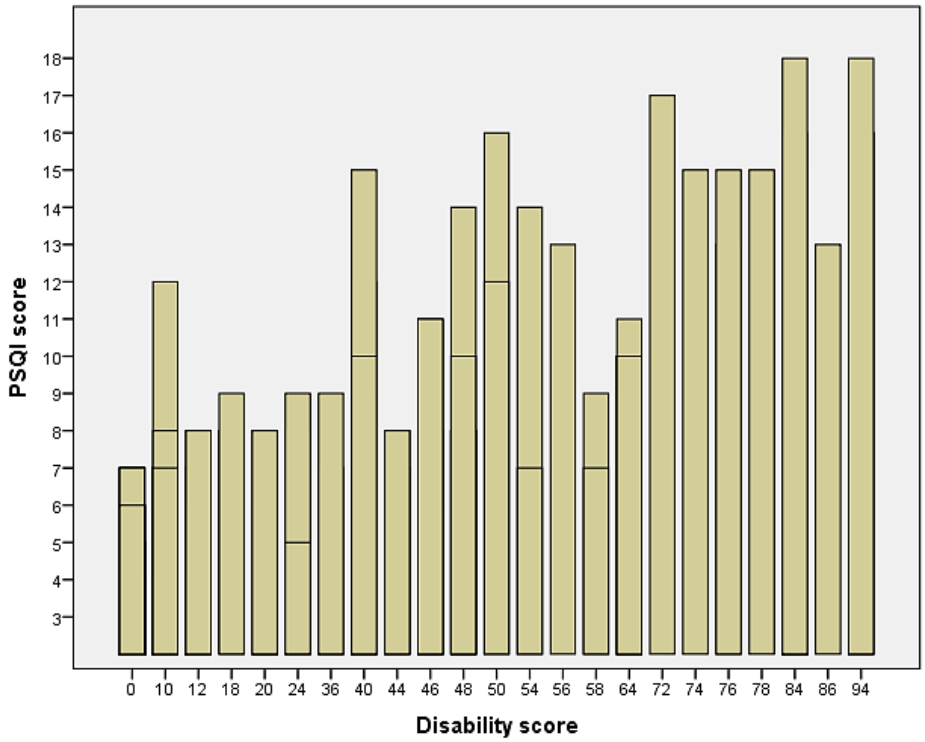

Fig. 4. Histogram showing PSQI scores and Disability scores

3. 1. Good sleepers and Bad sleepers

We have differentiated between good quality of sleep and bad quality of sleep based on PSQI scores. **Table 5** shows % ages of good sleepers and bad sleepers. Mean PSQI was found out to be 8.35.

Table 6 shows Quality of sleep in BPAD and Schizophrenia where majority of Mania (34 %) and Schizophrenia (37 %), whereas 50 % of BPAD depression patients are having bad quality of sleep. Patients reported that using medications have improved their sleep pattern, many of them dependent on them for sleep.

Table 5
Table showing Good sleepers and Bad sleepers based on PSQI scores

Quality of Sleep	Good sleepers	Bad sleepers
PSQI </= 5	27	–
PSQI >5	–	73

Note: PSQI-Pittsburgh Sleep Quality index; PSQI</ = 5 Good quality of sleep; PSQI>5:- Bad quality of sleep

Table 6
Quality of sleep in BPAD and Schizophrenia

Diagnosis	PSQI </= 5	PSQI > 5
BPAD-mania	12	34
BPAD-depression	2	2
Schizophrenia	13	37
Total	27	73

3. 2. Co-relations

Correlation between Quality of sleep and Quality of life domains was obtained using Pearson correlation as shown in **Table 7**. Strong negative correlation is found between both these variables i. e., lesser the PSQI score, more is the quality of life which also implies that, if quality of sleep is good, then there would be better quality of life. **Table 8** shows correlation between Quality of sleep and Functional disability. Strong positive correlation is found which implies that higher the PSQI score higher is the functional disability i. e., good quality of sleep reflects to show less functional disability. All Quality of life domains and Disability scores are negatively correlated as shown in **Table 9**, which finally implies that lower the disability higher is the quality of life.

Table 7
Co-relations between Quality of Sleep and Quality of Life domains

Correlation		PSQI score
QOL DOM 1*	Pearson Correlation	-0.816**
	Sig. (2-tailed)	0.000
QOL DOM 2†	Pearson Correlation	-0.823**
	Sig. (2-tailed)	0.000
QOL DOM 3‡	Pearson Correlation	-0.847**
	Sig. (2-tailed)	0.000
QOL DOM 4$	Pearson Correlation	-0.825**
	Sig. (2-tailed)	0.000

*Note: **Correlation is significant at the 0.01 level (2-tailed); QOL DOM 1* – Quality of Life Domain 1 (Physical domain); QOL DOM 2† – Quality of Life Domain 2 (Psychological domain); QOL DOM 3‡ – Quality of Life Domain 3 (Social relationships domain); QOL DOM 4$ – Quality of Life Domain 4 (Environmental domain)*

