Assessment of impact of pharmacophilia and pharmacophobia on medication adherence in patients with psychiatric disorders: A cross-sectional study

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Abstract:
Aims: To investigate the impact of pharmacophilia and pharmacophobia on medication adherence among patients with psychiatric disorders.

Materials and Methods: A cross-sectional, observational study was conducted in the Department of Psychiatry over a period of 2 months. Patients above 18 years of age with a psychiatric diagnosis as per the International Classification of Diseases 10 and receiving at least one psychotropic medication (any medication capable of affecting the mind, emotions, and behavior) for >1 month were enrolled in the study. Patients who were critically ill, on magico-religious treatment (beliefs prevalent in a particular culture concerning various supernatural influences operating in the environment), diagnosis of dementia, or mental retardation and patients from whom reliable history of illness cannot be obtained were excluded from the study. Drug attitude inventory scale was used to classify patients into pharmacophilic and pharmacophobic groups. Medication adherence rating scale was used to identify the extent of medication adherence.

Results: Among 176 patients included, 110 were found to be pharmacophilic and 54 were pharmacophobic. The number of hospitalizations ($P < 0.03$) and adverse drug reactions ($P < 0.001$) were found to be higher in pharmacophobic group as compared to pharmacophilic group. Antipsychotics were found to be most commonly prescribed medications among pharmacophobic group ($P < 0.001$). In this study, patients who had pharmacophobia were found to have higher adherence score (mean score: 6.98) than patients with pharmacophobia (mean score: 2.9), with $P < 0.001$.

Conclusions: This study concluded that pharmacophobia toward psychopharmacological agents can significantly reduce the medication adherence among patients with psychiatric disorders.

Key words: Medication adherence, pharmacophilia, pharmacophobia, psychiatric disorders

According to the World Health Organization estimates, approximately 450 million people suffer from some forms of psychiatric disorders globally. Currently, mental and behavioral disorders are statistically estimated to be one of the most common disorders among the many other diseases/disorders and account for about 12% of the total cases documented. [3] Results obtained from the surveys conducted to determine the prevalence of psychiatric disorders in different countries estimated that the USA has the highest rate of psychiatric illness with a prevalence of 26.4%, followed by Ukraine, France, Colombia, and Lebanon. [5] The findings from many of the epidemiological studies conducted in India estimated that around 20% of the adult population is affected from one or the other psychiatric disorders, which requires interventions from a mental health professionals. [5]

Medication adherence is a key issue in the prevention of relapse, morbidity, and mortality in patients with psychiatric disorders. [4] Prevalence of medication nonadherence among patients with psychiatric illness in India was found to be

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38.7% from a survey conducted by Baby et al.[5] Nonadherence to psychotropic medications is one of the greatest challenges in the treatment of patients with psychiatric illness. It is well documented that more than 50% of psychiatric patients do not comply with their medication regimens.[6‑8] A study conducted by Morken et al. concluded that nonadherence to antipsychotic medications was allied with psychotic relapses and rehospitalizations.[9]

Recent reviews have concluded that patients attitude toward medication play a significant role on medication adherence.[10‑12] Findings from the studies aimed at identifying factors that influence the patient’s attitude toward psychopharmacological agents showed little consistency.[13]

“Pharmacophobic” which defines the expression of negative attitudes toward medication and “pharmacophilic” which defines the expression of positive attitudes are of great interest and they bring about far-reaching consequences as these two positions compartmentalize the views concerning the use of psychotropic drugs usually prevalent in the general public. It shows a bias in the pharmacophilic attitudes in Europe and Australia whereas toward acceptance, but unwillingness to use in the US.[14‑17] Negative attitude toward antipsychotic medication is common among professionals, especially among the nonmedical mental health professionals.[18]

The present study was conducted to investigate the impact of pharmacophilia and pharmacophobia on medication adherence among patients with psychiatric disorders. We hypothesized that pharmacophilia is associated with medication adherence and pharmacophobia is linked with poor adherence to medications.

Materials and Methods

Study Design
A cross-sectional, observational study was conducted in the Department of Psychiatry at a tertiary care hospital in South India over a period of 2 months. An Institutional Human Ethics Committee’s approval was obtained before the commencement of the study.

