Study of various factors affecting compliance in schizophrenia: A single center experience in India

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Summary

Aim of the study: Schizophrenia is a major psychiatric disorder, imparting a major burden in health care sector. Many treatments are available now a days to treat schizophrenia, although, its burden is not decreasing. The main reason behind this is noncompliance to treatment. This study aims to find out the noncompliance prevalence and to study influence of sociodemographic factors, treatment related variables, illness related variables and various subjective reasoning in patients with schizophrenia.

Material and methods: Over the period of 1 year, 80 patients with schizophrenia who gave written informed consent were enrolled in the study and their sociodemographic, treatment related and illness related variables were noted. PANSS(positive and negative syndrome scale for Schizophrenia) was used to indicate the severity of illness. ROMI(Rating of Medication Influences Scale in Schizophrenia) was used to assess subjective reasons. Chi square test was used to find out statistical significance.

Results: 37.5% patients were non-compliant in our study. Education, the illness severity, the type of regimen and dosages of medication have a significant influence on treatment compliance. The subjective reason "no perceived benefit" is significantly associated with treatment noncompliance.

Discussion: A wide literature is available across the globe on compliance in schizophrenia. This study aids in the available resources and throws a light on the regional factor.

Conclusion: Schizophrenia, being a major disease imparting burden in psychiatry health care system, needs an attention in the area of compliance to treatment. This type of research should be done on regional basis to find out and address the factors that influence treatment compliance.

schizophrenia, treatment compliance, adherence

INTRODUCTION

Schizophrenia is a clinical syndrome of variable, but profoundly disruptive psychopathology that involves cognition, emotion, perception, and other aspects of behavior [1]. The etiology is multifactorial [2]. The typical age of on-set for schizophrenia is in late adolescence or early twenties, with a slightly later onset in females. An earlier age at onset has been associated with more severe clinical and behavioral symptoms, more social disability, narrower posterior brain segments and larger ventricles [3]. The 12 months prevalence of Schizophrenia is 1.1%. The total 12-month healthcare use in any type of health service sector is 64.3% in patients affected with Schizophrenia [4]. Schizophrenia rank fifth among men and sixth among women

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as a leading cause of years lived with disability. Schizophrenia also comprises roughly 1% of the global burden of disease (GBD). They also represent 1.3% of the disability-adjusted life years (DALYs) overall [5]. The classic course of schizophrenia remains chronic with multiple exacerbations and remissions. Most schizophrenia patients' life is characterized by aimlessness, inactivity, frequent hospitalizations, homelessness and poverty [6]. The prognosis is guarded and full recovery is unusual. Early onset of illness, family history of schizophrenia, structural brain abnormalities, and prominent cognitive symptoms are associated with a poor prognosis [7]. People with schizophrenia have a 5% lifetime risk of suicide. Other factors that contribute to increased mortality include lifestyle issues such as cigarette smoking, poor nutrition, and lack of exercise, and perhaps poorer medical care and complications of medications [8].

Compliance is the degree to which a patient correctly follows medical advice, which includes medication or drug use, medical device use, self-care, self-directed exercises, or therapy sessions [9]. Noncompliance can be defined as a discontinuation or failure of proper medication intake without prior approval from the treating physician. Non-compliance with the treatment is a major problem in case of psychiatric patients [10] DSM-5 [11] has also mentioned this issue of noncompliance to an important category as "nonadherence to medical treatment" under the heading "other conditions that may be a focus of clinical attention".

Schizophrenia by its chronic course, impairs judgment, insight and stability which place schizophrenic patients at increased risk for medication non-compliance. Non-compliance is considered as a barrier to effective health care, has implications for the health of the patients; the effective use of resources & assessments of the clinical efficacy of treatment. It is seen as an important area of concern for all health care professionals. Non-compliance contributes to relapse and re-hospitalization. The cost of poor compliance to sufferers and also to society is considerable and effective ways of improving compliance are a crucial part of good management [10].

Multiple studies [12-15] has shown that the prevalence of noncompliance is 30%-50%. They have also shown various factors which influence the compliance to treatment which includes relationship with psychiatrist, family pressure for taking medications, stigma of illness, and substance abuse, severity of illness, access to treatment and medications, financial situation, age at onset, employment, side effects of medication etc.

