



# The Utilization Pattern and Costs Analysis of Psychotropic Drugs at a Neuropsychiatric Hospital in Nigeria

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## Authors' contributions

Author CCE designed the study, collected and analysed data, and wrote the manuscript draft. Authors VNU and BOO participated in literature review and data analysis. All authors read and approved the final manuscript

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## ABSTRACT

**Background/Aim:** Drug utilisation study is essential for evaluating patient care to improve service delivery through awareness creation for appropriate choice of drugs. The study analysed the prescription pattern and associated costs of psychotropic drugs at the outpatient unit of a mental health facility in Nigeria, to assess and document information for enhancing rational and cost-effective use of psychotropic medicines.

**Methods:** A retrospective analysis of prescription records covering 8 September and 28 October 2008, was carried out using the WHO recommended use indicators, adapted for mental health care. Data was analysed for number of drugs, number of prescriptions, cost of prescription and cost per defined daily dose (DDD).

**Results:** 1,756 prescriptions were analysed. Each prescription contained an average of 2.1 ( $\pm 0.75$ ) drugs, at a mean cost of N1,089 ( $\pm N2,127$ ). Antipsychotics accounted for the highest number of prescribed drugs in 82% (1441/1756) of prescriptions, followed by antidepressants, 13%. Atypical antipsychotics were the most expensive psychotropics at an average cost per DDD of N241.67 ( $\pm N97.77$ ), about 35 times the average cost per DDD of traditional psychotropics at N7.00 ( $\pm N2.65$ ), which were the cheapest, accounting for over 90% of total prescriptions.

**Conclusion:** The high use frequency of antipsychotics suggests psychosis as the

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prevalent mental health disorders in the environment. Significant antipsychotic-antipsychotic combinations indicate scope for improving the use of antipsychotics. Average cost of prescription reflects the economic status of patients' population where cost appears to be the major consideration of the choice of prescribers, limiting the use of newer and better tolerated psychotropics. Policy measures are required to improve access to the utilisation of newer psychotropics for enhanced quality of life of patients. The study provides a baseline data for carrying out further utilisation studies, to provide regular information for improving psychotropic drugs utilisation in mental health facilities in Nigeria.

*Keywords: Drug utilization study; rational drug use; psychotropic drugs; drugs per prescription; cost per prescription; Nigeria.*

## 1. INTRODUCTION

Due to widely reported inappropriate drug prescriptions common in clinical practice with implication for significant economic and clinical consequences, drug utilisation research (DUR) became essential for regularly assessing drug use patterns in health facilities, in order to identify opportunities for remedial measures to enhance achievement of therapeutic goals and patients' quality of life [1]. For developing countries where resources are more limited, the costs of inappropriate drug prescription can be enormous in addition to the risk of clinical consequences. It becomes necessary that regular auditing of prescription be carried out to ensure rational and cost-effective use of drugs to increase efficacy, reduce side effects, and provide feedback for prescribers [1].

Rational drug prescription entails the use of minimum number of drugs to obtain the best possible effects at reasonable cost [2]. Achievement of clinical goals of pharmacotherapy depends on the appropriate selection of drugs and dosage regimen, which often depends on patients' specific factors [3]. These include the consideration of co-existing diseases and drugs currently in use, to avoid drug interactions as well as adverse drug reactions. Other factors include socio-economic and demographic factors to ensure compliance and clinical success. For psychotropic drugs, their use may also be determined by social, psychological and cultural motives which can shape the therapeutic behaviours of psychiatrists as well as drug preferences of patients [4]. Psychotropic drugs are known to cause long term CNS and deleterious side effects when not properly used, especially in the elderly [5], and since mental health disorders are chronic conditions, it becomes important that their use be regularly monitored to ensure improved patients' quality of life, in view of long-term exposure to drug therapy. The expanding and challenging field of psychopharmacology is constantly seeking new and improved drugs to treat psychiatric disorders [6]. Newer drugs with better safety profiles are however known to be expensive and unaffordable to majority of patients [3], especially in developing countries. The implication is poor adherence which affects achievement of therapeutic goals. In view of the foregoing, psychotropic drugs require optimal/rational and cost-effective use to ensure achievement of therapeutic goals and improved quality of life for patients. To achieve these goals, the World Health Organisation (WHO) recommended a set of standardised indicators for measuring drug use in health outpatient facilities [7]. These indicators provide measures of optimal use of resources to help in correcting deviations from expected standards [8]. Generally, inappropriate prescription of drugs is known to be responsible for enhanced side effects and therapeutic failures. Through DUR, useful information is generated on drug use pattern and for

identifying high cost drugs for corrective measures, to improve treatment standards at all levels of health care system [7]. Regular prescription audit helps identify problems related to drug use such as polypharmacy, drug-drug interactions and adverse drug reactions [9].