Table 8
Correlation between Quality of Sleep and Functional Disability

Quality of Sleep and Functional Disability		PSQI score	Disability score
PSQI score	Pearson Correlation	1	.860**
	Sig. (2-tailed)	–	.000
Disability score	Pearson Correlation	.860**	1
	Sig. (2-tailed)	.000	

*Note: ** – Correlation is significant at the 0.01 level (2-tailed)*

Table 9

Correlation between Quality of life domains and functional disability

Quality of Life Domains	Correlations	Disability score
QOL domain 1	Pearson Correlation	-0.814**
	Sig. (2-tailed)	0.000
QOL domain 2	Pearson Correlation	-0.808**
	Sig. (2-tailed)	0.000
QOL domain 3	Pearson Correlation	-0.830**
	Sig. (2-tailed)	0.000
QOL domain 4	Pearson Correlation	-0.835**
	Sig. (2-tailed)	0.000

*Note: ** – Correlation is significant at the 0.01 level (2-tailed)*

Table 10 shows t-test for Quality of life domain scores and Disability scores with good sleep quality and without good sleep quality. T-value for Disability-PSQI scores is 8.258, Quality of life domain 1 – PSQI scores is 118.736, Quality of life domain 2 – PSQI scores is 17.516, Quality of life domain 3 – PSQI scores is 15.233, Quality of life domain 4 – PSQI scores is 14.730 with significant p-values of 0.000 for all the pairs.

Table 10

Paired sample T-test showing quality of life scores and disability scores with and without good sleep

Paired Samples Test		Paired Differences			Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	
Pair 1	Disability score – PSQI score	21.790	26.387	±2.639	.000
Pair 2	QOL domain 1 – PSQI score	49.930	26.649	±2.665	.000
Pair 3	QOL domain 2 – PSQI score	48.280	27.563	±2.756	.000
Pair 4	QOL domain 3 – PSQI score	47.040	30.880	±3.088	.000
Pair 5	QOL domain 4 – PSQI score	47.060	31.949	±3.195	.000

p-value is significant at the 0.01 level (2-tailed)

3. 3. Quality of life in BPAD and Schizophrenia

In the BPAD-mania group of patients under remission, 65 % of them have better physical quality of life (QOL), 63 % have good psychological QOL, only 56 % having good social QOL whereas 50 % have good environmental QOL.

In the BPAD-depression group, 75 % have good physical, psychological, social and environmental domains of QOL.

In the Schizophrenia group of patients, 70 % with better physical QOL, 60 % with better physiological domain, 52 % with better social domain and 64 % had better environmental QOL.

Mean QOL domain 1 = 58.28, Mean QOL domain 2 = 56.63, Mean QOL domain 3 = 55.39, Mean QOL domain 4 = 55.41.

Table 11, 12 shows χ^2 tests for variables Physical quality of life domain with Diagnosis and Gender, where it is significant only with Gender variables.

Table 11

Chi-Square Tests for Physical Quality of life domain and Diagnosis

Chi-Square Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20.080a	22	0.578
Likelihood Ratio	18.055	22	0.703
N of Valid Cases	100	–	–

Note: p-value<0.05 is significant for diagnosis and physical quality of life domain

Table 12
Chi-Square Tests for Physical Quality of life domain and Gender

Chi-Square Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20.348a	11	0.041
Likelihood Ratio	26.339	11	0.006
N of Valid Cases	100	–	–

Table 13, 14 shows χ^2 tests for variables Psychological quality of life domain with Diagnosis and Gender, where it is not significant with either of the variables.

Table 13
χ^2 Tests for Psychological Quality of life domain and Diagnosis

χ^2 Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.962a	11	0.235
Likelihood Ratio	16.439	11	0.126
N of Valid Cases	100	–	–

Note: p-value<0.05 is significant for psychological quality of life domain and Diagnosis

Table 14
χ^2 Tests for Psychological Quality of life domain and Gender

χ^2 Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	24.157a	22	0.339
Likelihood Ratio	22.054	22	0.457
N of Valid Cases	100	–	–

Note: p-value<0.05 is significant for Psychological Quality of life domain and Gender

Table 15, 16 shows χ^2 tests for variables Social Quality of life domain with Diagnosis and Gender, where it is significant with only Gender variables.

Table 15
χ^2 Tests for Social Quality of life domain and Diagnosis

χ^2 Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.711a	22	0.723
Likelihood Ratio	20.712	22	0.539
N of Valid Cases	100	–	–

Note: p-value<0.05 is significant for Social Quality of life domain and Diagnosis

Table 16
χ^2 Tests for Social Quality of life domain and Gender

χ^2 Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	21.522a	11	0.028
Likelihood Ratio	25.039	11	0.009
N of Valid Cases	100	–	–

Note: p-value<0.05 is significant for Social Quality of life domain and Gender

Table 17, 18 shows χ^2 tests for variables Environmental quality of life domain with Diagnosis and Gender, where it is not significant with either of the variables.