Attitude towards antipsychotic medication is affected by various factors such as lack of insight into the illness, presence of global functioning, increased severity of illness and side effects of medications.

Improving medication compliance in persons who are mentally ill is important for reducing morbidity and suffering of patients and their families. Thus, to improve drug compliance in any treatment setting, first it is necessary to know the factors influencing the compliance. Literature regarding the treatment compliance in Schizophrenia is sparsely available in India and other developing countries.

With this background in present study, we have attempted to find out the prevalence of noncompliance and various factors influencing the treatment in patients with Schizophrenia.

METHODS

The study was conducted in Department of Psychiatry of a tertiary care hospital. After taking approval from IEC of our institute, over the period of 1 year (March'14 to March'15), from the patients attending Psychiatry department at IPD or OPD, patients suffering from Schizophrenia who fulfilled inclusion criteria were included in present study. They were explained about the study and written informed consent was taken. In our center, case history and treatment details are recorded on a case paper which is given to patient, which they bring with them in follow up visits. The follow up visits are decided by the treating doctor according to the patient's clinical condition. We also insist to come with relatives, but at times patients come alone. We prefer providing same treating doctor for ensuring a good rapport with the treating psychiatrist, still patient has a right to choose the doctor. Proper care has been taken for not violating the ethical duties related to patient's identities, treatment and therapeutic relations between therapist and the patients.

Inclusion criteria:

i.   Patient diagnosed with schizophrenia according to DSM-5
ii. Consulted any psychiatrist for treatment at least before 6 months of current visit
iii. Age 18-60 years

Exclusion criteria:

i.   Patient having acute substance intoxication/withdrawal.
ii. Patient whose consciousness is impaired.
iii. Patient showing signs of cognitive impairment during clinical interview.

Assessment of patient:

Socio-demographic details: Patients' socio-demographic details included age, sex, residence, education, occupation, marital status, family type and socio-economic status. Their socio-economic status was defined according to modified Prasad's classification[16] for socio economic status for 2013.

Compliance: The compliance was assessed by clinician's judgement. For the ease of understanding we have grouped patients in 4 groups.

0: Up to 1 week without medication otherwise good compliance(compliant)

1: Up to 1 month /4 times up to 1 week without medication

2: Up to 5 months without medication

3: >5 Months without medication

Illness details: This domain included details of patients' illness like age at onset of illness, total duration of illness, insight during the episode, severity of illness, comorbid substance use and presence of comorbidities. The severity of illness was defined by positive and negative syndrome scale for Schizophrenia (PANSS)[17] scale. The PANSS is a 30-item, 7-point rating instrument. Pearson correlation for positive, negative and general psychopathology scale was .80, .68 and .60, respectively (p < .001). The reliability was not significant in composite scale (.07).

Treatment details: This part included the details of treatment including type of molecules used, monotherapy or polytherapy, drug dosage frequency, route of administration, total number of tablets per day, approximate monthly cost for the treatment and side effects if any.

Subjective reasons for compliance and noncompliance: The rating of medication influences (ROMI) [18] scale was developed as part of a longitudinal study of Neuroleptic noncompliance in Schizophrenia. It takes 20-30 minutes to administer. The patient-report items includes three subscales related to compliance (prevention, influence of others, and medication affinity) and five subscales related to noncompliance (denial/dysphoria, logistical problems, rejection of label, family influence, and negative therapeutic alliance). ROMI is divided in two parts:1) **Semi-structured interview**: It includes information regarding living, treatment setting, prescribed medication, patient's overall attitude toward treatment and medication, the family's and caregiver's overall attitude toward treatment and medication. 2) **Structured interview:** It includes two type of questions i.e., open ended and closed. It is divided into two parts: the reasons for compliance section (items 1-7) and the reasons for noncompliance section (items 8-20). Response to each closed question is graded as "no influence", "mild influence" and "strong influence" (1, 2 and 3, respectively, or 9 when it is not possible to evaluate the degree of influence).