In Nigeria, data on psychotropic drug utilisation is limited. Availability of such data is essential for assessing utilisation patterns over time, to generate information necessary for enhancing the rational use of psychotropic medicines for improved quality of mental healthcare. This study analysed the pattern of prescription of psychotropic drugs at the outpatient department (OPD) of a federal mental health facility in Enugu state, south east Nigeria, to assess the extent of appropriate/inappropriate drug use in the hospital, and identify opportunities for improving the rational and cost-effective use of psychotropic medicines.

## **2. METHODS**

### **2.1 Study Site and Setting**

The study was conducted at the Federal Neuropsychiatric Hospital Enugu (FNHE), south east Nigeria, one of the 8 regional psychiatric health centers and departments located in different regions of the country. Mental health disorders, as part of tertiary services are statutorily provided by the federal government. Established in 1995, the hospital provides primary, secondary and tertiary services with specialized range of staff and psychiatric hospital services. In 2008 it had a total of 135 beds and staff strength of 426 made up doctors, pharmacists, nurses and other healthcare professionals and support staff. Apart from the inpatient department (IPD), which operates at about 82% bed occupancy, the hospital runs an outpatient department, OPD (including an outpatient emergency unit) which recorded a total of 20,497 outpatient's visits during the period of November to December 2008 [10]. Major mental health disorders treated at the facility include psychosis, depression, anxiety disorders and drug addictions, which have been identified to be common in about 25% of Nigerians, although only about 10% are said to receive treatment [11]. The hospital is 95% funded by the federal government while the rest is obtained from internally generated revenue, through user-charges, from both subsidized and unsubsidized services. While IP services are over 90% subsidized, OP and ancillary services such as pharmacy/drugs are generally unsubsidized, hence full cost recovery [10]. Since healthcare finance in Nigeria is still largely out-of-pocket there is implication for catastrophic expenditure and impoverished household given the high cost of some psychotropic drugs and chronic nature of psychiatric disorders such as schizophrenia and depression.

### **2.2 Study Design and Data Collection**

A standardised approach recommended by the WHO, (1993) [7] was employed to investigate the pattern of drug prescriptions at the health facility using core use indicators. Analysis of prescription records kept in the hospital pharmacy between 8 September and 28 October 2008 was carried out. 1756 prescriptions were reviewed, more than the 300 recommended by the (WHO) for a single health facility, in order to increase the precision of the parameters for more reliable results [8]. The pharmacy records were manually kept and it took about 4 weeks (July 2 and 15, 2011) to examine and collect required information. Excel worksheet was designed to collect relevant data based on indicators being analysed. The prescription records contained information on patient name, gender, number of prescriptions, number of drugs, and cost of drugs. These were manually copied into the worksheet.

Collected data were copied into Excel spreadsheet and analysed using descriptive statistics. The prescriptions were analysed for number of drugs per prescription, cost per prescription, cost per defined daily dose (DDD), based on the anatomical therapeutic chemical (ATC) classification [1]. Other use indicators collected and analysed were prescription by generics versus brands, proportion of injections prescribed and prescription by gender. The hospital did not maintain a drug formulary at the time hence this was not assessed. Proportion of prescription from Nigeria's essential drug list [12], as well as from the WHO's Essential Medicine list [13], were also assessed.

### 3. RESULTS

Table 1 summarises the findings of the analysis. A total of 1,756 prescriptions were analysed containing 3,673. The mean and standard deviation of the number of prescription generated per day was 58.5 ( $\pm 14.8$ ). Each prescription contained an average of 2.1 ( $\pm 0.75$ ) drugs. The number of drugs per prescription ranged between 0 and 6 drugs. 83% of the drugs were prescribed by generic names while the rest were branded. 505 injections accounted for 14% of total prescriptions within the period of study. 52% of the drugs were from the Nigeria's Essential Drugs List (EDL) while 56% were from the WHO's EML, 55% of the prescriptions were males while 45% were females.