Table 17

χ^2 Tests for Environmental Quality of life domain and Diagnosis

χ^2 Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	16.381a	22	0.797
Likelihood Ratio	16.000	22	0.816
N of Valid Cases	100	–	–

Note: p-value<0.05 is significant for Environmental Quality of life domain and Diagnosis

Table 18

χ^2 Tests for Environmental Quality of life domain and Gender

χ^2 Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.698a	11	0.387
Likelihood Ratio	12.844	11	0.304
N of Valid Cases	100	–	–

Note: p-value<0.05 is significant for Environmental Quality of life domain and Gender

Tables 19–23 shows χ^2 tests for PSQI and Physical quality of life domain, Psychological quality of life domain, Social quality of life domain, Environmental quality of life domain and Disability scores respectively. These scores are significant with p-values less than 0.05 indicating that hypothesis is false that Quality of sleep is not correlated significantly with Quality of life and Functional disability.

Table 19

χ^2 Tests for PSQI and Physical quality of life domain

χ^2 Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	314.977a	165	0.000
Likelihood Ratio	224.189	165	0.001
Linear-by-Linear Association	65.847	1	0.000
N of Valid Cases	100	–	–

Note: p-value<0.05 is significant for PSQI and Physical quality of life domain

Table 20

χ^2 Tests for PSQI and Psychological quality of life domain

χ^2 Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	268.060a	165	0.000
Likelihood Ratio	206.825	165	0.015
Linear-by-Linear Association	67.056	1	0.000
N of Valid Cases	100	–	–

Note: p-value<0.05 is significant for PSQI and Psychological quality of life domain

Table 21

χ^2 Tests for PSQI and Social quality of life domain

χ^2 Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	245.731a	165	0.000
Likelihood Ratio	207.643	165	0.014
Linear-by-Linear Association	71.009	1	0.000
N of Valid Cases	100	–	–

Note: p-value<0.05 is significant for PSQI and Social quality of life domain

Table 22

χ^2 Tests for PSQI and Environmental quality of life domain

χ^2 Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	250.117a	165	0.000
Likelihood Ratio	206.697	165	0.015
Linear-by-Linear Association	67.332	1	0.000
N of Valid Cases	100	–	–

Note: p-value<0.05 is significant for PSQI and Environmental quality of life domain

Table 23

χ^2 Tests for PSQI and Disability scores

χ^2 Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	573.973a	330	0.000
Likelihood Ratio	275.330	330	0.987
Linear-by-Linear Association	73.267	1	0.000
N of Valid Cases	100	–	–

Note: p-value<0.05 is significant for PSQI and Disability scores

4. Discussion

This study has a lot of implications to be discussed, which are very important in identifying the patients' suffering from psychiatric illnesses especially Bipolar affective disorder and Schizophrenia. This appears to be the first study to compare quality of sleep in BPAD and Schizophrenia with respect to their quality of life and functional disability. This study proved the hypothesis false which was stated at the beginning of the study. It was hypothesized that quality of sleep does not affect the quality of life and functional disability, which was false. Since the illness itself can cause sleep disturbances which can indeed impair the patient's day time function and work, this study is significantly cardinal and essential. This study has prioritized and concentrated on identifying the factors responsible for causing sleep disturbances and facets for quality of sleep in those under remission. The factors which were found to be causing sleep disturbances are either the illness itself can be causing sleep disturbances like difficulty in initiation of sleep or maintenance of sleep or difficulty in waking up. The other possible factors are also observed in this study which are excessive thoughts or family factors or difficulty in maintaining sleep due to multiple awakenings because of either feeling cold or hot or going to the bathroom. Awakenings due to bad dreams have also been found as one of the factors. All these resulted in decreasing the sleep efficiency scores in respective individuals and also overall quality of sleep as is evident in their respective PSQI scores. This study has also co-related the PSQI scores with the Quality of life and Functional disability scores obtained. The sleep quality has been compared with quality of life and disability using the t-test.

In our study sample, it is evident from **Table 1** males were more in number compared to females and those belonging to urban background. Nuclear family and Hindus dominated the population sample. Most of the participants in the study are married. As we have taken questionnaires from patients who are well versed in English language, our majority study samples are found to be those who have completed their high school education. From **Table 2**, it implies that the physical quality of life mean score is higher when compared to the other domains of quality of life and has a lesser standard deviation than others, which means that this domain is less deviated from the original scores. **Table 3** shows the sleep onset latency scores which is the time taken to initiate sleep. Most of the participants had good sleep onset latency. Patients during their interview, while answering the questionnaire, have reported many agencies that have caused them impairment in sleep viz,waking up to use bathroom, feeling either hot or cold, waking up because of having bad dreams. Individuals who had bad dreams during their sleep had relatively poorer quality of sleep when compared to those who had no bad dreams. They reported that bad dreams interrupted their sleep and also had difficulty in getting back to sleep later.

From **Table 4**, it appears that most of them had worse sleep efficiency indicating that majority were having difficulty initiating as well as maintaining sleep throughout the night. Among the 89 % of people who were having worse sleep efficiency, many people reported that they wake up several times in the night, some due to either feeling cold (when patients were interviewed in winter season) or hot (when interview was taken during summer).Most of the patients reported that they had to get up to use bathroom in the night and had difficulty falling back to sleep. It was also noticed that patients reported getting bad dreams at night because of which they are awakened following which they found difficulty going back to sleep.