The collected data was subjected to statistical analysis by using SPSS16. Chi-square test was used to find out statistical significance of variables in influencing compliance. The p value of less than or equal to 0.05 was used as a cut off for measuring significance

RESULTS

Table 1. Non-compliance prevalence

No. of total patients	80(n %)
No. of compliant patients	50(62.5%)
No. of noncompliant patients	30(37.5%)

Table 2. Socio demographic factors affecting compliance

Socio-Demographic Variable		Compliant n=50(%)	Noncompliant n=30(%)	Total n=80(%)	Significance (X^2)
Age	< 20 years	02 (4%)	01 (0.34%)	03 (3.75%)	$X^2=0.821$ df=2 p=0.663
	20-40 years	36 (72%)	19 (63.33)	55 (68.75%)	
	> 40 years	12 (24%)	10 (33.33%)	22 (27.5%)	
Sex	Male	34 (68%)	17 (56.67%)	51 (63.75%)	$X^2=1.042$ df=1 p=0.307
	Female	16 (32%)	13 (43.33%)	29 (36.25%)	
Residence	Rural	34 (68%)	22 (73.33%)	56 (70%)	$X^2=0.254$ df=1 p=0.614
	Urban	16 (32%)	08 (26.67%)	24 (30%)	
Religion	Hindu	44 (88%)	24 (80%)	68 (85%)	$X^2=0.941$ df=1 p=0.332
	Muslim	06 (12%)	06 (20%)	12 (15%)	
Education	Literate	42 (84%)	19 (63.33%)	61 (76.25%)	$X^2=4.422$ df=1 p=0.035
	Illiterate	08 (16%)	11 (36.67%)	19 (23.75%)	
Occupation	Unemployed	19 (38%)	14 (46.67%)	33 (41.25%)	$X^2=3.079$ df=2 p=0.215
	Inconsistent	23 (46%)	15 (50%)	38 (47.5%)	
	Consistent but not permanent	08 (16%)	01 (0.33%)	09 (11.25%)	
	Permanent	00 (0%)	00 (0%)	00 (0%)	
Marital Status	Married	24 (48%)	16 (53.33%)	40 (50%)	$X^2=3.840$ df=4 p=0.428
	Unmarried	16 (32%)	08 (26.67%)	24 (30)	
	Divorced	09 (18%)	03 (10%)	12 (15%)	
	Separated	01 (1%)	02 (6.67%)	03 (3.75%)	
	Widowed	00 (0%)	01 (0.33%)	01 (12.5%)	
Family	Joint	29 (58%)	14 (46.67%)	43 (53.75%)	$X^2=0.969$ df=1 p=0.325
	Nuclear	21 (42%)	16 (53.33%)	37 (46.25%)	
Socio-Economic class (A/C to modified Prasad's classification 2013)	class1	05 (10%)	02 (6.67%)	07 (8.75%)	$X^2=8.242$ df=4 p=0.083
	class 2	09 (18%)	05 (16.67%)	14 (17.5%)	
	class 3	23 (46%)	08 (26.67%)	31 (38.75%)	
	class 4	13 (26%)	12 (40%)	25 (31.25%)	
	class 5	00 (0%)	03 (10%)	03 (3.75%)	

In the current study, 37.5% patients with schizophrenia were noncompliant. Present study found that from the various socio-demographic variables, education was the significant factor in influencing compliance. Literate patients were more compliant than illiterate.

