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Factors Influencing Adherence to Prescribed Medication and Follow up Schedule in Patients with Psychiatric Disorders

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Abstract: Background: Low adherence to prescribed health advice puts a huge burden on public exchequer. In psychiatry there are additional concerns of stigma and poor insight. Availableresearch data often ignores broader aspects of adherence, focusing only on medication intake. Most studies also do not address areas like objective measurement of adherence and issues that may be unique to psychiatric patients.
Objective: The aim of this study was to objectively assess the adherence (to medication/regular follow up) of psychiatric outpatients in a tertiary centre and to evaluate the interaction of various individual, system and illness related factors in determining adherence.
Material and Method: Patients between 18 to 60 years were assessed for medication adherence using the Morisky Medication Adherence Scale (MMAS 4 and 8). Adherence in terms of follow up was measured as a ratio between the suggested gap between two follow up visits and the actual gap between the visits. Various factors were assessed for their effect on adherence using guided interviews.
Results: Adherence to medication was in the 'low' range of MMAS. Adherence in terms of regular follow up was 71%. Being females, having a family history of mental illness, college education and more than 5000 INR per capita monthly income predicted better adherence. People from distant and rural areas fared worse. Surprisingly, additional indigenous treatment received near patients' homes was as effective as psychotherapy delivered at the hospital in improving adherence.
Conclusion: Adherence in psychiatric outpatients is still suboptimal. In addition to factors that are common with other illnesses there are ones that are unique to psychiatric patients which adversely affect adherence.
Key words: Medication adherence, Adherence to follow up, Psychiatric disorders

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I. INTRODUCTION

Resistance to drug taking is profound and pervasive. Many centuries ago Hippocrates was aware of the fact that patients often pretended to take their medicines when they actually did not[1, 2, 3.] Ever since David Sackett's discovery in the1970s that many patients with hypertension showed disappointing outcome to treatment owing to noncompliance[4]a large body of research data has accumulated on compliance/adherence issues. Over time, the focus of research has shifted from patients 'pretending' to take medicines to clinicians' communication skills and their following of established protocols of care so that patients do not receive conflicting information about treatment from other, easily accessible resources. A complete definition of adherence/compliance, development of widely accepted, objective measures and detailed analyses of causes for non adherence in unique clinical settings are emerging as current needs in adherence research[5, 6].

Adherence is defined as "the degree to which the patients' behaviour corresponds with agreed recommendations of a health care provider"[5]. It is preferred over the previously used term 'compliance' because of its non judgmental nature.

Low adherence with consequent non response is a serious problem for all chronic illnesses, putting a huge burden on public health resources, prompting the WHO to single out low adherence as a "world wide problem of striking magnitude"[6]. Since most psychiatric illnesses require long term medication and life style modification, adherence rates tend to decline over time. This results in a key imbalance between process and outcome in psychiatric care.

In addition, psychiatry offers an interesting window into adherence research because the symptoms of different psychiatric disorders themselves, like delusions or amotivation or inappropriate anxiety about

treatment side effects can act as barriers to treatment adherence. Poor insight may be compounded by family members' persisting denial. The stigma of being on psychiatric treatment and the fatigue of long term follow ups add to the patient and caregivers' burdens. Hence it would be engrossing to know what factors exactly influence a psychiatric patients' drug taking behaviour. In India, where various forms of treatment practices abound, it would be worth knowing whether the addition of various indigenous healing methods augment or counter standard practices and how they influence adherence.

The National Mental Health Survey of India, 2015 - 2016 reports a 'treatment gap' of 70% to 85% in people with mental illnesses[7], but estimates of treatment adherence in psychiatric patients in India vary from 20 to 89%[8]. A study in this respect from the eastern parts of the country was long pending, and our study aims to address that.