From **Table 5**, we can see that 27 % have PSQI </ = 5, which implies that 27 patients have good quality of sleep. Hence they can be called as «Good sleepers». It is also evident from the same table that 73 patients have PSQI > 5, indicating that they amount to bad quality of sleep and hence are «Bad sleepers». The patient's bed partner or room partner reported to have had difficulty in sleeping and some have reported that snoring was present in some of the individuals which was found to have not affected their quality of sleep. Frequency of troubling sleep was identified to be more in poor sleepers. Those who were identified to have bad quality of sleep reported, the majority of them, restlessness and not having energy to work the next day. This pattern of sleep has continued almost every day for this group of patients. Cumulatively, this disruption could affect them in the form of excessive daytime drowsiness impairing quality of life and disabling them functionally. Mean PSQI score of 8.35 indicates that most of the study population are having poor quality of sleep. This implies the need for assessing the factors contributing to affecting sleep in those patients which is done in this study.

Table 6 shows the quality of sleep in BPAD and Schizophrenia. Most of the BPAD patients had good quality of sleep which is due to good compliance to medications as many are dependent on medications for their sleep. This applies in the same way to schizophrenic patients who are dependent on medications for inducing or maintaining sleep. Number of hospitalizations also play a vital role and is indicative of compliance to medications i. e., poor compliance to medications have caused many relapses in this study population and hence more number of hospitalizations. This study has observed the impact on various domains of quality of life i. e., Physical, Psychological, Social and Environmental. Patients seemed to have reported that sleep disturbances have affected their work capacity, decreased energy, feeling of negativity, decreased self-esteem, sexual activity, not participating in leisure activities etc. The total duration of using medications was also included in this study apart from the number of hospitalizations. Some were having poor compliance towards medications ultimately affecting their illness as well as sleep, leading to added up hospitalizations. The amount of disability was significant in those group of patients. Strong negative co-relation was found between PSQI and QOL scores i. e., lesser the PSQI score, more is the quality of life which also implies that, if quality of sleep is good, then there would be better quality of life. Contrast co-relation which was observed in this study was strong positive co-relation was found between PSQI scores and Functional disability scores which implies that patients with good quality of sleep have lesser disability functionally. Many studies have described sleep disturbances and their association with psychiatric illnesses, but haven't studied their association in remission periods and there appears from the literature that our study has also compared them in relation to quality of life and functional disability.

This study has described different domains in quality of life and how these are affected in BPAD – mania, depression and Schizophrenia. It was observed that the physical quality domain was the highest in BPAD-depression group followed by schizophrenia group. BPAD-mania patients had the lowest quality of life in this domain implying that their activities of daily living, energy, and work capacity are affected. Psychological domain was the least in schizophrenia group indicating that their ability to think, learn, memorize, feelings, religious beliefs and spiritual thinking are impaired in them. Social domain appears to be more affected in the schizophrenia group of patients in our study, when compared to the other two groups implying that personal relationships, social support and sexual activity are worse in these patients. BPAD mania patients are worst affected in Environmental domain of quality of life which infers that financial resources, freedom, physical safety and security, health and social care are badly impaired in these people. When functional disability was assessed in the patients it was found that poor sleepers had difficulty

in cognition i. e., communicating and understanding on daily basis and also getting along with people. Some of the poor sleepers whose quality of life was disturbed had poor self-care compared to others as said by their care takers. Domestic responsibilities and also at work were impaired in case of poor sleepers. However, schizophrenics had more impairments in such domains when compared to bipolar affective disorder patients.

Table 7 shows co-relations between PSQI scores and various Quality of life domains. It is observed from the table that Quality of life scores for all domains are strongly negatively co-related to PSQI scores i. e., lesser the PSQI score, (high PSQI scores indicate poor sleep quality – PSQI > 5) higher is the quality of life score and this implies that good sleep quality people have good quality of life and similarly vice versa.

Table 8 shows co-relations between PSQI scores and Disability scores. There is strong positive co-relation between PSQI scores and Disability scores. It indicates that higher the PSQI score, higher is the disability score which implies that poor sleep quality causes high functional disability and also vice versa.

Table 9 shows co-relations between Quality of life and disability scores where we found strong negative co-relation between them. It indicates that lower the quality of life higher is the functional disability and vice versa.

Table 10 shows t-test scores for quality of life domains with and without good sleep quality and also disability with and without good sleep quality. According to this, much difference in the values is not noted between different variables and the normal values are moderately deviated from the median.

Tables 11 to 23 show χ^2 tests for different variables and it was done to prove null hypothesis and it was found that Physical and Social quality of life domain were significant for Gender variables but not for Diagnosis variables. From the tables it is also evident that Quality of sleep is statistically significant with Quality of life domains and Functional disability domains.

In a study conducted by Morin CM et al. 2002, [28] who studied the dysfunctional beliefs and attitudes about sleep where they have studied in 78 participants with 47 women and 31 men, who had average duration of insomnia of 17.0 years, 64 % of participants had mixed difficulties initiating sleep and 25 % had difficulty in maintaining sleep, whereas 6.9 % had sleep onset difficulties only. Sleep latency scores were found to be high (sleep onset difficulties) in Bipolar disorder patients whereas in our study, majority of BPAD mania patients had good sleep latency in their remission periods and also many participants had poor sleep efficiency scores.

