

# Quantifying and Categorizing ADRs in Psychiatric Residential Long-Stay Patients Utilizing UKU-SERS Scale

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## ABSTRACT

**Background:** Psychotropic drugs are essential but not devoid of adverse drug reactions (ADRs), which lead to non-compliance and further failure of therapy, hampering the patient's quality of life.

**Methods:** A cross-sectional, observational study was carried out in a residential nursing home in Pune, India, from October 2018 to March 2019. Psychiatric inpatients of both genders and all ages receiving psychotropic drugs for at least one month were enrolled. Patients who were not alert or oriented enough to give a detailed history and response to a questionnaire, including dementia patients, and those who were not willing to give informed consent were excluded. The ADRs were categorized, and their management was documented using the Udvalg for Kliniske Undersøgelser (UKU) side effect rating scale. ADRs were assessed for causality and severity using the WHO-Uppsala Monitoring Centre (WHO-UMC) causality assessment scale and the Modified Hartwig and Siegel scale.

**Results:** In our study, 115 patients (76.6%) experienced 273 adverse drug events. Atypical antipsychotics accounted for the maximum number of ADRs (54.94%; n = 150). The most common ADRs were

weight gain, constipation, and tremors. The majority of ADRs were "mild" and had a "possible" causality relationship.

**Conclusion:** The study demonstrated a high incidence of ADRs, which was primarily managed either by reduction of dose or continued drug use with the treatment of side effects.

**Keywords:** Psychotropic drugs, adverse drug reactions, UKU-SERS

**Key Messages:** Adequate monitoring of patients who are on psychotropic medications will help in the early detection of ADRs. In our sample, the commonest ADRs were weight gain, constipation, and tremors.

Psychiatric medications are not devoid of side effects.<sup>1</sup> Guidelines suggest that medications for psychiatric patients should be continued for several months or years because of the chronic and relapsing nature of psychiatric disorders. This may, however, lead to an increased risk of adverse drug reactions (ADRs) in such patients.<sup>2</sup> Socio-demographic factors, polypharmacy, and multiple comorbidities can also contribute to ADRs. Despite the advancements in psychopharmacological treatment,

ADRs are still prevalent and have become a subject of great concern.

The ADRs can be monitored using different scales. But most scales do not cover all the parameters associated with ADRs of psychotropics. Rating scales that are currently available, mostly evaluate a single side effect such as extrapyramidal symptoms (EPS), sedation, weight gain, or sexual dysfunction. There have been few studies using scales that assess multiple side effects. However, the use of one scale instead of several separate scales can have advantages and might provide a better insight into the overall side effect profile.<sup>3</sup> The Udvalg for Kliniske Undersøgelser (UKU) side effect rating scale is a comprehensive rating scale designed to categorize and measure a broad range of ADRs caused by psychotropic drugs.<sup>4</sup> Studies done till date have scrutinized ADRs, their profile, and their management aspects; however, they did not use a scale that categorized psychiatric ADRs. There is paucity of Indian literature on the use of a single scale for identifying and classifying ADRs owing to psychotropic drugs. Available studies

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**HOW TO CITE THIS ARTICLE:** Mathew J, Varghese A, Sajith M. Quantifying and categorizing ADRs in psychiatric residential long-stay patients utilizing UKU-SERS scale. *Indian J Psychol Med.* 2021;43(1):38–44.

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**Submitted:** 26 Nov. 2019  
**Accepted:** 25 Apr. 2020  
**Published Online:** 20 Aug. 2020



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DOI: 10.1177/0253717620926784

that utilized the UKU scale are limited to a specific psychiatric diagnosis like bipolar affective disorder or a specific domain like outpatient settings.<sup>5,6</sup> Against such a background, this study is not limited to a particular diagnosis or a specific category of drugs but focuses on the application of the UKU scale. The objectives of our study are to identify and categorize ADRs in psychiatric patients receiving psychotropic drugs, to assess the causality and severity of the documented ADRs, and to analyze ADRs according to the demographics and predisposing factors.

## Materials and Methods

A cross-sectional observational study was carried out in a residential psychiatric hospital in Pune, India, from October 2018 to March 2019. It was a 225-bed hospital that provides acute as well as long-term care facilities for patients suffering from various psychiatric disorders such as schizophrenia, mood disorders, personality disorders, and substance-related disorders. The study protocol was approved by the Institutional Ethics Committee of Bharati Vidyapeeth (Deemed to be University) Medical College. Psychiatric inpatients of both genders and all ages, with or without comorbidities, diagnosed with psychiatric illness, and receiving psychotropic drugs for at least one month, were enrolled in the study. Patients who were not alert or oriented enough to give a detailed history and response to a questionnaire, including dementia patients, and those who were not willing to give informed consent were excluded. Patients' informed consent was taken for the study, and the counselors approved the consent. A total of 180 patients were initially screened, of which 150 were recruited. Out of the 30 patients excluded, 5 patients were discharged, 15 patients were not willing to take part in the study, and 10 patients did not cooperate as the study proceeded.