Adherence is not just about taking medicines. The process of seeking, receiving and following treatment and advice has many stages and many opportunities for non- adherence. Different types of non adherenceinclude: delay in seeking care (population at risk), non- participation in health programmes (screening), breaking of appointments (follow- up), failure to follow doctors' instructions (treatment)[9, 10, 11]. Since assessing all kinds of non adherence is beyond the scope of one study, we decided to focus on a second aspect of non adherence, that of delay in follow up. The ratio of the suggested gap between two follow up visits and the actual gap between the two, expressed as a percentage, was taken as a measure of non adherence in terms of follow up. This was derived from the well accepted method of assessing adherence in clinical epidemiology known as Continuous Single Interval Measure of Medication Acquisition (CSA)[12].We also borrowed from the concept of PDC (Proportion of Days Covered), a method of measuring adherence that is gaining popularity in recent times[10].

This was easy to measure since in our hospital date of subsequent follow up is mentioned in each visit and all data are saved in a digital format.

Causes of non adherence can be manifold. Literature review revealed around two hundred possible reasons for non compliance to treatment, including sociodemographic, illness and health care system related factors, but none of them could be considered as consistently predicting compliance[13].

Psychiatric patients have their own causes for low adherence to treatment, which have not yet been fully evaluated. The standard scales like MMAS, though objective, do not specifically address the needs of such special populations. Hence we supplemented the MMAS with interviews with patients and their caregivers which looked into possible causes of non adherence, tailoring questions to suit the concerns of these people.

II. MATERIALS AND METHODS

Study setting: This cross-sectional study was carried out among psychiatric outpatients of the Institute of Kolkata, a tertiary referral centre over 6 months (June 2017 to November 2017). Institutional Ethics Committee approval was obtained.

Study population: After taking informed consent, 145 consecutive patients between 18 to 60 years who fulfilled the inclusion and exclusion criteria were assessed. The inclusion and exclusion criteria were as follows:

Inclusion criteria

- Patients attending the outpatient department of Institute for at least the past six months
- Age between 18 to 60 years
- Patients willing to participate in the study

Exclusion criteria

- Patients who were unable to participate on account of cognitive deficits or very severe psychopathology.

Tools for assessment

A. Semi-structured proforma for assessment of sociodemographic and clinical variables.

Sociodemographic variables: Age, gender, education, area of residence, occupation, per capita monthly income, marital status, family type.

Clinical variables: Diagnosis, duration of illness, presence/absence of insight, associated non psychiatric / psychiatric comorbidity, co-morbid substance use, family history of mental illness and number of psychiatric hospitalization, if any.

Other variables: Distance from hospital, time to travel to and fro from home/workplace to hospital, travel expense, cost of medicine, if any (most medicines are provided free of cost), whether receiving formal psychotherapy or not, whether receiving any indigenous treatment or not.

B. Diagnostic Criteria for Research, ICD 10 was used by psychiatrists (authors 1 and 2) to verify the diagnosis in each case.

C**. Morisky Medication Adherence Scale (MMAS):** It is a self-report scale that has been proven to be a reliable and valid instrument to estimate medication adherence.The original scale (MMAS 4) has four items, each with dichotomous response categories. Its sensitivity and specificity are 81% and 44%, and Cronbach's alpha reliabilty 0.6. A modified scale with eight items (MMAS 8) has also been developed. The first seven items have dichotomous response categories while the last one is a Likert response type. Its psychometric properties are better, with sensitivity and specificity of 93% and 53% and Cronbach's alpha value of 0.83. An MMAS 8 score of 8 indicates high adherence, score of 6–7 indicates medium adherence, and score below 6 indicates low adherence. An MMAS 4 score of 4 indicates high adherence, 2 to 3 medium and less than 2 indicate low adherence. Both scales are still widely used in adherence research[14, 15, 16].

D. Interview with patients- A brief interview lasting around 15 minutes was carried out with the patients, including where applicable, the accompanying person who usually happened to be a family member or a friend. Due to the hospital policy of encouraging patients themselves to come for follow up, patients were nearly always present during these visits. The interviewer was a clinical psychologist (author 3). Patients found to be non adherent to medication were assessed further for reasons for non adherence. In the initial phase, they were asked open-ended questions to describe the reasons for their non adherence. To assist patients further in their responses, they were also interrogated about other specific factors which have been found to be related to non adherence depending on literature review and clinical experience. The information given by patients was corroborated with their attendants.