Gruber et al. 2009 [29] studied in 2024 bipolar patients. Their analysis implied that there were 32 % short sleepers, 38 % normal sleepers and 23 % long sleepers. They used DSM-IV criteria for diagnosing bipolar disorder, clinical status was measured using the clinical monitoring form to find out symptomatic, subthreshold and asymptomatic clinical status category. Global assessment of functioning was used to assess the global functioning, whereas perceived life satisfaction was determined by Quality of life enjoyment and satisfaction short form questionnaire. Their results showed that short sleepers had greater mood elevation, earlier age at onset, and longer illness duration compared to both normal and long sleepers. Both short and long sleepers had greater depressive symptoms, poor life functioning, and quality of life compared to that of normal sleepers. Our study used ICD-10 criteria to diagnose bipolar patients and remission criteria was used with YMRS. Quality of life was assessed using WHO-QOL BREF scale and our study had no such differentiation to find out the clinical status of symptomatic, asymptomatic and subthreshold statuses rather we have used remission status for patients and PSQI was used to differentiate into good sleepers and bad sleepers and found that good sleepers have maintained periods of remission for a longer period. Those with bad sleep efficiency had more depressive symptoms in our study.

In a study done by Cotrena C. et. al., 2016, [30] they found an absent co-relation between BD and Quality of life and functional disability and suggested that quality of life does not become progressively worse as symptom severity increases. This is in contrast to our study where there is strong positive co-relation found between all variables, quality of sleep and quality of life and functional disability. Cotrena C et al also studied co-relation between quality of life, disability and cognitive functioning but our study hasn't done co-relations with cognitive functioning.

In many of the studies from the literature, daytime functioning was seen as important and was related to good sleep quality, however these constructs are relatively poorly represented in presently existing self reported sleep measures. A review of Kleinman L. et. al. 2013, notes that existing measures tend to neglect these focusing instead on the more easily quantifiable factors of sleep latency, sleep duration and sleep maintenance. 32 participants were involved in their study, which describes research conducted with patients with clinical diagnoses of insomnia and focused on the development of a conceptual framework and an endpoint model which identifies a hierarchy and relationships among the potential outcomes in insomnia research studies. Focus groups were convened to discuss how patients experience insomnia and to generate items for patient-reported questionnaires on insomnia and associated daytime consequences. Results for the focus group produced two frameworks where one is for sleep and another one for daytime impairment. Approximately 50 % of the participants reported consistent sleep difficulties from night to night, whereas the remainder noted that they could not identify any trends in their insomnia. Participants could describe the characteristics of their sleep on a good night as well as a bad night. Each conceptual framework consists of hypothesized domains and variables in each domain based on patient language are taken from the focus group. Based on the two conceptual frameworks, they were able to develop an endpoint model for insomnia. The endpoint model was developed based on objective (quantitative) measures of insomnia used in most trials of insomnia medication and the qualitative subjective information elicited from patients during the focus groups. [31] There were similar findings seen in our study where sleep latency, sleep duration and efficiency were focused when self-reported sleep measures were taken. An endpoint model was not followed in our study rather we have used PSQI scale to assess the quality of sleep and differentiate into good sleep and bad sleep quality. Many measures in Kleinman L et al's study also do not ask regarding satisfactory timing of sleep, or sleep inertia, which in this population had a significant impact on social and occupational daytime functioning.

In a study done by Sylvia et al 2012, [34] 483 individuals with bipolar I and II disorder drawn from STEP_BD cohort, 15 % of the euthymic individuals i. e., 73 of them reported mild sleep disturbances. The presence of sleep disturbance was not associated with gender, age, race, marital status, bipolar subtype, rapid cycling in the prior year, or comorbid axis I anxiety or substance abuse disorder. Sleep disturbance was less prevalent in individuals with a history of psychosis, but more prevalent in those with a history of suicide attempts and hypomanic or manic symptoms. No association was found between sleep disturbances and pharmacotherapy. In their analysis, they found that the presence of sleep disturbance was significantly associated with greater risk for mood episode recurrence and also found that residual sleep disturbance among euthymic bipolar I and II patients was associated with risk of recurrence of subsequent mood episodes. In our study also it was observed that patients who had bad quality of sleep for major part of their illness had many episodes of relapses and subsequent number of hospitalizations. Our study also assessed the association between sleep disturbances and pharmacotherapy indirectly where we have assessed using the history to know medications induced sleep and found out that medications have significantly improved the sleep quality and compliance has prevented further relapses.

Our study is also in support with that of studies done by Plante et. al., 2008, [35] where patients had sleep disturbances even during remission periods.