Table 3. Illness related variables affecting compliance

Variable			Compliant n=50(%)	Noncompliant n=30(%)	Total n=80(%)	Significance (X²)
Age At Onset	< 20 Years		12 (24%)	05 (16.67%)	17 (21.25%)	X²=2.876 df=2 p=0.237
	20-40 Years		37 (54%)	22 (73.33%)	59 (73.75%)	
	> 40 Years		01 (2%)	03 (10%)	04 (5%)	
Total Duration Of Illness	1-5 Years		17 (34%)	17 (56.67%)	34 (42.5%)	X²=4.402 df=2 p=0.111
	5-10 Years		19 (38%)	09 (30%)	28 (35%)	
	>10 Years		14 (28%)	04 (13.33%)	18 (22.5%)	
Grade Of Insight During Present Episode	1		05 (10%)	09 (30%)	14 (17.5%)	X²=6.754 df=3 p=0.08
	2		04 (8%)	02 (6.67%)	06 (7.5%)	
	3		28 (56%)	16 (53.33%)	44 (55%)	
	4		13 (26%)	03 (10%)	16 (20%)	
Severity Of Illness (PANSS Score)	Total positive symptoms score	Low (7-21)	46 (92%)	18 (60%)	64 (80%)	X²=12 df=1 p=0.001
		Medium (22-35)	04 (8%)	12 (40%)	16 (20%)	
		High (36-49)	00 (0%)	00 (0%)	00 (0%)	
	Total negative symptoms score	Low (7-21)	36 (72%)	19 (63.33%)	55 (68.75%)	X²=1.516 df=2 p=0.469
		Medium (22-35)	13 (26%)	11 (36.67%)	24 (30%)	
		High (36-49)	01 (1%)	00 (0%)	01 (1.25%)	
	Total general psychopathology symptoms score	Low (16-48)	50 (100%)	22 (73.33%)	72 (90%)	X²=14.82 df=1 p=0.001
		Medium (49-80)	00 (0%)	08 (26.67%)	08 (10%)	
		High (81-112)	00 (0%)	00 (0%)	00 (0%)	
	Total PANSS Score	Low (30-90)	48 (96%)	21 (70%)	69 (86.25%)	X²=10.69 df=2 p=0.001
		Medium (91 – 150)	02 (4%)	09 (30%)	11 (13.75%)	
		High (151-200)	00 (0%)	00 (0%)	00 (0%)	
Primary caretaker living with patirnt	Yes		49 (98%)	30 (100%)	79 (98.75%)	X²=0.608 df=1 p=0.436
	No		01 (1%)	00 (0%)	01 (1.25%)	
Substance use	Nicotine		27 (54%)	18 (60%)	45 (56.25%)	X²=0.791 df=2 p=0.673
	Others		01 (1%)	00 (0%)	01 (1.25%)	
	none		22 (44%)	12 (40%)	34 (42.5%)	
Physical comorbidities	Present		13 (26%)	06 (20%)	19 (23.75%)	X²=0.373 df=1 p=0.542
	Absent		37 (74%)	24 (80%)	61 (76.25%)	

Among the various illness related variables, this study found that the severity of illness (PANSS score) is significantly associated with the treatment compliance. Present study found the total positive symptoms score, total general psychopathology symptom score and total PANSS score to be significantly associated with compliance.

Table 4. Treatment related variables affecting compliance

Variable			Compliant n=50(%)	Noncompliant n=30(%)	Total n=80(%)	Significance (X^2)
Anti-Psychotic Molecules Used	Type	Typical	01 (2%)	01 (0.33%)	02 (2.5%)	X^2=2.872 df=2 p=0.238
		Atypical	36 (72%)	16 (53.33%)	52 (65%)	
		Both	13 (26%)	13 (43.33%)	26 (32.5%)	
	Regimen	Mono	28 (56%)	09 (30%)	37 (46.25%)	X^2=5.099 df=1 p=0.024
		Poly	22 (44%)	21 (70%)	43 (53.75%)	
Dosage		OD	29 (58%)	09 (30%)	38 (47.5%)	X^2=6.278 df=2 p=0.043
		BD	20 (40%)	19 (63.33%)	39 (48.75%)	
		TDS	01 (2%)	02 (6.67%)	03 (3.75%)	
Route Of Administration		Oral	45 (90%)	27 (90%)	72 (90%)	X^2=0.001 df=1 p=1
		Injectables	00 (0%)	00 (0%)	00 (0%)	
		Both	05 (10%)	03 (10%)	08 (10%)	
Total no. of tablets		1	14 (28%)	06 (20%)	20 (25%)	X^2=10.734 df=5 p=0.057
		2	25 (50%)	09 (30%)	34 (42.5%)	
		3	07 (14%)	05 (16.67%)	12 (15%)	
		4	03 (6%)	06 (20%)	09 (11.25%)	
		5	00 (0%)	03 (10%)	03 (3.75%)	
		6	01 (2%)	01 (0.33%)	02 (2.5%)	
Approximate Cost Of Treatment Per Month(A/C To Patient)		<500 Rs/month	41 (82%)	19 (63.33%)	60 (75%)	X^2=3.484 df=1 p=0.062
		>500 Rs/month	09 (18%)	11 (36.67%)	20 (25%)	
Side Effects		Present	10 (20%)	08 (26.67%)	18 (22.5%)	X^2=0.478 df=1 p=0.489
		Absent	40 (80%)	22 (73.33%)	62 (77.5%)	

Present study found that the type of regimen i.e., monotherapy or polytherapy and the dosing frequency of medication are significant in influencing the compliance. The patients receiving monotherapy and receiving drugs once or twice in a day were more compliant.