The subject information sheet was provided to the counselors, caretakers, and patients. It included information on the detailed procedure, objectives of the study, and advantages of the study. Patients' informed consent forms, assent forms, and subject information sheets were made available in English and the local language (Marathi). The study

commenced after the informed consent and assent forms were signed by the patients, their caretakers, and counselors. For patients with mental retardation, the informed consent and assent forms were obtained with the help of close relatives, counselors, and the nursing staff. Details such as socio-demographic information, medical and medication history, the reason for hospitalization, drugs prescribed (general and psychotropic medications), dose, dosage form, frequency, and the duration of treatment were noted in a predesigned pro forma. The daily analysis reports of the patients were keenly observed and documented. The patients' weight and blood pressure were noted regularly. The medication chart was reviewed after an ADR had occurred, and the ADR was analyzed for three days as per the UKU scale. We observed the patients for about 2–3 months for certain late-onset ADRs such as weight gain.

For determining ADRs, all the psychotropic medications were considered. ADRs were identified by the assessment of the symptoms using a semistructured interview with the patients and supplemented by clinical observation and information obtained from the ward staff and the case records. The interview was conducted by the clinical pharmacist, and the opinions of the clinicians and the counselors were also considered to confirm the feedback obtained from the patients.

The UKU side effect rating scale was used for documenting ADRs.<sup>4</sup> This scale requires to be used for a duration of three days. The UKU scale includes 48 items. Each item is scored on a 4-point scale (0–1–2–3). ADRs were documented based on the feedback obtained by the patients on each of the parameters listed on the UKU scale. The methods suggested for the management of the observed ADRs were documented as per the consequence parameter of the UKU scale. The consequence parameter is categorized into four degrees (0, 1, 2, 3) wherein degree 0 implies no action, degree 1 implies a more frequent assessment of the patient but no reduction of the dose and/or occasional drug treatment of side effects, degree 2 implies a reduction of the dose and/or continuing the drug with the treatment of side effects, and degree 3

implies the discontinuation of the drug or change to another preparation.

The documented ADRs were assessed for causality and severity. Causality assessment, which determines the causal relationship of a suspected drug to the ADR in question, was done using the WHO-Uppsala Monitoring Centre (WHO-UMC) causality assessment scale.<sup>7</sup> ADRs were also correlated with the drug/drugs with the aid of the literature product monograph, software, and Micromedex. The WHO-UMC scale divides the causality of an ADR into six categories: "certain," "probable," "possible," "unlikely," "conditional/unclassified," and "unassessable/unclassifiable." The Modified Hartwig and Siegel scale was used for assessing the severity.<sup>8</sup> This scale consists of seven questions which on answering classifies the severity of ADR as "mild," "moderate," and "severe." Individual scales were utilized for each patient.

Confidentiality of the patients was preserved throughout the study. The collected data were summated and entered into a Microsoft Excel sheet and analyzed using the Statistical Package for the Social Sciences (SPSS) version 18.0. The data are presented in the form of mean, frequency, and percentage. A chi-square test was performed to find out the association between ADRs and psychotropic drugs and scales utilized for causality and severity assessment (WHO-Uppsala scale, Hartwig severity scale). The level of significance was considered to be  $<0.05$ .

## Results

A total of 150 patients were recruited for the study. The demographic and clinical profiles of the patients are shown in **Tables 1** and **2**, respectively.

Maximum patients enrolled were diagnosed with schizophrenia (63.33%;  $n = 95$ ), followed by bipolar affective disorder (10.66%;  $n = 16$ ). The prescription pattern of psychotropic drugs in this study revealed that the majority of the drugs were atypical antipsychotics (83.33%;  $n = 125$ ), followed by typical antipsychotics (65.33%;  $n = 98$ ), benzodiazepines (50.66%;  $n = 76$ ), and mood stabilizers (49.33%;  $n = 74$ ). On average, patients received approximately three drugs per prescription.