**Table 1. Summary indicators**

<b>Indicator parameter</b>	<b>Result</b>
Total number of prescriptions analysed	1,756
Total number of drugs prescribed	3,673
Average number of prescriptions per day (Mean and standard deviation)	58.5 ( $\pm 14.8$ )
Average number of drugs per prescription (Mean and standard deviation)	2.1 ( $\pm 0.75$ )
Percentage of psychotropic drugs prescribed by generic name	83% (3,035/3,673)
Percentage of psychotropic drugs prescribed by brand name	17% (624/3673)
Number of psychotropic drugs prescribed from Nigeria's EML	52%
Number of psychotropic drugs prescribed from the WHO EML	56%

To determine the incidence of poly-pharmacy, prescriptions were categorised according to the number of drugs contained per prescription, and the prescribing frequency of each category determined. Categories analysed were those containing 0,1,2,3,4 and above 4 drugs.

Table 2 shows the distribution of number of prescribed drugs per patient. The number of prescriptions containing 2 drugs each accounted for the highest number of prescriptions at 42% while those containing 1 and 3 drugs per patient were 26% respectively. Prescriptions containing more than four drugs each accounted for only 4% of total prescription. Altogether 94% of prescriptions contained 1 – 3 drugs.

**Table 2. Distribution of number of drugs per prescription**

Number of drugs per prescription	Number of prescriptions	Percentage (%)
0	24	1
1	449	26
2	741	26
3	450	26
4	77	4
Above 4	15	1
Total	1,756	100

Analysis was also carried out for the frequency of prescription of drugs and by therapeutic class. Frequency of prescription of a drug/drug category was based on proportion of the prescription containing an individual drug or drug category and the number of individual drug prescription to the total number of drugs prescribed. Incidence of poly-pharmacy was also used to assess incidence of polypsychopharmacy, in which more than one psychotropic drug could be prescribed to one patient (concomitant use).

Table 3 shows the summary of prescription frequency by therapeutic category. Antipsychotics accounted for 49.4% of prescribed drugs, followed by antidepressants were prescribed 7%. Anticholinergic, trihexylphenidyl accounted for 30% of total drugs prescribed. It was the single most prescribed agent within the study period. The typical antipsychotics constituted over 95% of antipsychotic drugs prescribed. Haloperidol was the most prescribed in this group, 36% (650/1813). The newer atypical antipsychotics accounted for less than 5% (58/1,813). Tricyclic antidepressants (TCAs) were the preferred antidepressants in about 95% (232/246) of the prescriptions, while selective serotonin reuptake inhibitors (SSRIs) accounted for 5% of antidepressant prescriptions analysed.

**Table 3. Prescription frequency by therapeutic class**

Therapeutic class	Prescribing frequency	Proportion
Antipsychotics	1,813	0.49
Antidepressants	246	0.07
Anti-anxiety agents	122	0.03
Mood stabilizers/Bipolar agents	109	0.03
Anticholinergics	1,095	0.30
Others	300	0.08
Total	3,673	1.00

### 3.1 Cost Analysis

Analysis of prescription costs was by cost per prescription and cost per DDD. The WHO developed the DDD as a unit of measurement defined as the assumed average daily maintenance dose of a drug used in its main indication in adults, which however vary for different indications, particularly for antipsychotics [1]. The DDD does not necessarily reflect the recommended or actual dose of the drug used. For the purposes of this study, cost per DDD was defined to mean the cost per average daily maintenance adult dose of a psychotropic drug used in its main indication. This was used to classify the drugs as either high-cost (expensive) or low-cost drugs. Alternatively, for a more accurate measurement of actual drug consumption, WHO suggests the use of prescribed daily dose (PDD), defined as

the average daily dose prescribed, as obtained from a representative sample of prescriptions [1]. The PDD is linked to the diagnosis for drugs where the recommended dosage differs from one indication to the other, such as the antipsychotics. Our study did not use this method due to inadequacy of the relevant data.