Study Subjects and Data Collection
Patients above 18 years of age with a psychiatric diagnosis as per the International Classification of Diseases 10 and receiving at least one psychotropic medication (any medication capable of affecting the mind, emotions, and behavior) for >1 month were enrolled in the study. Patients who were critically ill, on magico-religious treatment (beliefs prevalent in a particular culture concerning various supernatural influences operating in the environment), diagnosis of dementia, or mental retardation and patients from whom reliable history of illness cannot be obtained were excluded from the study.

Study Procedure
All the patients who met the study criteria were enrolled in the study after getting informed consent either from the patients or first-degree relatives. Relevant data such as demographic details, past and current medical/psychiatric illness, and medication history were collected and documented using suitably designed data collection form.

Drug Attitude Inventory Classification
We grouped patients into pharmacophobic and pharmacophilic group based on the positive or negative scores on the drug attitude inventory (DAI) scale which allocates scores of +1 (positive view of medications) and −1 (negative view of medications) to ten selected items, allowing total scores from −10 to +10. This scale has been proven to be suitable for grouping patients according to their attitude toward medication as pharmacophilic and pharmacophobic. Scores classified as pharmacophobic ranged from −10 to −2 scale points and that of pharmacophilic attitudes are ranged from 2 to 10 scale points. Scores from −1 to +1 were excluded from the analysis.[19]

Medication Adherence Rating Scale
We grouped patients into adherent and nonadherent based on the score obtained from medication adherence rating scale (MARS), which is a ten-item questionnaire that assigns a score of +1 (positive view of medication usage) and 0 (negative view of medication usage), allowing total scores ranging between 0 and 10. Scores classified as adherent ranging from 6 to 10 scale points and as nonadherent ranging from 0 to 5 scale points.[20]

Statistical Analysis
The continuous variables presented as mean (standard deviation [SD]) and difference between these variables identified using Student’s t-test. Categorical variables presented as number (%) and difference between these variables identified using Chi-square test. The impact of pharmacophilia and pharmacophobia on medication adherence was identified using multivariate logistic regression analysis. P < 0.05 was considered to be statistically significant. All the statistical analyses were carried out using SPSS (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp).

Results
A total of 176 patients were enrolled in the study, of which 110 patients were found to be pharmacophilic and 54 patients were pharmacophobic based on the scores obtained from the DAI scale and the remaining 12 patients with DAI scale score of 0 were excluded from the analysis. The sociodemographic details of the study population are shown in Table 1. None of the sociodemographic characteristics vary significantly between both the groups.

Clinical characteristics of the patients such as diagnosis, comorbidities, and common class of drugs prescribed are depicted in Table 2. In this study, bipolar affective disorder (BPAD), schizophrenia, and alcohol dependence syndrome (ADS) were found to be the most common diagnoses in pharmacophobic patients and anxiety in pharmacophilic patients. Antipsychotics were found to be the most commonly prescribed class of drugs in the pharmacophobic group, and the other classes of medications were found to be higher in pharmacophilic group.

Adverse drug reactions (ADRs) were found to be significantly more in pharmacophobic group as compared to pharmacophilic group, with a P < 0.001. About 83% of the patients with pharmacophobia experienced either one or more of the ADRs during their treatment which is comparatively higher compared to pharmacophilic group. Mean (SD) number of hospitalizations was found to be significantly higher among patients with
were found to be adherent and remaining 51 (94.4%) were found to be nonadherent. The mean (SD) adherence score was found to be significantly higher among patients with pharmacophilia (6.98 [1.9]) as compared to patients with pharmacophobia (2.87 [1.6]) \( [\textbf{Table 3}] \).

**Discussion**

Studies have revealed that patients’ attitude toward medication plays a significant role on medication adherence. 

### Pharmacophilia vs. Pharmacophobia

- **Table 1: Sociodemographic characteristics of the study population receiving psychotropic drugs**