Procedure: After taking informed consent eligible patients were assessed using the semistructured proforma for sociodemographic and clinical variables, the Morisky Medication Adherence Scale (MMAS 4 and MMAS 8) and a brief interview lasting 15 minutes with the patient, and where applicable, his/her accompanier. Adherence was also calculated as the ratio between the suggested gap between two consecutive visits (usually 1 to 4 weeks) and the actual gap between the visits. This was averaged over the past six months and expressed as a percentage. All individual, system and illness related factors were assessed for their effect on adherence scores using appropriate statistical analyses.

Statistical analysis: Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS for Windows, Version 20, SPSS Inc., Chicago, USA). Data were analyzed using descriptive statistics such as frequency and percentage for categorical variables and mean and standard deviation for continuous variables. To assess the relationship of various sociodemographic, clinical and other variables with adherence (MMAS 4 and 8 scores and adherence to follow up score expressed as percentage), t test and one way ANOVA using Bonferroni correction in post hoc analysis were employed as appropriate. For all tests, statistical significance was fixed at 5% level ($p<0.05$).

III. RESULTS

One hundred and fifty consecutive patients who fulfilled our criteria were approached, of whom only 5 refused consent. Among the 145 patients, 82 were males and 73 were females. The age range varied between 18 to 60 years (Mean age 36 years). 43% hailed from urban areas, 38% were from rural residences and the remaining were from suburban locales. Majority had received formal education for 5 to 12 years (61%) whereas only 19% had college education. 65 (45%) patients' families had a per capita income of less than INR 2000 per month, only 21 (14%) families earned more than INR 5000 per person per month. 25% suffered from a psychotic illness, 17% each had a diagnosis of depression or bipolar disorder, 14% were diagnosed with anxiety disorders other than obsessive compulsive disorder. 8% received the latter diagnosis. The rest were classified in the "other" category which included somatoform disorder, substance dependence and dissociative disorder with comorbid depression. All patients were being treated with medicines and a large majority (74%) were on pharmacotherapy alone. 16% were on additional psychotherapy at the hospital by clinical psychologists, 10% also received some kind of indigenous treatment delivered by local healers. 26% of patients had to travel more than 50 kms to visit the hospital. Travel time exceeded 3 hours for 11% of patients. A similar percentage of patients had to spend more than INR 300 for transit. The details of sociodemographic, clinical and other characteristics of the patients are shown in Table 1 and 2.

Table 1: Socio-demographic and clinical characteristics

Variables	Groups	Total No
Gender	Males Females	82 63
Marital Status	Living Alone Living with Spouse	59 86
Family Type	Nuclear Joint	88 57
Family H/O Mental Illness	Yes	32

	No	113
Presence of Physical Co morbidity	Yes No	38 107
Presence of Psychiatric Co morbidity	Yes No	11 134
Substance Dependence	Yes No	64 91
Presence of Insight	Yes No	118 27
Admission if any	Yes No	21 124
Cost of medicine	Yes No	31 114

Table 2: Socio-demographic and clinical characteristics

Variables	Group	Total No
Education in Years	0-4 yrs 5-12yrs >12yrs	29 89 27
Area	Rural Urban Semi urban	55 63 27
Per capita income	<2000rs 2000-5000rs >5000rs	65 55 21
Home distance	0-10km 11-50kms >50kms	46 61 38
Travel Time	<1 hr 1-3hrs >3hrs	62 67 16
Travel Expense	0-50rs 50-200rs >200rs	61 67 17
Diagnosis	Psychosis BPAD Depression OCRD Anxiety Others	36 25 25 12 21 26
Substance Type	Nicotine smoking Nicotine smokeless Others	80 29 30
Nonpharmacological treatment	None Psychotherapy Indigenous	107 23 15

Results showed that the overall adherence to follow up was 71%. In terms of adherence to medication (MMAS 4 and 8), most patients were in the low range (Mean MMAS 4 score 1.86, mean MMAS 8 score 2.59).