**TABLE 1.**  
**Socio-demographic Variables of Psychiatry inpatients**

Variables	Number of patients (%) (n = 150)
<b>Gender</b>	
Male	83 (55.33)
Female	67 (44.66)
<b>Age (in years)</b>	
< 20	15 (10.00)
20–39	77 (51.33)
40–59	38 (25.33)
60–79	19 (12.66)
≥80	01 (06.66)
<b>Educational status</b>	
Primary	13 (08.66)
Secondary	31 (24.00)
Higher secondary	35 (23.33)
Graduate	59 (39.33)
Postgraduate	12 (08.00)
<b>Employment status</b>	
Employed	57 (38.00)
Unemployed	88 (58.66)
Self-employed	02 (01.33)
Retired	03 (02.00)
<b>Marital status</b>	
Married	44 (29.33)
Unmarried	99 (66.00)
Divorced	05 (03.33)
Widow	02 (01.33)

Note: The highest values in each category have been highlighted.

Out of 150 patients monitored, 115 (76.66%) experienced ADR, and the number of events was 273. Among the psychotropic drugs, atypical antipsychotics (54.94%; n = 150) were observed to have the maximum number of ADRs followed by mood stabilizers (17.21%; n = 47) and antidepressants (10.25%; n = 28).

Among 273 events, 31 (11.35%) of psychotic ADRs, 60 (21.97%) of autonomic ADRs, and 54 (19.78%) of other ADRs were associated with antipsychotics, whereas 17 (6.22%) of neurological ADRs were associated with mood stabilizers, and this was statistically significant (**Table 3**). Sedation (10.98%; n = 30), tremor (12.82%; n = 35), constipation (15.38%; n = 42), and weight gain (16.48%; n = 45) have been observed to be the highest in each

**TABLE 2.**  
**Clinical Characteristics of Psychiatry Patients**

Variables	Number of patients (%) (n = 150)
<b>No. of psychiatric medications</b>	
≤ 2	13 (08.66)
3–4	63 (42.00)
≥5	74 (49.33)
<b>Duration of psychotropic therapy</b>	
≤6 months	82 (54.66)
7–12 months	31 (20.66)
> 1 year	37 (24.66)
<b>Comorbidity</b>	
Yes	55 (36.66)
No	95 (63.33)
<b>Family history of psychiatric disorders</b>	
Yes	08 (05.33)
No	142 (94.66)
<b>Length of stay</b>	
≤6 months	82 (54.66)
7–12 months	31 (20.66)
> 1 year	37 (24.66)

Note: The highest values in each category have been highlighted.

of the ADR categories as per the UKU scale, that is, psychic, neurologic, autonomic, and others.

According to the WHO-UMC causality assessment scale, the maximum number of events was classified as “possible” (59.7%; n = 163) and 87 (31.86%) of possible events were associated with antipsychotics. The correlation of ADRs with the WHO category (possible) was not significant, and the P value was 0.057 (**Table 4**).

The severity of ADRs was assessed by the Hartwig scale. Most of the ADRs were mild (45.05; n = 123). The correlation of ADRs and Hartwig’s scale was not significant (**Table 5**).

The participants had a female preponderance (53.11%; n = 145) as compared to males 128 (46.88%), and the maximum number of events was reported in the age group of 20–39 years (45.05%; n = 123), graduate (41.02%; n = 112), unemployed (52.38%; n = 143), and unmarried (71.42%; n = 195). On the chi-square test, a significant association was found between the age group, educational status, employment status, marital status, and ADR,

whereas no significant association was observed between the gender and ADR (**Table 6**).

The clinical characteristics of patients who developed ADRs showed that 68 patients (59.13%) were diagnosed with schizophrenia, the same number of patients received more than five psychotropic drugs, 58 patients (50.43%) were under psychotropic drug therapy for less than six months, 47 patients (40.86%) had comorbidities, and 8 patients (6.95%) had a family history of psychiatric illness (**Table 7**).

The consequence of ADRs according to UKU scale showed that maximum patients developed ADRs of Type 2 degree (n=67; 58.26%) that required reduction of dose and/or continuing the drug with the treatment of ADR, followed by Type 1 degree 23 (20.00%) requiring more frequent assessment of the patient, but no reduction of dose, and/or occasional drug treatment of side effects (**Table 8**).

## Discussion

In different parts of the world, the incidence rate of ADRs in psychiatric inpatients varies from 43.5% to 94.6%.<sup>9</sup> The incidence of ADRs in our patients was 76.6% (n = 115), and the number of events was 273.