The costs of drugs were calculated using the hospital price list for individual drugs available at the pharmacy. References were also made for the retail prices of the drugs at the community pharmacy outlets. The cost is expressed in Nigerian Naira (N) and converted to the United States Dollar (\$) at the 2008 exchange rate, of N120 to 1US\$

Table 4 presents the summary of costs of prescriptions within the study period. The total cost of the prescriptions was N1,911,854 (\$15,932.12 ), with the cost of each prescription ranging from N14 to 42,142.00, (\$0.12 - 351.18 ). The mean and Std deviation of cost per prescription was N1,089 ( $\pm 2,127$ ). Majority of the prescriptions (68%), cost less than 1000 Naira (\$8.33), while about 32% of prescriptions cost N1, 000 and above.

**Table 4. Prescription cost indicators**

<b>Cost indicator</b>	<b>Value</b>
Total cost of prescriptions	N1,911,854 (\$15, 632.18)
Average cost of prescriptions per day (mean and standard deviation)	63,729 ( $\pm$ N22,279)
Average cost of drugs per prescription (mean and standard deviation)	1,089 ( $\pm$ N2,472)
Number of prescriptions < N1,000 (%)	1192 (68%)
Number of prescriptions > N1,000 (%)	562 (32%)

Based on cost per prescription and average duration of prescription (28 days), cost per prescription per day was estimated at N39 per patient. This was therefore used as a guide to classify the drugs as high cost and low cost drugs, adjusted up to N50 per day using the DDD. Hence those drugs whose cost/DDD was below N50 were classified as low cost while those costing N50/DDD or greater were classified as high cost drugs.

Consequently atypical antipsychotics were the most expensive psychotropic drugs, costing between N100 and N335 per DDD (Table 5). Risperidone was the most expensive of the group at N335 per DDD, and by extension the most expensive psychotropic drug in the hospital. However the cheapest psychotropic drugs, haloperidol and chlorpromazine cost N6 per DDD each. The average cost per DDD of the expensive/high cost atypical antipsychotics at N241.67 ( $\pm$ N97.8) is about 35 times the average cost per DDD of the low cost typicals, at N7.00 ( $\pm$ 2.65). The cost of haloperidol, the most prescribed antipsychotic, at 10mg per day is about 23 times lower than the cost of clozapine at 100mg per day. The cost of risperidone in schizophrenia is about 56 times the cost of haloperidol.

The most prescribed antidepressant, amitriptylline cost N21 per DDD, which is about four times lower than the cost of most prescribed SSRI, fluoxetine at N80 per DDD. Paroxetine was the most expensive antidepressant at N150 per DDD.

The costs per DDD of anti-anxiety agents was each below N50, making them fall within the low cost/inexpensive category. Sodium valproate cost N80 per DDD as a high cost bipolar agent while carbamazepine cost N26 per DDD as the cheapest and most prescribed bipolar agent in the hospital. In all, the high cost/expensive drugs which ranged from N52

(thioridazine) to N335 (risperidone) per DDD accounted for about 3.6% (134/3673) of the total number of prescribed drugs.

**Table 5. Prescription frequency and cost per average daily dose (DDD)**

<b>Drug class</b>	<b>Prescribing frequency (%)</b>	<b>DDD*</b>	<b>Cost/DDD (N)</b>
<i>Antipsychotics</i>	49% (n = 1,813)		
Haloperidol	36	10mg	6.00
Trifluoperazine	15	10mg	10.00
Chlopromazine	15	100mg	6.00
Thioridazine	3	50mg	52.00
Risperidone	1	2mg	335.00
Clozapine	2	100mg	140.00
Olanzapin	0	5mg	250.00
<i>Antidepressants</i>	7% (n = 246)		
Amitriptylline	82	75mg	21.00
Imipramine	13	75mg	16.50
Fluoxetine	3	20mg	80.00
Paroxetine	2	20mg	150.00
<i>Anti-Anxiety agents</i>	3% (n = 122)		
Diazepam	39	5mg	10.00
Lorazepam	29	2mg	16.00
Nitrazepam	32	5mg	7.00
<i>Antimania</i>	3% (n = 109%)		
Carbamazepin	86	400mg	26.00
Sodium Valproate	14	400mg	80.00
<i>Anticholinergics</i>			5.00
Trihexylphenidyl	30% (n = 1,093)	5mg	