Table 5. Subjective reasons for compliance-compliant patients (ROMI-open ended question section)

Sr. no.	Reason	No. of patients n=50 (100%)
1.	Mental illness	20 (40%)
2.	Family belief	11 (22%)
3.	Family force	10 (20%)
4.	Prevention of relapse of mental illness	03 (06%)
5.	To stay healthy	03 (06%)
6.	Fear of relapse	02 (04%)
7.	Past illness	01 (02%)

Table 6. Subjective reasons for noncompliance-compliant & noncompliant patients (ROMI-open ended question section)

Sr. no.	Reason	Compliant n=50(%)	Noncompliant n=30(%)	No. of patients n=80 (%)
1	No need to take medicine now	12 (24%)	13 (43.33%)	25 (31.25%)
2.	Feels cured	14 (28%)	02 (6.67%)	16 (20%)
3.	Access problems	09 (18%)	05 (16.67%)	14 (17.5%)
4.	Financial problem	09 (18%)	04 (13.33%)	13 (16.25%)
5.	Side effects	02 (04%)	02 (6.67%)	04 (5%)
6.	Not having any illness	01 (02%)	02 (6.67%)	03 (3.75%)
7.	Feels embarrassing	02 (04%)	00 (0%)	02 (2.5%)
8.	Medicines are harmful	01 (02%)	01 (3.33%)	02 (2.5%)
9.	Not comfortable with medicine	00 (00%)	01 (3.33%)	01(1.25%)

Table 7. Subjective reasons for compliance-compliant patients (ROMI-closed question section)

Sr. no.	Reason	Degree of influence	No. of patients n=50 (100%)
1.	Perceived daily benefit	None	08 (16%)
		Mild	27 (54%)
		Strong	15 (30%)
2.	Positive relation with prescribing clinician	None	19 (38%)
		Mild	26 (52%)
		Strong	05 (10%)
3.	Positive relation with therapist	None	41 (82%)
		Mild	07 (14%)
		Strong	02 (04%)
4.	Positive family belief	None	08 (16%)
		Mild	22 (44%)
		Strong	20 (40%)
5.	Relapse prevention	None	23 (46%)
		Mild	10 (20%)
		Strong	17 (34%)
6.	Pressure/force	None	35 (70%)
		Mild	02 (04%)
		Strong	13 (26%)
7.	Fear of rehospitalization	None	33 (66%)
		Mild	09 (18%)
		Strong	08 (16%)

Table 8. Subjective reasons for noncompliance-compliant & noncompliant patients (ROMI-closed question section)

Sr. no.	Reason	Influence	C n=50 (%)	NC n=30 (%)	Total n=80 (%)	X^2 Significance
1.	No perceived daily benefit	No	43 (86%)	14 (46.67%)	57 (71.25%)	X^2=14.161 df=1 p=0.001
		Yes	07 (14%)	16 (53.33%)	23 (28.75%)	
2.	Negative relation with clinician	No	50 (100%)	30 (100%)	80 (100%)	-
		Yes	00 (0%)	00 (0%)	00 (0%)	
3.	Negative relation with therapist	No	50 (100%)	30 (100%)	80 (100%)	-
		Yes	00 (0%)	00 (0%)	00 (0%)	
4.	Practitioner opposed to meds	No	50 (100%)	30 (100%)	80 (100%)	-
		Yes	00 (0%)	00 (0%)	00 (0%)	
5.	Family/friend opposed to meds	No	49 (98%)	28 (93.33%)	77 (96.25%)	X^2=1.131 df=1 p=0.287
		Yes	01 (2%)	02 (6.67%)	03 (3.75%)	
6.	Access to treatment problems	No	26 (52%)	11 (36.67%)	37 (46.25%)	X^2=1.773 df=1 p=0.183
		Yes	24 (48%)	19 (63.33%)	43 (63.75%)	
7.	Embarrassment or stigma over meds/illness	No	26 (52%)	15 (50%)	41 (51.25%)	X^2=0.030 df=1 p=0.862
		Yes	24 (48%)	15 (50%)	39 (48.75%)	
8.	Financial obstacles	No	28 (56%)	12 (40%)	40 (50%)	X^2=1.920 df=1 p=0.166
		Yes	22 (44%0	18 (60%)	40 (50%)	
9.	Substance abuse	No	42 (84%)	21 (70%)	63 (78.75%)	X^2=2.196 df=1 p=0.138
		Yes	08 (16%)	09 (30%)	17 (21.75%)	
10.	Denial of illness	No	34 (68%)	14 (46.67%)	48 (60%)	X^2=3.556 df=1 p=0.059
		Yes	16 (32%)	16 (53.33%)	32 (40%)	
11.	Medication currently unnecessary	No	16 (32%)	06 (20%)	22 (27.5%)	X^2=1.354 df=1 p=0.245
		Yes	34 (68%)	24 (80%)	58 (72.5%)	
12.	Distressed by side effects	No	42 (84%)	22 (73.33%)	64 (80%)	X^2=1.333 df=1 p=0.248
		Yes	08 (16%)	08 (26.67%)	16 (20%)	
13.	Desires rehospitalization	No	50 (100%)	28 (93.33%)	78 (97.5%)	X^2=3.419 df=1 p=0.064
		Yes	00 (0%)	02 (6.67%)	02 (2.5%)	