A total of 45 drugs were prescribed in our study (which included 4 typical antipsychotics, 8 atypical antipsychotics, 14 antidepressants, 3 mood stabilizers, 7 sedative-hypnotics and benzodiazepines, 6 anticonvulsants, and 3 central nervous system [CNS] stimulants). Nearly half of the patients received more than five psychotropic drugs and, on average, the patients received approximately three drugs per prescription, which is similar to the findings of Sharma et al.<sup>10</sup> Most patients were prescribed antipsychotics. This is in contrast to the findings of Gurung et al as prescription pattern may vary within different hospital settings.<sup>11</sup> Other classes of psychotropic drugs prescribed were mood stabilizers, antidepressants, anticonvulsants, benzodiazepines, other sedative-hypnotics, and CNS stimulants. None of the patients received depot psychotropic drugs.

The highest number of events was observed in association with antipsychotics, especially atypical antipsychotics

TABLE 3.

**Summary of Adverse Drug Reactions According to UKU-SERS**

Type of ADR	Number of events (N= 273)					
	Antipsychotics n (%ADR)	Antidepressants n (%ADR)	Mood Stabilizers n (%ADR)	Benzodiazepines n (%ADR)	Hypnotic-Sedatives n(%ADR)	Anticonvulsants n (%ADR)
Psychic ADR	31(11.35)	09 (3.29)	14 (5.12)	20 (7.32)	00	04 (1.46)
Neurologic ADR	13 (04.76)	07 (2.56)	17 (6.22)	00	00	04 (1.46)
Autonomic ADR	60 (21.97)	07 (2.56)	09 (3.29)	03 (1.09)	00	04 (1.46)
Others	54 (19.78)	05(1.83)	07 (2.56)	01(0.36)	00	04 (1.46)

UKU-SERS: Undersogelser side effect rating scale

TABLE 4.

**Causality Assessment of Suspected Adverse Drug Reactions in Relation to Psychotropic Drug Class**

WHO Probability Assessment	Number of events n(%ADR) (N= 273)					
	Antipsychotics	Antidepressants	Mood Stabilizers	Benzodiazepines	Anticonvulsants	Total
Probable	45 (16.48)	07 (2.56)	03 (1.09)	03 (1.09)	03 (1.09)	61 (22.34)
Possible	87 (31.86)	14 (5.12)	37 (13.55)	16 (5.86)	09 (3.29)	163 (59.70)
Unlikely	26 (9.52)	07 (2.56)	07 (2.56)	05 (1.83)	04 (1.46)	49 (17.94)

TABLE 5.

**Severity Assessment of Suspected Adverse Drug Reactions in Relation to Psychotropic Drug Class**

Severity Assessment	Number of events n(%ADR) (N= 273)					
	Antipsychotics	Antidepressants	Mood Stabilizers	Benzodiazepines	Anticonvulsants	Total
Mild	123 (45.05)	21 (7.69)	36 (13.18)	22 (8.05)	15 (5.49)	217 (79.48)
Moderate	35 (12.82)	07 (2.56)	11 (4.02)	02 (0.73)	01 (0.36)	56 (20.51)

(54.94%;  $n = 150$ ), followed by mood stabilizers (17.21%;  $n = 47$ ). Several studies also indicate the same.<sup>11-14</sup> In our study population, maximum ADRs were observed because of atypical antipsychotics. The prescription pattern also revealed that the majority of patients received antipsychotics across all diagnostic categories. In contrast, a study by Shah et al.<sup>15</sup> showed that antidepressants caused maximum ADRs (41.86%;  $n = 114$ ). Therefore, the association of antipsychotics and occurrence of ADRs found in our sample may have been influenced by the prescription pattern of psychotropic drugs.

Patients may experience multiple ADRs during treatment with psychotropic drugs. Traditional methods that are commonly used in healthcare settings to identify ADRs include a detailed review of the medical record, incident reporting systems, and trigger tools. These methods undoubtedly enable us to identify, assess, and document ADRs and events. However, many events may

go undiscovered and reporting may be biased. Participants are more likely to report unusual, interesting, or particularly dangerous events. Trigger tools, if used, often need training for better outcomes.<sup>16</sup> UKU-SERS includes a list of ADRs likely to be encountered in patients receiving psychotropics. This scale is designed in such a manner that it allows interaction with the patient, which is an add-on for confirming ADRs. UKU-SERS is a comprehensive rating scale that helps assess multidomain side effects.<sup>3</sup>