| Parameter          | Total (n=164) | Patients with pharmacophilia (n=110) | Patients with pharmacophobia (n=54) | P* |
|--------------------|--------------|------------------------------------|-----------------------------------|----|
| Age (years)        |              |                                    |                                   |    |
| Mean (SD)          | 39.0 (14.0)  | 39.4 (13.7)                        | 38.1 (13.3)                       | 0.563 |
| Gender, n (%)      |              |                                    |                                   |    |
| Male               | 84 (51.2)    | 57 (51.8)                          | 27 (50)                           | 0.869 |
| Female             | 80 (48.8)    | 53 (48.2)                          | 27 (50)                           |    |
| Education, n (%)   |              |                                    |                                   |    |
| Illiterate         | 4 (2.4)      | 2 (1.8)                            | 2 (3.7)                           | 0.085 |
| Primary            | 54 (32.9)    | 35 (31.8)                          | 19 (35.2)                         |    |
| Secondary          | 75 (45.7)    | 49 (44.5)                          | 26 (48.1)                         |    |
| Graduate           | 27 (16.5)    | 21 (19.2)                          | 6 (11.1)                          |    |
| Postgraduate       | 4 (2.5)      | 3 (2.7)                            | 1 (1.9)                           |    |
| Marital status, n (%) |            |                                    |                                   |    |
| Single             | 32 (19.5)    | 22 (20.0)                          | 10 (18.5)                         | 1.000 |
| Married            | 132 (80.5)   | 88 (80.0)                          | 44 (81.5)                         |    |
| Family history, n (%) |            |                                    |                                   |    |
| Present            | 29 (17.7)    | 19 (17.3)                          | 10 (18.5)                         | 0.831 |
| Absent             | 135 (82.3)   | 91 (82.7)                          | 44 (81.5)                         |    |

*No significant difference observed between patients with pharmacophilia and pharmacophobia among all the parameters. SD=Standard deviation

### Table 2: A comparison of clinical characteristics of patients with pharmacophilia and pharmacophobia

| Parameter          | Total (n=164) | Patients with pharmacophilia (n=110) | Patients with pharmacophobia (n=54) | P* |
|--------------------|--------------|------------------------------------|-----------------------------------|----|
| Diagnosis, n (%)   |              |                                    |                                   |    |
| Depression         | 89 (54.6)    | 64 (58.3)                          | 25 (45.2)                         | 0.041* |
| BPAD               | 29 (15.1)    | 12 (10.9)                          | 17 (26.2)                         |    |
| Mania              | 1 (0.7)      | 1 (0.9)                            | 0                                 |    |
| Schizophrenia      | 10 (6.6)     | 5 (4.5)                            | 5 (11.9)                          |    |
| Anxiety            | 11 (7.2)     | 11 (10.0)                          | 0                                 |    |
| ADS                | 10 (6.6)     | 5 (4.5)                            | 5 (11.9)                          |    |
| Others*            | 14 (9.2)     | 12 (10.9)                          | 2 (4.8)                           |    |
| Comorbidities, n (%) |            |                                    |                                   |    |
| Hypertension       | 18 (11.0)    | 15 (13.6)                          | 3 (5.6)                           | 0.097 |
| Diabetes           | 11 (6.7)     | 5 (4.5)                            | 6 (11.1)                          |    |
| Hypothyroidism     | 7 (4.3)      | 7 (6.4)                            | 0                                 |    |
| Nil                | 128 (78.0)   | 83 (75.5)                          | 45 (83.3)                         |    |
| Class of drugs, n (%) |            |                                    |                                   |    |
| Antipsychotics     | 75 (45.7)    | 30 (27.3)                          | 45 (83.3)                         | <0.001* |
| SSRIs              | 72 (43.9)    | 53 (48.2)                          | 19 (35.2)                         |    |
| SNRIs              | 22 (13.4)    | 19 (17.3)                          | 3 (5.6)                           |    |
| TCAs               | 54 (32.9)    | 39 (35.5)                          | 15 (27.8)                         |    |
| Mood stabilizers   | 13 (7.9)     | 9 (8.8)                            | 4 (7.4)                           |    |
| Others†            | 56 (34.1)    | 42 (38.2)                          | 14 (25.9)                         |    |

*Significant difference observed between patients with pharmacophilia and pharmacophobia among these parameters, †Somatoform disorders, antisocial personality disorder, headaches, seizure disorder, conversion disorder, delusional disorders, nonorganic psychotic disorders, GABA analogues, melatonin receptor agonist, dopamine, and norepinephrine reuptake inhibitors, anticonvulsants, calcium channel blockers, beta blocker, NRI. BPAD=Bipolar affective disorder, ADS=Alcohol dependence syndrome, SSRIs=Selective serotonin reuptake inhibitors, SNRIs=Serotonin-norepinephrine reuptake inhibitors, TCAs=Tricyclic antidepressants, NRI=Norepinephrine reuptake inhibitor