Table 3: t-test for MMAS 4

VARIABLES	GROUP	Mean (Sd)	t	Sig.
GENDER	Male	1.67 (1.22)	**1.995**	**.048**
	Female	2.11 (1.44)		
MARITAL STATUS	Single	1.71 (1.32)	1.126	.262
	Married	1.97 (1.33)		
FAMILY TYPE	Nuclear	1.78 (1.24)	.738	.462
	Joint	1.95 (1.47)		

INSIGHT	Present	1.77 (1.24)	-1.730	.086
	Absent	2.26 (1.63)		
PHYSICAL COMORBIDITY	Absent	1.82 (1.34)	.600	.549
	Present	1.96 (1.33)		
PSYCHIATRIC COMORBIDITY	Absent	1.84 (1.39)	.592	.555
	Present	2.09 (1.58)		
SUBSTANCE USE	Present	1.79 (1.25)	.523	.602
	Absent	1.91 (1.40)		
FAMILY HISTORY	Absent	1.73 (1.31)	**-2.355**	**.020**
	Present	2.34 (1.31)		
COST OF MEDICATION	Free	1.86 (1.38)	-.021	.983
	Paid	1.87 (1.17)		
NO OF ADMISSION	1	1.87 (1.30)	.535	.594
	2	1.70 (1.45)		

There was a significant difference in the score for Gender variable, Male (M= 1.67, SD= 1.22) and Female (M=2.11, SD=1.44) in MMAS4 SCORE; t (1.995), p= .048. Females tend to have higher adherence to medication as compared to males.

There was a significant difference in the score for Family history variable, history of illness absent (M= 1.73, SD= 1.31) and history of illness present (M=2.34, SD=1.31) in MMAS4 SCORE; t (2.335), p= .020. Individuals having family history of illness tend to have higher adherence to medication as compared to individuals who do not have any history of illness.

Table 4: t-test for MMAS 8

VARIABLES	GROUP	Mean (Sd)	t	Sig.
GENDER	Male	2.24 (1.69)	**2.41**	**.017**
	Female	3.05 (2.32)		
MARITAL STATUS	Single	2.42 (1.94)	.834	.405
	Married	2.71 (2.08)		
FAMILY TYPE	Nuclear	2.43 (1.82)	1.09	.279
	Joint	2.81 (2.31)		
INSIGHT	Present	2.45 (1.84)	1.806	.073
	Absent	3.22 (2.62)		
PHYSICAL COMORBIDITY	Absent	2.54 (2.09)	.509	.612
	Present	2.74 (1.84)		
PSYCHIATRIC COMORBIDITY	Absent	2.58 (2.00)	-.228	.820
	Present	2.73 (2.33)		
SUBSTANCE USE	Present	2.53 (1.86)	.326	.745
	Absent	2.64 (2.15)		
FAMILY HISTORY	Absent	2.37 (1.93)	**-2.523**	**.013**
	Present	3.38 (2.17)		
COST OF MEDICATION	Free	2.60 (2.07)	.080	.936
	Paid	2.57 (1.87)		
NO OF ADMISSION	1	2.56 (1.94)	-.073	.942
	2	2.60 (2.44)		

There was a significant difference in the score for Gender variable, Male (M= 2.24, SD= 1.69) and Female (M=3.05, SD=2.32) in MMAS8 SCORE; t (2.41), p= .017. Females tend to have higher adherence to medication as compared to males.

There was a significant difference in the score for Family history variable, history of illness absent (M= 2.37, SD= 1.93) and history of illness present (M=3.38, SD=2.17) in MMAS8 SCORE, t (2.523), p= .013. Individuals having family history of illness tend to have higher adherence to medication as compared to individuals who do not have any history of illness.