ADRs were assessed using the UKU scale after a few days of psychotropic drug administration. The scale categorizes ADRs into psychic, neurologic, autonomic, and other ADRs. A total of 83 (30.40%) ADRs were found in the autonomic category, which is comparable with the findings of Shah et al.<sup>5</sup> Autonomic ADRs were followed by psychic, others, and neurologic ADRs. Antipsychotics were associated mostly with autonomic ADRs (21.97%;  $n = 60$ ) followed by other (19.78%;  $n = 54$ )

and psychic ADRs (11.35%;  $n = 31$ ), whereas mood stabilizers were associated mostly with neurologic ADRs (6.22%;  $n = 17$ ). There are not many studies conducted using the UKU scale, which gives deficient information on the same. The overall ADRs observed were weight gain (16.48%;  $n = 45$ ), followed by constipation (15.38%;  $n = 42$ ), tremors (12.82%;  $n = 35$ ), and sedation (10.98%;  $n = 30$ ), and this coincides with the findings of a number of studies.<sup>5, 10, 12, 14, 15</sup> A high incidence of weight gain was seen owing to more prescription of atypical antipsychotics, especially long-term therapy with them, as 131 patients (48%) had received psychotropic medications for more than six months. Similar results were reported by Farhat et al.<sup>17</sup> and Sengupta et al.<sup>18</sup> The exact mechanism of antipsychotic-induced weight gain is unclear. Still, studies suggest that it is possibly because of several genetic polymorphisms, the antagonism, or inverse agonism of atypical antipsychotics such as olanzapine and clozapine

TABLE 6.

**Correlation of ADRs and Socio-demographic Factors**

Variables	No. of events (% ADR) (n = 273)	Chi-square value	P value
Gender		1.05	0.303
Male	128 (46.88)		
Female	145 (53.11)		
Age (in years)		217.82	<sup>a</sup> < 0.001
< 20	24 (8.79)		
20-39	123 (45.05)		
40-59	103 (37.72)		
60-79	22 (8.05)		
> 80	1 (0.36)		
Educational status		123.79	<sup>a</sup> < 0.001
Primary	23 (8.42)		
Secondary	41 (15.01)		
Higher secondary	65 (23.80)		
Graduate	112 (41.02)		
Postgraduate	28 (10.25)		
Uneducated	04 (1.46)		
Employment status		228.43	<sup>a</sup> < 0.001
Employed	117 (42.85)		
Unemployed	143 (52.38)		
Self-employed	06 (2.19)		
Retired	07 (2.56)		
Marital status		358.72	<sup>a</sup> < 0.001
Married	71 (26.00)		
Unmarried	195 (71.42)		
Divorced	07 (2.56)		
Widow	0		

ADRs: adverse drug reactions. Note: The highest values in each category have been highlighted. <sup>a</sup>The result is significant.

levels.<sup>21</sup> Fluoxetine, an selective serotonin reuptake inhibitor, was observed to exhibit nausea as an ADR in several patients. Nausea with fluoxetine may be mediated centrally through the stimulation of certain serotonin receptors (5-HT<sub>3C</sub>) that activate the chemoreceptor trigger zone.<sup>22</sup> In patients with nausea, antiemetic drugs such as ondansetron were given. Antipsychotics such as clozapine have a high affinity for muscarinic cholinergic receptors, which results in gastrointestinal hypomotility and reduces bowel movements, which contribute to constipation.<sup>23</sup> Patients with moderate to severe constipation were recommended to add laxatives such as lactulose and bisacodyl. Divalproex was most commonly observed to induce tremor in most of the patients. Valproic acid has multiple mechanisms of action, including reduction of the high-frequency neuronal firing of sodium-dependent action potentials, as well as increasing GABAergic neurotransmission.<sup>24</sup> Amantadine or propranolol were prescribed to these patients to provide relief from tremors. In contrast to these findings, a study conducted by Gurung et al.<sup>11</sup> observed EPS as the most common ADR followed by sedation. This difference in the findings could be due to the difference in the prescribing pattern of psychotropic medications.<sup>14</sup>

Certain ADRs such as hyperglycemia, endocrine problems, joint pain, and muscular pain were observed in patients, especially the elderly and patients with co-morbidities, but could not be categorized as UKU scale does not have a provision to categorize these ADRs. Therefore, these ADRs were only observed and documented. The management of ADRs by utilizing the consequence parameter of the UKU scale exhibited maximum patients to be categorized as degree 2, which is the reduction of dose and/or continuous drug with treatment of side effects.