Of the 110 pharmacophilic patients, 103 patients (93.6%) were found to be adherent and seven patients (6.4%) were found to be non-adherent according to MARS questionnaire. Among the 54 pharmacophobic patients, only 3 (5.6%) patients were found to be adherent and remaining 51 (94.4%) were found to be nonadherent. The mean (SD) adherence score was found to be significantly higher among patients with pharmacophilia (6.98 [1.9]) as compared to patients with pharmacophobia (2.87 [1.6]) \( [\textbf{Table 3}] \).
medication nonadherence among patients with psychiatric illness is reported to be common, the current study has emphasized on the factors influencing the pharmacophilic and pharmacophobic attitude and its impact on medication adherence. No significant difference was observed between pharmacophilic and pharmacophobic patients in terms of most of sociodemographic variables such as age, gender, education, marital status, and family history, which imply that these parameters does not have any role to play in terms of pharmacophilic and pharmacophobic attitude in psychiatric patients. Our study clearly indicates that there is no correlation between the education level and the patients attitude toward the medication, whereas in a study conducted in Spain shows patients attitude toward medication depends on the educational level of the patient.\cite{21} Number of hospitalizations was found to be significantly higher among pharmacophobia group than pharmacophilia group, which resembles the results of other studies which imply that there is a correlation between number of hospitalization and attitude toward medications.\cite{19,22} However, a study conducted in Vienna among the patients with schizophrenia and schizoaffective psychoses and other studies apparently reported there is no correlation between the number of hospitalization with attitude toward the medication.\cite{19,22,23}

In our study, majority of the patients were primarily diagnosed with depression in both pharmacophilic and pharmacophobic groups which is similar to that of the study conducted in Spain.\cite{24} However, patients with a diagnosis of BPAD, schizophrenia, and ADS were found to be comparatively higher in number among the pharmacophobic group. Medication history of the pharmacophobic patients revealed that the most common class of psychotropic agent implicated among this group was antipsychotics and is consistent with the previous findings\cite{13,16} and antidepressants were found to be higher in number among pharmacophilic group, which is consistent with the results of the survey conducted by Husain et al.\cite{25}

A significantly higher number of ADRs in pharmacophobic group suggest that ADRs play a role in developing negative attitude toward psychopharmacological agents, which is similar to the finding from the studies which conclude that patient who feel impaired by medication develops negative attitude toward medication.\cite{12,13,24}

In our study, patients with pharmacophilia were found to have statistically significant higher adherence score (more adherence to medications) than patients with pharmacophobia (low adherence to medications). This result affirms that pharmacophilia or pharmacophobia toward psychopharmacological agents significantly affects medication adherence of the patient, thereby proving the proposed hypothesis. This study also reveals that the DAI-10 scores are significantly related with the MARS for patients adherence toward their medication and similar relationship was established between the DAI-10 scale and the Morisky medication adherence scale-8 in the study conducted in Spain.\cite{21}

**Conclusions**

Pharmacophobia toward psychopharmacological agents can significantly reduce the medication adherence among patients with psychiatric disorders.

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**Conflicts of Interest**

There are no conflicts of interest.

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\[\text{Table 3: A comparison of other characteristics of with pharmacophilia and pharmacophobia}\]

| Parameter                                | Total (n=164) | Patients with pharmacophilia (n=110) | Patients with pharmacophobia (n=54) | P     |
|------------------------------------------|--------------|-------------------------------------|-----------------------------------|-------|
| Patients with adverse drug reactions, n (%) | 61 (37.2)    | 16 (14.5)                           | 45 (83.3)                         | <0.001* |
| Number of hospitalizations               | 1.02 (1.5)   | 0.82 (1.3)                          | 1.45 (1.7)                        | 0.038* |
| Duration of disease and treatment (years) | 2.06 (0.9)   | 2.04 (0.9)                          | 2.11 (0.9)                        | 1.00  |
| Number of medications per patient       | 4.1 (4.6)    | 3.8 (4.15)                          | 4.9 (5.4)                         | 0.144 |
| Cost per prescription (Rs.)              | 308 (234)    | 305 (245)                           | 314 (212)                         | 0.831 |
| Medication adherence                     | 17-1485      | 17-1485                             | 56-1000                           |       |
| Adherents, n (%)                         | 106 (64.6)   | 103 (93.6)                          | 3 (5.6)                           | <0.001* |
| Adherence score, mean (SD)               | 5.63 (2.6)   | 6.98 (1.9)                          | 2.9 (1.6)                         | <0.001* |

*Significant difference observed between patients with pharmacophilia and pharmacophobia among these parameters. SD=Standard deviation
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