\*DDD = Defined Daily Dose

#### 4. DISCUSSION

Findings from the study reflect the pattern of psychotropic drugs prescription at the health facility in 2008, which in turn reveal the attitudes of physicians to the disease and treatment with drugs. In our study antipsychotics were by far the most prescribed psychotropics followed by antidepressants. Anxiolytics and bipolar agents were about equally prescribed. Frequency of prescription of a drug, which was measured as the total number of the particular drug divided by the number of the category is also expressed as prescribing prevalence [14]. Prescribing prevalence studies have been found useful in determining the prevailing morbidity patterns of diseases [15]. Hence, in this study the high prescription frequency of antipsychotics indicates the prevalence of psychotic disorders compared to other mental health disorders. This is consistent with reports that psychotic disorders, especially schizophrenia, are more prevalent among Africans and blacks [3]. Depression appears to be more prevalent in other races, especially in developed countries than other psychiatric conditions [3,16]. In our study the number of antidepressant prescriptions (13%) indicates a low number of depressive disorders in the hospital. Similarly prescription frequencies of anxiolytics (benzodiazepenes) and antimania drugs (7% each) suggest that the number of anxiety and bipolar disorders presenting at the hospital was relatively low during the period of study.

Majority of drugs were prescribed by generic names (82%) and a few by brand names, mostly the newer drugs in which the generic brands were not yet available in the area at the time. This helps to reduce the cost of prescription as branded drugs are more expensive than the generic counterparts which contain same active ingredients [17].

Our findings clearly show that psychiatrists at the hospital prescribe traditional psychotropics much more than the newer agents. This can be attributed to three factors; i) they are more conversant and comfortable with the traditional agents, ii) the newer agents are far more expensive, and iii) availability of the newer agents is limited, which could be attributed to the fact that they were being newly introduced in the area during this period.

Typical antipsychotics, haloperidol and the phenothiazines (fluphenazine, chlorpromazine, stelazine), were the most preferred among the antipsychotics. Haloperidol was the most used drug in this group even though all typical antipsychotics are said to be equally effective, but mainly differ in their side effect profile [18]. Haloperidol is known to produce less side effects (less sedation, fewer anticholinergic and cardiovascular effects), but has higher incidence of extra-pyramidal side effects, compared to phenothiazines [3]. Hence, the use of haloperidol is hinged on the belief that the side effect profile will be easier handled by the clinician and better tolerated by the patient. The newer/atypical antipsychotics such as clozapin, olanzapin and risperidone are known to be better tolerated with less extrapyramidal symptoms than the typical antipsychotics [5]. They require less dosage adjustments, administered on once daily dose frequency, which is expected to enhance patients' compliance to treatment. These have made them the current drugs of choice in developed countries [5, 18]. However their use in our study was very limited, accounting for only about 3% of antipsychotic prescription. The costs are very high and most unaffordable to the majority low income population. The study showed that antipsychotic depot injections were significantly used (fluphenazine and flupentixol), during the period in about 28% of the time. The depot injections are recommended to be used in patients expected to be noncompliant [3].

For the antidepressants which were the second most prescribed category, TCAs were clearly the most frequently prescribed compared to the SSRIs. Although the two categories of antidepressants are said to have similar onset of action, the SSRIs appear to have better side effects profile; wider therapeutic index in addition to once daily dosing which is expected to improve patients compliance [19]. They are reported to have lower incidence of side effects such as lack of sedative, anticholinergic and hypotensive effects, which in effect make them safer [19]. Amitriptyline was the most prescribed TCA in our study, with imipramine coming a distant second. The analysis identified fluoxetine and paroxetine as the two major SSRIs prescribed during the period accounting for only about 5% of antidepressant prescriptions. SSRIs are recommended mostly for elderly patients because of reported increased potentials of the TCAs to cause significant extra pyramidal side effects in elderly patients [20,21]. Hence the frequent prescription of the TCAs suggests the use of these drugs in older patients despite the recommendation, indicating a scope for improved use of SSRIs in elderly patients.

The study showed that trihexylphenidyl was the only medication used in the hospital for the control of extra pyramidal side effects in patients on antipsychotics, especially the elderly. The use of the medication was very significant in the study, accounting for about 30% of total prescriptions. The frequent use of trihexylphenidyl was not surprising in view of the predominant prescription of antipsychotics. Anticholinergic drugs are used for short-term prevention of acute extrapyramidal side effects in patients on antipsychotics, which has been



found beneficial in many studies [18]. There is however the risk of inappropriate use in patients who may not need this. Diazepam and nitrazepam were the most prescribed drugs in this group, closely followed by lorazepam.