Table 5: ANOVA For MMAS 4

VARIABLES	GROUPS	Sums of Squares	df	Mean Square	f	Sig.
EDUCATION	Between groups	5.789	2	2.894	1.648	0.196
	Within groups	249.452	142	1.757		
AREA	Between groups	10.272	2	5.136	2.977	0.064
	Within groups	244.969	142	1.725		
PER CAPITA INCOME	Between groups	8.379	2	4.190	2.410	0.093
	Within groups	246.862	142	1.738		
DISTANCE	Between groups	18.389	2	9.194	**5.512**	**0.005**
	Within groups	236.853	142	1.668		
TRAVEL TIME	Between groups	8.109	2	4.055	2.330	0.101
	Within groups	247.132	142	1.740		
TRAVEL EXPENSE	Between groups	7.810	2	3.905	2.241	0.110
	Within groups	247.431	142	1.742		
DIAGNOSIS	Between groups	2.596	5	0.519	0.286	0.920
	Within groups	252.645	139	1.818		
SUBSTANCE TYPE	Between groups	4.098	3	1.366	0.767	0.514
	Within groups	251.144	141	1.781		
NON PHARMACOLOGICAL TREATMENT	Between groups	15.307	2	7.654	**4.530**	**0.012**
	Within groups	239.934	142	1.690		

An one way analysis of variances showed that the effect of non-pharmacological treatment was significant, F(2, 142)= 4.530, p= .012. Post hoc analysis using Bonferroni correction indicated that adherence to medication in individuals receiving indigenous treatment (M=2.80, SD=1.15) was significantly higher than individuals receiving psychotherapy (M=1.61, SD=1.53), F (2, 142)=.4.503, p=.020 . The pairwise comparison of individuals receiving no treatment and psychotherapy, and no treatment and indigenous treatment is insignificant.

An one way analysis of variances showed that the effect of distance was significant, F(2, 142)= 5.512, p= .005. Post hoc analysis using Bonferroni correction indicated that adherence to medication in individuals travelling the distance of less than 10 kms (M=2.39, SD=1.13) was significantly higher than individuals travelling >50 kms (M=1.45, SD=1.44), F (2, 142)=.4.203, p=.020 . The pairwise comparison of individuals travelling the distance of less than 10 kms and 11-50 kms is insignificant.

Table 6: ANOVA For MMAS 8

VARIABLES	GROUPS	Sums of Squares	df	Mean Square	f	Sig.
EDUCATION	Between groups	18.265	2	9.133	2.272	0.107
	Within groups	570.728	142	4.019		
AREA	Between groups	22.892	2	11.446	2.871	0.060
	Within groups	566.101	142	3.987		
PER CAPITA INCOME	Between groups	6.906	2	3.453	0.842	0.433
	Within groups	582.087	142	4.099		
DISTANCE	Between groups	45.629	2	22.814	**5.962**	**0.003**
	Within groups	543.364	142	3.827		
TRAVEL TIME	Between groups	13.607	2	6.803	1.679	0.190
	Within groups	575.386	142	4.052		
TRAVEL EXPENSE	Between groups	14.357	2	7.179	1.774	0.173
	Within groups	574.636	142	4.047		
DIAGNOSIS	Between groups	8.647	5	1.729	0.414	0.838

	Within groups	580.347	139	4.175		
SUBSTANCE TYPE	Between groups	13.311	3	4.437	1.087	0.357
	Within groups	575.682	141	4.083		
NON PHARMACOLOGICAL TREATMENT	Between groups	24.684	2	12.342	**3.106**	**0.048**
	Within groups	564.309	142	3.974		

An one way analysis of variances showed that the effect of distance was significant, F(2, 142)= 5.962, p= .003. Post hoc analysis using Bonferroni correction indicated that adherence to medication in individuals travelling the distance of less than 10 kms (M=3.37, SD=1.62) was significantly higher than individuals travelling >50 kms distance (M=1.89, SD=1.12), F (2, 142)=.4.223, p=.002 . The pairwise comparison of individuals travelling the distance of less than 10 kms and 11-50 kms is insignificant.