On assessing the subjective reasons for maintaining compliance and not maintaining compliance by using ROMI scale, the 3 major reasons for maintaining compliance in this present study were: 1. Perceived daily benefit with medication, 2. Acceptance of mental illness and 3. Family force or belief. The compliant patients reported that no need of medication currently and feeling of cured can be their probable reason for noncompliance in majority instances.

The leading reasons for noncompliance in noncompliant patients were: 1. Medicines are unnecessary, 2. Access problems, 3. Financial problems, 4. No perceived benefit with medication and 5. Embarrassment or stigma related to illness. The "perceived daily benefit" variable had shown the statistical significance in relation to compliance.

Table 9a. Grades of noncompliance

Grade of noncompliance	Total number of patients n=30(%)
0: Up to 1 Week Without Medication Otherwise Good Compliance	03 (10%)
1: Up to 1 Month /4 Times Up to 1 Week Without Medication	13 (43.33%)
2: Up to 5 Months Without Medication	10 (33.33%)
3: >5 Months Without Medication	04 (13.33%)

Table 9b. Relation between grades of noncompliance and illness severity

Grade of noncompliance		0	1	2	3	Significance X^2
PANSS – positive symptoms score	Low (7-21)	2	8	8	0	$X^2=7.735$ df=3 p=0.052
	Medium (22-35)	1	5	2	4	
PANSS – total score	Low (30-90)	2	10	9	0	$X^2=11.551$ df=3 p=0.009
	Medium (91 – 150)	1	3	1	4	
Grade of insight	1	1	1	3	4	$X^2=13.302$ df=9 p=0.149
	2	0	1	1	0	
	3	2	9	5	0	
	4	0	2	1	0	

It is showing that majority of patients (87%) were without medication since 1-5 months; most of them scored at lower range in PANSS and had grade 3 of insight in their illness. On statistical analysis, illness severity was found to be significantly (**p < 0.05**) related to grade of noncompliance.

DISCUSSION

Present study had included 80 patients who gave written informed consent for enrolling in study, of which 30 (37.5%) were noncompliant. Shakeel Ansari et al [12] (37%) and R Baby et al [13] (38.7%) found similar results. Other studies like, T.N. Srinivasan et al,[19] K.Kousalya et al [20] Chandra IS et al,[14] N J B Kazadi et al [21] have found higher rates ranging from 42-80%. The reason for the difference may be the regional differences. Although, it is important observation that the rates are on higher range which is hindering the prognosis.

In the present study education was found to be the only socio demographic variable significantly affecting the treatment compliance. These results are similar to R Baby et al.,[13] Hudson et al.[22], Janssen et al.[23] Linden M et al.[24] and Aldebot S et al.[25] the possible explanation for this is the negative relation of lower education with treatment compliance. Education help people understand the explanation given for the importance of compliance and thus help in maintaining it well. On the contrary, other studies reported significance of some other variables; Shakeel Ansari et al [12] and Chandra IS et al [14] reported gender & residential area and age & employment respectively as variables which are associated significantly with treatment adherence. This difference is may be because of less diversity in this socio demographic variables in our group of patients.