The occurrence of ADRs in psychiatric patients may differ according to their age, gender, drugs prescribed, and the underlying disease condition. In our study, ADRs were commonly observed in females and the younger population. Similar results have been observed in different studies.<sup>12, 25</sup> The explanation for a higher risk in females may be that the ADRs are multi-causal, including

at the serotonin 2C receptor (5-HT<sub>2C</sub>), and the antagonism at the histamine H<sub>1</sub> receptor, which can disrupt the normal hormonal regulation of the system.<sup>19</sup> Patients with weight gain were preferred for lifestyle modifications, and in those who are susceptible or with diabetes and cardiovascular disease were recommended change of therapy to aripiprazole. In certain diabetic patients, a change of anti-diabetic drugs was also suggested.

Sedation/somnolence is known to occur as the psychotropic medications act on the CNS. Benzodiazepines and atypical antipsychotics were associated with sedation. Benzodiazepines enhance GABA at the GABA<sub>A</sub> receptor. Different antipsychotics block histamine H<sub>1</sub> receptors, resulting in sedation.<sup>20</sup> Sedation

may persist for the first few months and usually wears off.<sup>12</sup> Analyzing the risk and benefit of psychotropic drugs, medication causing sedation was recommended to be administered at night so that it does not interfere with the patient's daily activities. Among the antidepressants, patients who were receiving paroxetine were observed to have sedation and sexual dysfunction. The biochemical mechanisms associated with sexual dysfunction were increased serotonin release, resulting in agonism at inhibitory 5-HT<sub>2</sub> receptors, selectively decreased dopamine in both the limbic and frontal areas, selectively decreased norepinephrine, antagonism at cholinergic receptors and  $\alpha$ <sub>1</sub> adrenergic receptors, inhibition of nitric oxide synthetase and elevation of prolactin

TABLE 7.

### Correlation of ADRs and the Clinical Characteristics of the Study Subjects

Variables	Number of patients without ADR (%) (n = 150)	Number of patients with ADR (%) (n = 115)	Chi-square value	P value
Diagnosis				
Schizophrenia	82 (54.66)	68 (59.13)	118.17	* < 0.001
Bipolar affective disorder	137 (91.33)	13 (11.30)		
Depression	149 (99.33)	01 (0.86)		
substance induced psychosis	137 (91.33)	13 (11.30)		
Mild MR	141(94.00)	09 (7.82)		
OCD	147 (98.00)	03 (2.60)		
Others	142 (94.66)	08 (6.95)		
No. of psychiatric medications				
≤2	143 (95.33)	07 (6.08)	48.62	* < 0.001
3-4	110 (73.33)	40 (34.78)		
≥5	82 (54.66)	68 (59.13)		
Duration of psychotropic therapy				
≤6 months	92 (61.33)	58 (50.43)	16.18	*0.001
6-12 months	117 (78.00)	33 (28.69)		
≥1 year	126 (84.00)	24 (20.86)		
Comorbidity				
Yes	103 (68.66)	47 (40.86)	3.84	0.050
No	82 (54.66)	68 (59.13)		
Family history of psychiatric disorders				
Yes	142 (94.66)	08 (6.95)	85.23	* < 0.001
No	43 (28.66)	107 (93.04)		

ADRs: adverse drug reactions. Note: The highest values in each category have been highlighted. \*The result is significant.

TABLE 8.

### Consequence of ADR According to UKU Scale

Degree of ADR	Consequence	Number of patients (%)
0	No action	18 (15.65%)
1	More frequent assessment of the patient, but no reduction of dose, and/or occasional drug treatment of side effects	23 (20.00%)
2	Reduction of dose and/or continuous drug with the treatment of side effects	67 (58.26%)
3	Discontinuation of drug or change to another preparation	10 (08.69%)

ADR: adverse drug reaction.

gender-related differences in pharmacokinetics, pharmacodynamics, pharmacogenetics, immunological, and hormonal factors, as well as diversity in the use of medications (contraceptives) by women compared with men.<sup>25</sup> The reason for more ADRs being experienced in the younger population may be that there

might be objective physiological differences in response to psychotropics.<sup>13</sup> Also, the psychiatrists may have considered the special requirements of the elderly patients and may have prescribed lower dosages and avoided high-risk drugs and dangerous combinations, thus reducing the risk of ADRs in elderly patients.<sup>25</sup>

Among the 55 patients having comorbidities, 47 experienced ADRs. The underlying physical condition may influence the pattern of prescription of psychotropic drugs and enhance the precipitation of ADRs. Patients receiving more than five psychotropics experienced maximum ADRs. Studies show growing evidence regarding the increased ADRs due to polypharmacy. Concerns with polypharmacy include not only possibilities of cumulative toxicity and increased vulnerability to adverse events<sup>26</sup> but also adherence issues that emerge with increasing regimen complexity.

