



(RESEARCH ARTICLE)



Costs and affordability of psychotropic medicines for patients with schizophrenia in Nigeria

Amala Chukwunwike Ofor ^{1,*}, Obinna Ikechukwu Ekwunife ², Brian Onyebuchi Ogbonna ² and Raymond Offiah ³

¹ Department of Clinical Pharmacy and Biopharmaceutics, Enugu State University of Science and Technology, Agbani, Enugu, Nigeria.

² Department of Clinical Pharmacy and Pharmacy Management, Nnamdi Azikiwe University, Awka, Nigeria.

³ Department of Pharmacology, College of Medicine, Enugu State University of Science and Technology, Enugu, Nigeria.

GSC Biological and Pharmaceutical Sciences, 2024, 28(01), 206–214

Publication history: Received on 04 May 2024; revised on 18 July 2024; accepted on 21 July 2024

Article DOI: <https://doi.org/10.30574/gscbps.2024.28.1.0231>

Abstract

Background: Schizophrenia is a complex illness, in other words, requires certain costs to tackle the challenge. However, the use of psychotropic medicines is paramount for the disease management and the costs of these medications should be considered in the management especially in low- and – middle income countries. There is over-reliance on out-of-pocket payments among the individuals in these countries whereby a large number of the patients purchase the medicines out of pocket, and majority unable to afford the medicines for their illness.

Aim: The aim of this study was to assess the costs and affordability of psychotropic medicines for management of Schizophrenia. It specifically evaluated the financial burden of out-of-pocket payment to purchase medicines for patients with Schizophrenia in Nigeria.

Method: The study was conducted in a Neuropsychiatric Hospital in Southeastern part of Nigeria using a retrospective, cross-sectional study of the costs of psychotropic medicines for adult patients with Schizophrenia that visited the hospital.

Results: All the prescribed oral typical antipsychotics (except chlorpromazine 200mg/day and 300mg/day) gave the patients less than one day wage to pay for medicines, whereas, all the oral atypical antipsychotics gave the patients more than one day wage to pay for the psychotropic medicines.

Conclusion: The atypical antipsychotics were unaffordable to the patients. We considered various factors as limitation and recommend interventions for reimbursements or make the psychotropic medicines free for the patients.

Keywords: Schizophrenia; Costs; Psychotropic medicines; Affordability; Nigeria

1. Introduction

Global estimate show that as much as 24 million individuals are suffering from Schizophrenia with a peak age of 15 – 45 years [1]. Schizophrenia is a complex chronic illness that requires certain costs for its management. However, the use of psychotropic medicines is paramount for management of Schizophrenia and the costs of these medications should be considered in low- and – middle income countries. Nigeria, a low middle-income country in West Africa region is the most populous black Africa nation with over 200 million people [2], has a prevalence rate of Schizophrenia as 0.4%,

*Corresponding author: Amala, Chukwunwike, Ofor

with estimated annual national cost of the illness as \$609 million [1]. Moreover, there is over-reliance on out-of-pocket payments for medicines among the individuals in Nigeria whereby a large number of the patients purchase the medicines out of pocket, and majority unable to afford the medicines for their illness since a good number of the population wallow in multidimensional poverty [3, 4]. However, the monthly minimum wage of Nigeria worker is ₦30,000 (\$70.8 as at June 2022) which when multidimensional measure of poverty is used, has trapped the workers in a cycle of poverty [5]. The aim of this study is to assess the cost and affordability of psychotropic medicines for management of Schizophrenia. It specifically evaluated the financial burden of out-of-pocket payment to purchase medicines for patients with Schizophrenia in Nigeria. .

2. Material and Methods

2.1. Study Site and Study setting

The study was conducted at Anambra State Neuropsychiatric Hospital, Nawfia, Anambra State in South-Eastern part of Nigeria. Nawfia is a town in Njikoka Local government of Anambra State of Nigeria, and is bordered by Umuokpu town, Enugwu-ukwu town, Enugwu-Agidi town, Amawbia town, and Nise town. There are numerous patent medicine stores in and around the town with very few registered pharmacies. The hospital is a government-owned hospital located on the Enugu-Onitsha old express way between Nawfia primary health centre and Nawfia central market; about 4km from the State Capital and about 30 km from the State commercial city Centre. Majority of the daily clientele are outpatients that come to fill prescriptions or visit the physicians for treatment or counseling. However, the hospital management mainly procures the medicines for patients use from the state's central medical store or directly from the pharmaceutical wholesalers. The hospital management have a structure that makes it practically possible that all the prescribed medications are procured by the patients from the hospital pharmacy

2.2. Study Design

It was a retrospective, cross-sectional study of the costs of psychotropic medicines prescriptions for adult Schizophrenia patients from 18 years of age that visited the hospital.