Giglio et. al., 2009, [36] in their cross-sectional study, 190 bipolar patients diagnosed by application of Structured Clinician Interview for DSM-IV Disorders (SCID), were distributed in two groups based on absence or presence of sleep disorders. Quality of life, disability, and global dysfunction were evaluated using the Health Organization's Quality of Life instrument (WHOQOL-Brief), the Sheehan Disability Scale, and the Global Assessment of Functioning (GAF), respectively. Patients with sleep problems showed worse quality of life scores in all domains. They also observed that the score of physical and psychological domains presented worse impairment than social and environmental domains. Patients with both bipolar disorder and sleep disturbance showed lower quality of life than bipolar patients that did not experience insomnia. Bipolar patients with impaired sleep felt exhausted with need for more time in bed, which could explain the physical disability. Furthermore, the poor quality of sleep promotes difficulties in concentration, learning, and memory. They also

demonstrated that the sleep alteration was another factor that contributes to low quality of life experienced by bipolar patients. Our study also evaluated quality of life and sleep in bipolar patients where bipolar affective disorder patients showed worst social and environmental domains of quality of life. Our study used WHO-DAS for assessing functional disability unlike the Sheehan disability scale. Our study also showed that poor sleep quality caused poor quality of life and disability.

Dahl et. al., 1996, [41] Harvey et. al., 2005 [42] have found that sleep disturbances are associated with impulsivity and suicidal attempts. However, in our study patients were not assessed for suicidal attempts, rather patients subjectively reported restlessness, difficulty in controlling anger outbursts, decreased frustration tolerance in remission periods.

Hofstetter et. al., 2005, [43] studied sleep quality, coping and symptoms in 29 patients with schizophrenia or schizoaffective disorder. They examined the associations between sleep and coping style and performed partial correlations, using the Pittsburgh sleep quality index total score to predict Ways of coping questionnaire, Escape Avoidance, and Ways of coping questionnaire Positive Reappraisal score with age and positive and negative component scores as covariates. Their Results revealed that poor sleep was related to a reduced preference for Positive Reappraisal. Sleep quality was found to be unrelated to Escape Avoidance. The Sleep quality index accounted for over 37 % of the variance in coping. Patients with schizoaffective disorder had worse sleep as measured by the PSQI than did patients with. The two groups did not differ in total scores of the Quality of Life Scale or Ways of Coping. The correlations between total Pittsburgh sleep index scores and total Quality of life scale scores, and between total Pittsburgh sleep index scores and Positive Reappraisal for patients with schizophrenia were significant. Actigraphy was done in these groups and it verified that participants with schizophrenia had less overall sleep and more interrupted sleep than normal. They assessed Quality of sleep and Quality of life and way of coping in Schizophrenia and co-related sleep and quality of life, but did not find any co-relation between quality of sleep and quality of life, which is in contrary to our study where 100 participants, 50 each of schizophrenia and BPAD were taken as participants and negative co-relation was found between PSQI and QOL scores i. e., lower the PSQI higher is the QOL. In other words, better the quality of sleep better is the quality of life. Ways of coping was not assessed in our study and schizoaffective disorder patients were not included in our study.

Ritsner M. et. al, 2004, [21] examined the relationship between perceived quality of life and subjective quality of sleep in Schizophrenia patients and found negative relation between them which is in support to findings in our study. It was also seen in their study that poor sleepers reported low mean scores in all QOL domains, but in our study physical domain was better when compared to other three domains in QOL.

AliyahRehman et al (2017), [44] also found in their study that quality of sleep is impaired in psychosis which was also observed in our study.

Kalucy, Grunstein, Lambert, & Glozier, 2013 [45] in their study observed that co-morbid physical conditions could be the cause of sleep disturbances in people diagnosed with schizophrenia, but in this study it was not found secondary to medical illnesses. Decreased sleep quality in schizophrenia has been correlated with patients spending more time in bed in a study done by Royuela A. et. al. (2012) [18] which was also seen in most of the schizophrenic patients under remission in this study.

Chan M. S. et. al. (2016) [23] showed that patients with schizophrenia have significantly shorter total sleep time, longer sleep onset latency, more wake time after sleep onset and lower sleep efficiency. Our study also showed findings of low sleep efficacy scores and shorter sleep onset latency scores in most of the schizophrenics. Their study was done using polysomnography, but our study was based on questionnaire.

Zeitlhofer et. al. (2000) [46] have done a study on quality of sleep and quality of life in Austrian population where they distinguished the population results into good sleepers and bad sleepers and also compared them with quality of life which was also done in our study. They also showed strong co-relation between quality of sleep and quality of life. Our study has also shown similar findings. They did not study the possible factors associated with these co-relations, but our study has found out the probable reasons for these co-relations which are medicine induced, compliance, number of hospitalizations, family support etc.

M. J. Muller et. al. (2016) [47] studied about subjective sleep quality and sleep duration in 309 in-patients of a psychiatric hospital where they included schizophrenics, substance use disorders and anxiety disorder patients. More than 2/3 of all patients reported poor sleep quality during hospitalization without significant differences between the other diagnostic groups. Numerically, the highest proportion of patients with persistently poor subjective sleep quality during hospitalization was found in the substance use disorder group. Mean sleep duration was significantly different between the groups, substance use disorder patients reported significantly lower sleep durations than patients with schizophrenia. However, in our study we assessed sleep quality in BPAD and schizophrenics where it was observed that most of the BPAD patients had better sleep quality and quality of life. Substance use disorders and anxiety disorders were not included in our study.