Findings suggest limited incidence of polypharmacy as the average number of drugs per prescription during the period was 2, in line with WHO recommendations. The WHO has also reported 3.3 drugs per prescription in developing countries such that anything within this limit is recommended. In our study, over 95% of prescriptions contained between 1-3 drugs. Only about 4% of prescriptions contained more than 4 drugs per prescription and majority of these included non-psychotropic drugs such as antihypertensives, analgesics, vitamin preparations and antimalarials. The fewer number of drugs per prescription in the study, which is in line with recommendations, reduces the risk of side effects, drug-drug interaction and reduced cost of treatment.

Concomitant administration of psychotropics was identified in few cases and these can be justified in co-morbidities, treatment of adverse drug reactions or to boost or augment efficacy of primary treatment [22,23]. The frequent prescription of trihexylphenidyl with antipsychotics for the control of extra pyramidal side effects therefore contributed significantly to the incidence of polypharmacy during the period. Comorbid conditions are known to occur in psychiatric cases, requiring the need to use more than one drug, which in turn needs monitoring to prevent adverse drug reactions. Some studies have documented the likelihood of drug interactions occurring in some patients in which the risks were not properly assessed [24]. Apart from the use of anticholinergic, the most prevalent drug combination prescriptions observed in our study were the use of antipsychotics and antidepressants, suggesting the coexistence of psychosis and depression as a common comorbidity in the hospital. There was a significant antipsychotic-antidepressant prescription (98/3673), and antipsychotic-anxiolytic combinations, while antipsychotic-antipsychotic and antidepressant-anxiolytic combination were limited. Antipsychotic-antipsychotic combinations observed were mainly haloperidol/chlorpromazine and chlorpromazine/trifluoperazine. Reports have been documented suggesting that combination of two antipsychotics is not more effective than a single agent [25,26]. The incidence of side effects may however increase, in particular extra-pyramidal effects, requiring the addition of an anticholinergic to deal with these effects. Hence, all prescriptions of two antipsychotic combinations in our study included trihexylphenidyl.

Combinations of antipsychotics with antidepressants occurred mostly with the TCAs in about 98 cases of encounters. Amitriptyline accounted for most of the prescriptions in which it was combined with mostly the phenothiazines. Combinations of TCAs and phenothiazines have been found to be beneficial in patients with psychotic depression but they are recommended to be administered initially at low doses and gradually increased based on clinical indications [3]. The two groups are known to possess sedative and anticholinergic properties which may be prolonged and intensified when used concomitantly, due to the inhibition of their metabolism resulting from their pharmacological interaction. Caution is therefore required when increasing or withdrawing the drugs to avoid the risk of seizures which may be increased by lowering the seizure threshold [3].

Combination between antidepressants was not identified, even though this has been documented in other studies [3,27]. Fluoxetine has also been reported to increase the systemic levels of benzodiazepines (and in effect clinical and side effects), through its competitive inhibition of cytochrome P450 enzyme [28]. Although our study recorded 5 cases of antidepressant-anxiolytic combinations, none of these included fluoxetine, apparently due

to the limited number of prescriptions of SSRIs. However the possibility exists as a significant number of the hospital prescriptions are dispensed in pharmacies outside the hospital. Our study did not analyse patient case notes to identify prescription combinations that could lead to drug-drug interactions with implications for significant clinical manifestations.

The study documented two prescriptions in which Amitriptyline, a TCA was prescribed with propranolol, a beta-blocker. Reports suggest that beta-blocker may decrease the metabolism of TCAs by reducing the blood flow to the liver thereby leading to accumulation of the agents with the risk of toxicity, although the mechanism is not well understood [27].

#### **4.2 Costs of Prescription**

Understanding the cost of prescription is important for determining compliance and adherence to treatment by patients, especially in mental health disorders where duration of treatment is long, and compliance is known to range from 20 - 50% [29]. Hence, for a low income country like in Nigeria, the cost of prescription becomes important for interpreting the results of this study, due to affordability. Cost per prescription in this study averaged N1,089 (\$9.75) per patient. This is similar to the value obtained for this indicator in a hospital-wide assessment of unit cost of psychiatric hospital services in the facility [10], which however reflected annual estimate.