Meguid et al [27] reported significant relation between all PANSS score and compliance. The R Baby et al. [13] reported only total positive symptoms score to be significantly correlated to noncompliance while study [14] done by Chandra IS and colleagues reported only total PANSS score as a significant variable to be associated with noncompliance. These finding are similar to our study. The reason for this may be because of negative effect of illness severity on understanding the nature of illness and importance of treatment. There are reports of no relation between illness severity and compliance [24] and significant relation between compliance and only negative symptoms score [26], which is contrary to our study's findings.

Linden M et al.[24] reported that there is no relation between insight and compliance. R Baby et al. [13] found that substance use, comorbid physical conditions and total duration of illness are not significantly related to compliance. these results are similar to our study. On the contrary, Shakeel Ansari et al [12] reported substance use as significantly affecting the treatment compliance. This contradiction may be because of the fear of the patients that treating psychiatrist could tell their family about their abuse which may worsen their relationship with them. Information related to substance abuse was taken only as subjective report, no objective assessment was done for the same.

Insight has been found a significant factor to be associated with compliance by many studies [13,28,29,30]. It is obvious that the lack of insight in illness can impair the compliance but the different finding of our study explains that the patients in our study are maintaining compliance without proper insight in the illness. This indicates the need for improvising the education given to the patient regarding the insight in the illness. This can further improve the compliance rates in our center.

R Baby et al.[13] has reported that there is no significant relation between total number of medication, approximate cost of treatment, type of molecules, presence of side effects or route of administration and treatment compliance. J.Meier et al.[31] found the dosing frequency to be a significant factor in influencing the compliance. This result is similar to our study. It is obvious that the lesser the number of drugs per day and the less frequent is the dose, it is easy to remember and sticking to the prescription. McCann T. et al [32] reported side effects are not significant in altering treatment compliance. The type of molecule particularly atypical neuroleptic has been considered superior than typical ones in terms of better adherence by Janssen et al. [23]; particularly when switched from typical to atypical molecules rather than maintained on typical molecules. This may be because of lesser side effects with the newer atypical molecules.

Previously various studies have studied the subjective reasons for compliance using ROMI. Majority patients included in this study were living in rural region and not having a good employment. This explains the access problem to the center and financial difficulty as one of the important reasons for noncompliance. In Indian culture, Family plays a significant role. Many patients reported that they are maintaining compliance because of family force or belief. So, it is important for the mental health professionals to educate the family members regarding the illness and the need for treatment. The perceived benefit because of drugs is important reason given by the compliant patient for compliance, this explains that the treating psychiatrist should access this more vigorously in each follow up visit to understand it and can do the needful accordingly. the compliant patients reported that the feeling of cured give them a thought to break the compliance, this should be prevented by frequent explanation regarding course, prognosis and need for the long term treatment for the patients who are maintaining a good compliance. Studies like R Baby et al [13] Shakeel Ansari et al [12] Chandra IS et al [14] found the similar results as the present study. Loffler et al [33] and Rosa et al [34] has reported "inconvenience due to side effects" as the important reason for noncompliance in addition to above mentioned reasons. this may be because the patients in our study may not be well aware of minor side effects and they have tolerated them on their own. this explains the need for a thorough explanation of side effects to the patients by treating professional.

CONCLUSION

The present study has assessed various factors affecting compliance in patients with schizophrenia. The study finds a need for a vigorous work up for addressing the issue of compliance in a chronic illness like schizophrenia. For our center we found that treating psychiatrist can help in improving compliance by frequent psycho-education of patients and family members about the illness and the need for treatment, by keeping the regimen as simple as possible, by prescribing medication in a single time dosing, by controlling the acute illness as soon as possible and in many other ways. We also find the need for extending services to the interior areas that can cut down the access problems the patients facing for maintaining the compliance. improving compliance can greatly reduce the disease burden and thus can improve the quality of life of patients and their family members.

Merits of the study

A good sample size of the study makes the results more validated. All the tools used in the study have a strong validity and reliability. Study results gave the important areas related to noncompliance which can be addressed by the psychiatrists with a good emphasis; eventually all these can help in improving compliance and reducing the relapse rates related to medication noncompliance.

Limitations of the study

Being a single center hospital based study, the results cannot be generalized. The best possible efforts were made while applying the tools in the local language, still there may be language bias affecting the study quality.

Future perspective

This type of research should be conducted in each mental health services to explore the prevalence of non-compliance and to find out particular reasons for the same. This can help in overall reduction in disease burden and overall improvement in health care delivery.

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