An one way analysis of variances showed that the effect of non-pharmacological treatment was significant, F(2, 142)= 3.106, p= .048. Post hoc analysis using Bonferroni correction indicated that adherence to medication in individuals receiving indigenous treatment (M=3.80, SD=1.79) was significantly higher than individuals receiving no treatment (M=2.48, SD=1.91), F (2, 142)=.3.106, p=..052 . The pairwise comparison of individuals receiving no treatment and psychotherapy, and psychotherapy and indigenous treatment is insignificant.

Table 7: ANOVA For Adherence to follow up

VARIABLES	GROUPS	Sums of Squares	df	Mean Square	F	Sig.
EDUCATION	Between groups	1474.088	2	737.044	**3.201**	**0.044**
	Within groups	32695.884	142	230.253		
AREA	Between groups	1433.451	2	716.725	**3.109**	**0.048**
	Within groups	32736.522	142	230.539		
PER CAPITA INCOME	Between groups	1978.044	2	989.022	**4.363**	**0.014**
	Within groups	32191.929	142	226.704		
DISTANCE	Between groups	1280.832	2	640.416	2.765	0.066
	Within groups	32889.141	142	231.614		
TRAVEL TIME	Between groups	579.338	2	289.669	1.225	0.297
	Within groups	33590.635	142	236.554		
TRAVEL EXPENSE	Between groups	812.679	2	406.339	1.730	0.181
	Within groups	33357.293	142	234.911		
DIAGNOSIS	Between groups	469.832	5	93.966	0.388	0.857
	Within groups	33700.140	139	242.447		
SUBSTANCE TYPE	Between groups	444.513	3	148.171	0.619	0.604
	Within groups	33725.460	141	239.188		
NON PHARMACOLOGICAL TREATMENT	Between groups	925.743	2	462.871	1.977	0.142
	Within groups	33244.230	142	234.114		

An one way analysis of variances showed that the effect of education was significant, F(2, 142)= 3.201, p= .048. Post hoc analysis using Bonferroni correction indicated that adherence in individuals with >class 12 education (M=75.44, SD=14.31) was significantly higher than individuals with <class IV education (M=65.44, SD=15.73), F (2, 142)=.3.201, p=.045 . The pairwise comparison of <class 4 and 4-12 class education and class 4-12 education and >12 class education is insignificant.

An one way analysis of variances showed that the effect of area was significant, F(2, 142)= 3.109, p= .044. Post hoc analysis using Bonferroni correction indicated that adherence in individuals belonging to rural

area (M=67.87, SD=16.29) was significantly lower than suburban area (M=76.67, SD=9.00), F (2, 142)=.3.109, P=.045 . The pairwise comparison of urban and suburban area and rural and urban area is insignificant.

An one way analysis of variances showed that the effect of income was significant, F(2, 142)= 4.363, p= .014. Post hoc analysis using Bonferroni correction indicated that adherence in individuals with income >5000 (M=77.57, SD=17.43) was significantly higher than individuals with <2000 income (M=67.43, SD=15.02), F (2, 142)=.4.63, p=.024 . The pairwise comparison of <2000 and 2000-5000 income and 2000-5000 income and >5000 income is insignificant.

Table 8: t-test for Adherence to follow up

VARIABLES	GROUP	Mean (Sd)	t	Sig.
GENDER	Male	62.68 (13.93)	1.338	.183
	Female	69.24 (17.05)		
MARITAL STATUS	Single	70.36 (15.11)	.536	.593
	Married	71.76 (15.66)		
FAMILY TYPE	Nuclear	70.97 (15.89)	.444	.657
	Joint	72.12 (14.22)		
INSIGHT	Present	72.12 (14.67)	1.531	.128
	Absent	67.11 (18.03)		
PHYSICAL COMORBIDITY	Absent	70.86 (15.51)	.427	.670
	Present	72.11 (15.28)		
PSYCHIATRIC COMORBIDITY	Absent	71.28 (15.28)	.265	.792
	Present	70.00 (17.63)		
SUBSTANCE USE	Present	73.05 (11.94)	1.296	.197
	Absent	69.72 (17.60)		
FAMILY HISTORY	Absent	72.21 (15.16)	1.514	.132
	Present	67.56 (15.95)		
COST OF MEDICATION	Free	70.64 (15.00)	-.830	.408
	Paid	73.27 (16.96)		
NO OF ADMISSION	1	70.53 (15.50)	-1.487	.142
	2	76.00 (14.22)		

The above table indicates no significant difference between the variables in terms of adherence to follow up.