With an average duration of prescription at 28days, the cost translates to about N39 (\$0.33) per day of treatment, which can be considered affordable for majority of patients in this part of the low income setting. It was therefore necessary to use this value, adjusted to N50 per day (N1,400 per 28-day prescription), to classify the drugs as high or low cost, as a measure of affordability. Presumably the high cost drugs (Table 5) accounted for only about 3.6% of prescribed drugs in our study, explaining the clear preference of the psychiatrists for the use of cheaper and more affordable old generation/traditional psychotropics. The predominant use of typical antipsychotic haloperidol, as the most preferred drug reflects the economic status of the patient population, since second generation/atypical antipsychotics such as risperidone, clozapine, olanzepine etc, which have better side effects profile were much more expensive and unaffordable to majority of the patients. Hence their use was very limited based on our estimates.

Consequently the cost per prescription in our study reflects the predominant use of low cost first generation antipsychotics which were the most prescribed category. The fact that greater number of the prescriptions (68%) falls below the estimated average attests to the predominant use of low cost psychotropics which are more affordable to the predominantly low income population. The low incidence of poly-pharmacy in the study further contributed to reduced cost of prescriptions. However, the predominant use of older generation and more traditional psychotropic drugs has implication for poor quality of life of the patients in view of their side effects profile, and the longer duration of treatment, compared to newer agents. Given their better side effect and tolerability profile, in addition to better dosing frequency, which altogether make for patients compliance and expected improved quality of life, the newer psychotropics have since become the preferred lines in developed countries [5,16,18]. The lack of access to these drugs in our settings due to high costs therefore deprives the patients the benefits of enhanced quality of life. Measures are earnestly needed to improve access to these drugs through affordable prices in a country where the finance of healthcare is still largely out-of-pocket [10]. The use of these agents at their current costs will

definitely be catastrophic. It is also necessary to conduct pharmacoeconomic analyses of these drugs to determine whether the benefits justify their high costs.

#### **4.3 Limitations of the Study**

The study mainly analysed pharmacy prescription records which consist only of dispensed drugs and did not capture the prescriptions dispensed outside the hospital pharmacy, partly due to stock out. Significant number of prescriptions was dispensed outside the hospital especially for the newer agents such that the records were not part of the analysis [10]. Hence our analysis may not fully reflect the actual total prescriptions generated. Patients' records were not examined to obtain adequate prescription information for comprehensive analysis. This was necessary to assess and analyse prescription pattern across demographic and diagnostic areas. Records at the hospital were manually kept and the study encountered challenges which affected the comprehensive documentation of relevant data to inform adequate analysis, which include the use of the PDD as a more accurate measure of drug consumption. However, the management of the hospital has since made efforts at addressing some of these issues with the computerisation of hospital records to ensure effective documentation and hospital management [10]. A more comprehensive study to promote prescribing habits will be pursued in future planned drug prescription audits at the hospital.

#### **5. CONCLUSION**

This study was necessary to reveal the prescription pattern of psychotropic drugs as part of drug utilisation research in mental health, often neglected in this part of the world. It provides opportunities for enhancing the quality of mental healthcare in our environment, through awareness creation for rational and cost-effective use of psychotropic medicines. Drug use indicators from the study largely conform to standard recommendations for developing countries. Incidence of poly-psycho-pharmacy was limited. Prescription pattern which shows traditional antipsychotics as the most commonly prescribed psychotropics, suggests psychosis as the prevalent mental health disorders in the study environment. The average cost of prescription at N1,089 (\$9.08) for about 28-day period reflects the economic status of the population which is expected to enhance compliance and adherence to treatment. Findings show that cost of drugs is a major consideration expected to have greatly influenced the choice of prescribers. Newer drugs, which have become the preferred options in developed countries are very expensive and unaffordable to the majority the low income patients. This indicates the need for measures to reduce cost of newer psychotropic drugs, to increase their availability and use for enhanced quality of life of mentally ill patients in Nigeria. The study provides a baseline data for carrying out further utilisation studies, to provide regular information for improving psychotropic drugs utilisation in mental health facilities. Given the limitations of the study and the developments since the period of analysis, it will be necessary for a follow-up study to assess the current state of drug utilisation in the hospital.

#### **ETHICAL CONSIDERATIONS**

Ethical approval for the study was obtained from the hospital's Institution Review Board, (IRB). There was no direct contact with the patients hence, the study did not obtain patients' informed consent.

## **COMPETING INTERESTS**

Authors declare no conflict of interest.

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