The causality assessment of an ADR with the psychotropic drug can be carried out using Naranjo and WHO-UMC scale. However, constraints in carrying out certain factors included in the Naranjo scale, namely the placebo administration, rechallenge process in patients, lack of tests performed to obtain the serum drug concentration, and clarification through objective measurement, restricted the use of the Naranjo scale in our study. Causality assessment was done by using the WHO-UMC scale,<sup>7</sup> which classified maximum ADRs to have a possible relationship with psychotropic drugs (59.70%; *n* = 163), followed by probable (22.34%; *n* = 61) and unlikely (17.94%; *n* = 49). Also, there was no sufficient information on drug withdrawal, which restricts the likeliness of ADRs to be categorized as certain or probable. This observation has been found in multiple studies.<sup>10, 14, 15</sup> This is in contrast to the studies by Shah et al.<sup>5</sup> and Pahari et al.<sup>27</sup> No cases could be labeled “certain,” as rechallenge was not attempted once the drug was withdrawn. The severity was assessed using Hartwig’s severity assessment scale, which categorized maximum ADRs to be mild (45.05%, *n* = 123), which showed resemblance to the findings of numerous studies.<sup>14, 28</sup> No cases were categorized as severe in our study, as there were no episodes of fatal or life-threatening ADRs.

### Limitations

Although the UKU scale categorizes ADRs into specific groups, it does not categorize certain ADRs, such as endocrine, metabolic, muscular, and bone-related ADRs. Also, it does not have a category for correlating the laboratory values with the ADRs.

The study was conducted for a short duration in a single center. This limited the data collection and overall findings.

We did not compare the ADRs in long-term patients and in those who were newly prescribed psychotropic drugs. Future studies may address these limitations and also perform a comparison of the pattern of ADRs in the residential nursing home and outpatient healthcare setting.

## Conclusion

Our study demonstrates a representative profile of ADRs experienced in different age groups, with a variation in their psychiatric disorders and the pattern of psychotropic prescription in the residential nursing home. Most of the psychiatric inpatients receiving psychotropic drugs experienced ADRs. Females, patients in the age group of 20–39 years, and those receiving more than five psychotropic drugs experienced more ADRs. ADRs observed were weight gain, sedation, constipation, and tremors caused majorly by atypical antipsychotics and mood stabilizers.

ADRs cannot be eradicated but should be managed to enhance compliance with the drug. Pharmacovigilance of psychotropic medications is essential to improve patient care. Constant vigil in detecting ADRs and subsequent dose adjustments can make therapy with psychotropic drugs safer and more effective.<sup>8</sup> Pharmacists, doctors, and caregivers should work in collaboration for the betterment of the patient's health status and quality of life.

### Declaration of Conflicting Interests

The authors declare that there are no conflicts of interests regarding this study.

### Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

## References

- Lucca JM, Varghese NA, Ramesh M, et al. Economic impact and severity of adverse drug reactions in patients with mental illness: A prospective observational study. *Int J Health Allied Sci* 2017 Apr 1; 6(2): 93.
- Rajkumar RP and Melvin G. Pharmacovigilance for psychiatrists: An introduction. *Indian J Psychiatry* 2014 Apr; 56(2): 176.
- VanStrien AM, Keijsers CJ, Derijks HJ, et al. Rating scales to measure side effects of antipsychotic medication: A systematic review. *J Psychopharmacol* 2015 Aug; 29(8): 857–866.
- Lindstrom E and Lewander T. UKU-SERS-Pat: The UKU side effect self-rating scale. 2002. [online] Research Gate. Available at: [https://www.researchgate.net/publication/247241175\\_UKU-SERS-Pat\\_-\\_the\\_UKU\\_side\\_effect\\_self-rating\\_scale](https://www.researchgate.net/publication/247241175_UKU-SERS-Pat_-_the_UKU_side_effect_self-rating_scale) (accessed January 19 2020).
- Shah A, Yadav PP, Chaudhari M, et al. A prospective study of adverse drug reactions in patients with bipolar disorder in psychiatry outpatient department of a tertiary care hospital. *J Clin Diagn Res: JCDR* 2017 May; 11(5): FC24.
- Gummadi T, Harave VS, Aiyar LN, et al. Adverse drug reaction monitoring in a tertiary care psychiatry setting: A comparative study between inpatients and outpatients. *Indian J Psychol Med* 2017 May; 39(3): 306.
- World Health Organization. *The use of the WHO-UMC system for standardized case causality assessment*. Geneva: World Health Organization; 2015.
- Hartwig SC, Siegel J, and Schneider PJ. Preventability and severity assessment in reporting adverse drug reactions. *Am J Hosp Pharm* 1992; 49(9): 2229–2232.
- Aburamadan H A, Sridhar S B, and Tadross T M. Intensive monitoring of adverse drug reactions to antipsychotic medications in the inpatient psychiatry department of a secondary care hospital of UAE. *Int J Pharmaceutical Investig* 2018; 8(3): 151–156.
- Sharma T, Vishwakarma K, Dhasmana DC, et al. Adverse drug reaction monitoring in psychiatry outpatient department of a tertiary care teaching hospital. *JK Sci* 2014 Oct 1; 16(4): 156.
- Gurung A, Jaju JB, Pawar GR, et al. Study of drug utilization pattern and adverse drug reactions of psychotropic drugs in psychiatric inpatient department of tertiary care hospital. *Int J Basic Clin Pharmacol* 2018 Feb; 7(2): 259.
- Singh H, Yacob M, and Sabu L. Adverse drug reactions monitoring of psychotropic drugs: A tertiary care centre study. *Open J Psychiatry Allied Sci* 2017; 8(2): 136–140.
- Lucca JM, Ramesh M, and Ram D. Gender differences in the occurrences and pattern of adverse drug reactions in psychiatric patients: A prospective observational study. *Trop J Med Res* 2017 Jan 1; 20(1): 84.
- Sridhar SB, Al-Thamer SS, and Jabbar R. Monitoring of adverse drug reactions in psychiatry outpatient department of a Secondary Care Hospital of Ras Al Khaimah, UAE. *J Basic Clin Pharm* 2016 Jun; 7(3): 8.
- Shah VM and Mehta DS. A longitudinal study of monitoring adverse drug reactions at psychiatry out-patient-department in our tertiary care teaching hospital, Surendranagar. *J Drug Deliv Ther* 2014 Jan 8; 4(1): 49–52.
- Michel P. *Strengths and weaknesses of available methods for assessing the nature and scale of harm caused by the health system: Literature review*. Geneva: World Health Organization, 2003.
- Farhat S, Ahmad A, Parveen S, et al. Adverse drug reaction monitoring to anti-psychotic drugs in out-patient department of a psychiatry hospital. *World J Pharm Pharm Sci* 2015; 5: 608–617
- Sengupta G, Bhowmick S, Hazra A, et al. Adverse drug reaction monitoring in psychiatry out-patient department of an Indian teaching hospital. *Indian J Pharmacol* 2011 Feb; 43(1): 36.
- Cooper SJ, Reynolds GP, with expert co-authors (in alphabetical order): Barnes TR, England E, Haddad PM, et al. BAP guidelines on the management of weight gain, metabolic disturbances and cardiovascular risk associated with psychosis and antipsychotic drug treatment. *J Psychopharmacol* 2016 Aug; 30(8): 717–748.
- Miller DD. Atypical antipsychotics: sleep, sedation, and efficacy. *Prim Care Companion J Clin Psychiatry* 2004; 6(Suppl 2): 3.
- Nevels RM, Gontkovsky ST, and Williams BE. Paroxetine—the antidepressant from hell? Probably not, but caution required. *Psychopharmacol Bull* 2016 Mar 1; 46(1): 77.
- Koda-Kimble M. *Applied therapeutics*. 9th ed. Philadelphia, PA: Lippincott Williams & Wil, 2003.
- Every-Palmer S, Newton-Howes G, and Clarke MJ. Pharmacological treatment for antipsychotic-related constipation. *Cochrane Database Syst Rev* 2017; 2017(1): CD01128.
- Morgan JC, Kurek JA, Davis JL, et al. Insights into pathophysiology from medication-induced tremor. *Tremor Other Hyperkinet Movements* 2017; 7: 442.
- Lucca JM, Ramesh M, Parthasarathi G, et al. A prospective surveillance of pharmacovigilance of psychotropic medicines in a developing country. *Psychopharmacol Bull* 2016 Mar 1; 46(1): 54.
- Kukreja S, Kalra G, Shah N, et al. Polypharmacy in psychiatry: A review. *Mens Sana Monogr* 2013 Jan; 11(1): 82.
- Pahari NI, Tripathi SK, Maity TA, et al. Evaluation and analysis of adverse drug reactions of second generation antipsychotics in a psychiatry outpatient department. *Int J Pharm Pharm Sci* 2012; 4: 158–162.
- Munoli S and Patil SB. Adverse drug reaction monitoring of antipsychotic drugs and mood stabilizers in a teaching hospital. *Int J Pharmacol and Clin Sci* 2016; 5(4): 118–121.