Diagnosis had no effect on adherence. Females and those with a family history of mental illness had higher medication adherence (MMAS 4 and 8) (Tables 3 and 4). In terms of MMAS 4 and 8 scores, those who had to travel more than 50 kms to attend the hospital had lower medication adherence. (Table 5 and 6)When adherence as a ratio of suggested and actual gaps between two consecutive follow up visits was considered as a dependent variable, results showed that having a college education (>12 years of formal education), having residences in urban or suburban areas and having more than 5000 INR per capita monthly income predicted better adherence (Table 7 and 8). Surprisingly, additional indigenous treatment received near patients' homes predicted better medication adherence compared to pharmacotherapy alone and was equally effective as formal psychotherapy delivered at the hospital (Table 5 and 6).

IV. DISCUSSION

We tried to address two aspects of adherence in our study - medication intake and regular follow up. Psychopharmacology is only a part of psychiatric treatment. Regular doctor patient visits, even in the absence of formal psychotherapy, is known to improve outcome. The Morisky Medication Adherence Scale is a widely accepted tool for measuring medication adherence and it has been used with psychiatric patients in many studies[14, 15, 16]. The method of measuring regularity in follow up in our study is simple but effective. Earlier studies have used it too[17, 18, 19].

Majority of our patients had a medication adherence in the low to medium range. An adherence study from India in 2017 estimated high to medium adherence (MMAS 8) in 48% of patients with schizophrenia. Almost similar figures were reported in other Indian studies of schizophrenia in the last decade[20, 21, 22]. The WHO document on adherence to long term therapies in 2009 reported that 40% to 70% patients with depression show good adherence to antidepressant treatment.

In our study, diagnosis did not have a significant effect on medication adherence, though patients of obsessive compulsive disorder scored better than others, in terms of both MMAS 4 and 8 scores. Such low adherence despite free supply of most medicines at the hospital needs urgent addressal in order to make

effective health policy decisions in the future. We suggest better communication between doctor and patient, provision of care closer home rather than injudicious referrals to tertiary care centres as possible remedies.

Adherence measured in terms of keeping up with appointment (follow up visit) was 71% overall, with no significant difference across diagnoses. This would roughly translate into an average delay of 12 days for every 1 month of suggested follow up. Since most patients in our hospital receive free medicines, a gap in follow up usually suggests failure to take medicines, though a small number of patients report they buy the prescribed medicines for the days they cannot report. Missing out on medicines for this long a gap is a matter of grave concern and naturally results in low medication adherence, in addition to dropping out on psychotherapy appointments. This gap in follow up is often due to the inability to take a day off from work, pressing household duties and even difficulty in procuring money to travel. Patients are often held back from delegating responsibility, at home or work, because they do not want to reveal to others that they have a psychiatric illness, something that is still a stigma in many parts of the country.

Various factors known to influence adherence in psychiatric patients were incorporated in the sociodemographic and clinical proforma. Further enquiry was done at the time of interview with patients and their caregivers. Female patients and those with a family history of mental illness had significantly higher medication adherence. Being a female has been consistently associated with better medication adherence in patients with mental illness[23, 24, 25]. This phenomenon, however, may be unique to psychiatric patients. A metanalysis of adherence in patients with HIV AIDS and dyslipidemia report the opposite[26],whereas studies in patients with diabetes or hypertension report no such bias[27].The reason for this unique gender bias in psychiatry is not known. Some authors have argued that Indian women, mostly homemakers, have more time at their disposal for regular follow up and are expected to resume their household chores at the earliest, and these factors lead to better medication adherence[8].

Another reason could be that since most women in our studies were homemakers, they did not have to take a day off from work outside home and hence lose a day's wage in order to attend hospital.