In a study done by Benca and Wooten et al ,polysomnographic findings of mania patients revealed reduced total sleep time, since the maniac patient appears to have difficulty in falling asleep. They also stated that two or three hours after falling asleep, the patient awakes, totally reinvigorated. As in depression, the duration of stages 3 and 4 may be curtailed, although the findings regarding REM sleep were less consistent [48, 49]. Our study also gave similar findings, but in remission patients, on PSQI scale where mania patients had difficulty in falling asleep and also had shorter sleep duration. Most of the subjects had multiple relapses of episodes and hospitalizations due to decreased quality of sleep. They also had decreased life quality and functional disability was present.

Monty and Benson et al in their study where polysomnography was done in schizophrenic group of patients found that sleep continuity disturbance, decreased slow-wave sleep, decreased REM latency, increased REM % age and decreased amount of time in NREM sleep (in minutes) have been observed [50, 51]. Atypical antipsychotics such as olanzapine, risperidone and clozapine significantly increase total sleep time and stage 2 sleep. They also studied how typical antipsychotics would affect the overall quality of sleep in polysomnography .Similar findings in our study were found in schizophrenics under remission where they had disturbances in sleep continuity resulting in intermittent awakenings at night during sleep and medications caused increase in total sleep duration. But our study did not differentiate the effect of sleep with different antipsychotics and also not with polysomnography.

Palmese et. al. (2011) in their study have reported the rate of insomnia among persons with schizophrenia; of 175 people receiving outpatient treatment for schizophrenia, 100 of them being male and 75 being female. 118 were taking anti-psychotics. 44 % had insomnia severity index (ISI) scores within the moderate to severe clinical range. They used Insomnia severity index, Pittsburgh sleep quality index , quality of life enjoyment and satisfaction questionnaire for schizophrenia, body mass index and clinical global impression scale [21] but our study has not studied the rates of insomnia severity and type of medications the participants were on and body mass indices are not obtained in schizophrenics in our study.

Klingamann et. al. (2015) in their meta-analytic study have researched the need and development of non-pharmacological treatment strategies in schizophrenia spectrum disorders. They also noted the importance of investigating the sleep problems in schizophrenia spectrum disorders [52]. But our study has not been through the same research.

Rottenberg et. al. (2000) investigated 20 patients with chronic schizophrenia using polysomnography to collect sleep data. The diagnosis was based on DSM-IV criteria: 11 patients had paranoid type, five had residual type, three had disorganize d type, and one had schizo-affective disorder. The duration of illness ranged from 11 to 39 years (mean being 21.6). They evaluated the severity of positive and negative features with the PANSS rating scale. All patients were free from medical problems, and were taking neuroleptic medication (equivalent to haloperidol 15 mg/day), treatment being unchanged during 60 days prior to polysomnography. Hypnotic medication was stopped at least 2 weeks before polysomnography. The control group contained 10 healthy subjects (six men, four women; mean age 43.3 years) without any complaints of sleep disturbance, and without medical problems. Sleep latency, depth of the sleep and duration of wakefulness were estimated and were found to be high in the study groups compared to controls [53]. Our study did not assess the depth of the sleep and also did not use polysomnography. And lastly there was no intervention in our study with medications.

In a longitudinal twin study done by Nicola L. Barclay et. al. in 2015, 739 complete monozygotic twin pairs and 672 complete dizygotic twin pairs of the age ranging from 8–18 years, determined prevalence and heritability of insomnia in middle and late childhood and also adolescence. Clinical ratings of insomnia symptoms were assessed using Child and Adolescent Psychiatric assessment and found out that clinically significant insomnia was moderately heritable in almost all the participants and concluded that insomnia is prevalent in childhood and adolescent and is moderately heritable. The progression of insomnia across this developmental time period is influenced by stable as well as new genetic factors that come into play at the age of around 10 years [54]. Our study does not assess any prevalence nor does it determine heritability using genetics and also does not include childhood and adolescent age group population.

Heath et al. at the Australian Twin Registry collected sleep data from almost 4000 pairs of twins. Genetic differences accounted for at least 33 % of the variance in sleep quality and sleep disturbances and 40 % of the variance in sleep patterns. Short-term environmental fluctuations accounted for as much as 30 % of the variance and more stable non-familial environmental effects accounted for the remainder [55]. But our study has not involved any parameters of genetics as such rather it has analyzed sleep quality using Pittsburgh sleep quality index.

In human studies done by Reimann et. al. (2007) and Noh H. J. et. al. (2012), patients with insomnia show alterations in the brain region target of stress hormones. Comparing the magnetic resonance imaging of the brain of patients with primary insomnia with that of good sleepers showed bilateral reductions in hippocampal volumes [56]. Another study was able to confirm these findings [57] and the impaired memory functions of insomniacs have been related to these findings. Neylan et al in 2010 described that subjective insomnia severity is associated with hippocampal volume loss of the CA3/ dentate subfields [58].

In a genetic study done by Palagini et al in 2014 have found out that familial aggregation with high heritability of insomnia has been found. Studies based on large twin data sets report heritability estimates of 21–57 % for insomnia in general. Higher heritability has been estimated for specific symptoms like sleep onset latency, sleep efficiency etc., and these findings suggest that perhaps a more accurate method of investigating the heritability of insomnia needs to focus on these specific symptoms constituting the disorder separately, rather than relying on an overall insomnia per se. Specific genotypes that might account for some phenotypic variance in insomniacs have been described and suggest that genetic underpinnings might be identified [59].