It may also be argued that it is becoming easier for women to accept that they suffer from depression or anxiety, the common mental disorders (CMD)[28]. In India, whereas men still suffer from a greater degree of denial, on account of a patriarchal mindset. Though the study was carried out in a tertiary referral centre, many patients with CMDs attend the outpatient department here instead of going to a primary care physician, possibly on account of increased awareness, and also because in India referral from a primary care physician is not a prerequisite for seeing a tertiary centre. There could be other explanations as well, and this needs to be looked into.

In keeping with our findings, presence of family history of mental illness has been seen to be associated with better adherence in another study involving Indian patients[20]. Family history of psychiatric illness may improve adherence through prior sensitization of patients about the morbidity involved and hence importance of treatment, having a close relative with mental illness also serves to improve understanding and reduce stigma, leading to better adherence.

There was no relation between age, occupation, marital status, duration or severity of illness and adherence. A study by Rao et al in 2017[8]revealed similar findings. Besides, we had excluded patients with very severe psychopathy, hence the association between illness severity and adherence may have been missed.

Distance proved to be a major hurdle in adherence to medication, with people who had to travel more than 50 kms faring worse. In our hospital, most patients hail from lower socioeconomic status, and travelling more than 50kms a day would entail loss of a day's wage. This could have resulted in lower adherence, a finding replicated in other studies as well[8].

The findings with respect to follow up are interesting. Majority of adherence studies focus on medication intake, leaving out other important aspects of adherence. Regular follow up is crucial not just because it indicates better compliance to medication regime. Rather, it is an independent measure of therapeutic relationship. Many patients may prefer not to take medicine but remain otherwise in touch with their treating teams, and health care providers must now get ready to accommodate the patients' preferences. The focus of adherence research is changing, so much so that one author has described medication non adherence as an "unavoidable by-product of collisions between the clinical world and other competing worlds of work, play, friendship and family life"[29].

We tried to accommodate this aspect of adherence in our study. When adherence as a ratio of suggested and actual gaps between two consecutive follow up visits was considered as a dependent variable, results showed that having a college education (>12 years of formal education), having residences in urban or suburban areas and having more than 5000 INR per capita monthly income predicted better adherence.

One surprising finding of our study is the fact that having an additional indigenous treatment near the patients' homes predicted better medication adherence. This seemed to be as effective than having formal psychotherapy delivered at the hospital. One possible explanation for this could be that the psychotherapy they received was more attuned to the patients' psychopathology rather than adherence issues per se. On the other hand, indigenous treatment, in whatever form, often involves significant 'counselling' by the local care provider

in a language and idiom that the patients understand. This happens across cultures, as stressed by a community level study with depressed patients in Wessex, UK. It involved nurses who had no experience or training in mental health. After receiving training for 4 hours they went to the community and did only two sessions with patients that included assessment of lifestyle and attitudes, educating patients about depressive illnesses, self help, and local resources. Practical tips to improve adherence were also discussed and feasibility of involving family or friends with medicine taking was explored. This resulted in significant improvement in adherence[30]. A similar finding in our study underscores the importance of involving local resources in improving adherence in particular, and psychiatric care in general. Replication of such findings in future studies will call for a more judicious use of available local resources.

The WHO document on adherence to long term therapies states that adherence is a multidimensional phenomenon - determined by the interplay of five interrelated domains - patient, condition (social/economic), health system and therapy related domains[5, 6]. We have looked into many of these domains as possible causes of non adherence. During the course of a brief interview we have tried to elicit possible concerns. Surprisingly, issues like stigma did not figure prominently as a cause of non adherence, though financial issues, and access to health care delivery system were narrated as important causes of irregular follow up. Stigma is something that the patients tend to deny, and it is unlikely that only a 15 minute interview will be able to uncover that. We also did not look into the personality pattern of our patients, a factor widely believed to be causal for non adherence.

V. CONCLUSION

Adherence both in terms of medication intake and follow up is still sub optimal. In addition to factors that are common for other illnesses, psychiatric patients have some unique reasons for low adherence. In addition to standard measures, involving practitioners of indigenous treatment at a local level may help improve adherence.

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