After reviewing through the literature thoroughly, it was found that our study was having many strengths as well as some limitations. Some of the previous studies have done extensive researches on sleep in patients with psychiatric illnesses but have failed to explain the factors responsible for the same. Many studies have done extensive research in depressive and anxiety disorders too, which was not the study population in our research. Some studies have been in the field of interventions with sleep studies where REM sleep and NREM sleep patterns have been studied in people with psychiatric illnesses and also genetics related studies of insomnia were extensive. Our research is beyond scope as of those studies.

The null hypothesis which was stated at the beginning of the study was found to be false by the t-test where p-value was <0.001. And according to the χ^2 tests, it is proved that null hypothesis is false and tests are statistically significant. Statistically it has been observed that Quality of sleep is co-related to the quality of life and functional disability. Quality of sleep is positively co-related to quality of life and negatively co-related to functional disability which proves the hypothesis false.

It was observed from our research that more practical intervention as of studying the sleep patterns using sleep studies would have helped more. Finally, the factors affecting quality of sleep, which were observed in our study population were sleep onset latency, sleep efficiency, frequency of troubling sleep, bad dreams, compliance to medications, number of hospitalizations, family support and care and inter-episodic remission period. All these factors have collectively contributed to affecting quality of life and also disability of these patients. These factors can be improved after taking necessary actions and steps to reward the patients with symptom free periods during remission. As remission is an important part of a patient suffering from psychiatric illnesses, it is necessary that sleep is adequate and maintained at all times in order to prevent further relapses

which, as observed from our research, can badly or presumably effect the quality of life and cause disability to the patient functionally. Non pharmacological management like improving sleep hygiene, avoiding usage of electronic light emitting devices before sleeping, avoiding caffeine containing drinks, daily physical exercise could also help the patients to effectively overcome their sleeplessness or disturbances in sleep. Management aiming at improving coping skills to overcome problems in life and adequate family support are essentially useful. Behavioral interventions like psychotherapy can be undergone in these patients to improve their quality of life and minimizing functional disability.

This study was done with extensive search for literature on sleep disturbances in remitted individuals with psychiatric illness. Many important findings were observed that were not done or observed in many of the studies on sleep disturbances which explains the uniqueness of the study. Ample time was taken to collect the samples along with interviewing of the patients to collect data and analyze them appropriately. Co-relations helped out in finding the association between sleep quality and quality of life and functional disability. Apparently no such study was found while reviewing the literature where quality of sleep was assessed in remitted patients which has effect on quality of life and disability. Many previous studies have concentrated or studied in population during their illness, but our study is important in studying the quality of life during the remission periods. This study has also identified and reported the probable causative factors affecting sleep and life quality. Finally, this study is essential in further researching and would be useful to other researchers in evaluating and preventing further attrition caused by psychiatric illnesses especially BPAD and Schizophrenia.

Limitations: This study has some limitations which are required to be mentioned. Samples were taken from a single tertiary care hospital. Many patients had difficulty in reading and understanding the questionnaire, help was provided at times when the subjects requested for, while administering the scales. Some took longer time to answer the questions than others. Other psychiatric illnesses like depression, substance use disorders can also have sleep disturbances whereas this study could study quality of sleep in only two groups BPAD and Schizophrenia. It is a very lengthy process that was adopted for doing this study as it involved many administering scales and questionnaire which took time for the individuals to complete. Sample size considered for this study is less.

Future Research: Future research aims at studying the prevalence of sleep disturbances in psychiatric illnesses under remission. Research should also be directed towards identifying quality of sleep and comparing it with quality of life and functional disability in other psychiatric illnesses like substance use disorders, depressive and anxiety disorders and also parasomnias. As sleep disturbances are not uncommon in some of the patients with psychiatric illnesses further studies should be aimed at identifying and implementing management options which are helpful in improving this aspect of sleep disturbances and also cognition of the patient which can also be affected in such patients. This study should add further details and ideas to future researchers about the management of the outcomes and overcoming them easily through this study. This should also add up to the future research on improvising the quality of sleep without this having any effects on the quality of life. Lastly this field of research in psychiatry should help up the future generations in aiming at neurobiology and genetic makeup of an individual and target the same and find out the causative genes responsible for sleep disturbances and its linkage with psychiatric illnesses and their relapses.

5. Conclusion

This study has shown that Sleep disturbances like insomnia are prevalent during remission periods of psychiatric illnesses which require attention in order to avoid relapse. Poor quality of sleep has been observed in Schizophrenia and BPAD which needs to be addressed as it is shown in this study how sleep can affect all domains of quality of life and disability. Poor sleep quality has reduced the quality of life of the patients in our study whereas Good sleep quality patients had good quality of life and lesser functional disability.Hence it is important to improve their quality of life and to render them functionally able. From this study, it is evident that sleep plays a paramount role and in the light of these results and observations, clinicians should treat the possible and probable factors responsible for the benefit of the patient.

Conflicts of Interest

None

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