2.3. Data Collection

The prices of the medicines from the hospital were first compared retrospectively with the prices from 5 pharmacies that are close the hospital. The medications in the psychiatric hospital were seen to be cheaper.

A standardized data collection questionnaire was developed and data regarding the psychotropic drugs, strength of drugs prescribed, cost, and affordability were collected from the prescription records of 1st April 2022 to 31st March 2023 kept manually in the pharmacy unit. The prices of the medicines were obtained from the price list of the hospital pharmacy. The Dollar to Naira exchange rate fluctuates but we used the average exchange rate for 2022 (1 US\$ = ₦423.75) [6].

The minimum monthly wage of Nigeria government worker as at the time of study was ₦30,000 (\$70.8), and there are about 22 working days in one month; therefore the average daily wage used is ₦1,363.63 (\$3.22).

However, the affordability of the drugs was calculated as the number of working days necessary for the lowest-paid unskilled government employee to purchase a medication for one month (30 days) course of therapy [7, 8]. If the result is less than 1 day, it is affordable whereas if it is greater than 1 day, it is unaffordable.

The period of data collection was from 24th September 2023 to November 6th 2023.

2.4. Eligibility Criteria

2.4.1. Inclusion Criteria

- Costs of Psychotropic medicines prescribed for Confirmed diagnosis of Schizophrenia, Schizophreniform disorder, Schizoaffective disorder.
- Costs of Prescriptions for individuals from 18 to 65 years of age.

2.4.2. Exclusion Criteria

- Costs of Prescriptions for affective disorders
- Costs of Prescriptions for clear experience of more than one discrete psychotic episode.

- Costs of Prescriptions for those on Clozapine that require close monitoring.

2.4.3 Sample Size Determination/ Sampling Technique

Information from the hospital medical record showed that there were 698 prescriptions for Schizophrenia Spectrum from 1st April 2022 to 31st March 2023-

Sample size calculation for a finite population:

$$S = X^2NP (1-P) / d^2 (N-1) + X^2P (1-P)[9]$$

Where

X = 1.96 (Z value for 95% confidence interval)

N = 698 (Population size)

P = 0.5 (50% Population proportion)

d = 0.05 (degree of accuracy/margin of error)

$$\begin{aligned} \text{Sample size} &= 1.96^2 \times 698 \times 0.5 (1 - 0.5) / 0.05^2 (698-1) + 1.96^2 \times 0.5 (1 - 0.5) \\ &= 3.8416 \times 698 \times 0.5 (0.5) / 0.0025 (697) + 3.8416 \times 0.5 (0.5) \\ &= 670.4 / 2.7 \\ &= \mathbf{248} \end{aligned}$$

Allowing for 10% drop out rate accounted to a minimum sample size of **273**..

21 patients met the exclusion criteria and systematic random sampling was employed to collect the data from every 2nd prescription of 677 encounters of individuals with Schizophrenia.

Total of **338** prescriptions were assessed for the costs of psychotropic medicines.

2.5. Data Analysis

Data were analyzed with the use of designed Excel worksheet to collect relevant data based on the costs of the medications. The data collected were transferred into Excel spreadsheet and analyzed.

2.6. Ethical Considerations

Ethical clearance was obtained from the hospital ethics committee (Ref: NPHN/010) and a Study code for the purpose of data was used to ensure confidentiality of information. The researcher was made aware that the research process can be terminated if he/she was not following the study protocol.

3. Results

3.1. Demographic data of the individuals

The demographic features of the individuals include age, sex, and employment status. It shows that of the 338 prescriptions, 176 (52.07%) are Males while 162 (47.93%) were Females. Majority of the individuals were in the age of 26 – 35 years, 48.09% for Males and 51.91% for Females; while minority were in the age bracket of 56 – 65 years, 55.81% for Males and 44.19% for Females [Table 1].

Table 1 Study population prescriptions by gender and age

S/n		Frequency (%)
1.	Gender	
	Male	176 (52.07)
	Female	162 (47.93)
2.	AGE (YEARS)	
	Male	
	18 – 25	27 (58.70)
	26 – 35	63 (48.09)
	36 – 45	32 (52.46)
	46 – 55	30 (52.63)
	56 – 65	24 (55.81)
	Female	
	18 – 25	19 (41.3)
	26 – 35	68 (51.91)
	36 – 45	29 (47.54)
	46 – 55	27 (47.37)
	56 – 65	19 (44.19)

3.2. Cost Analysis

3.2.1. Oral typical antipsychotics

The oral typical antipsychotics prescribed were haloperidol (5mg and 10mg), Chlorpromazine (100mg, 200mg, and 300mg), and Trifluoperazine (5mg and 10mg).

Haloperidol was the most prescribed (54.8%) oral typical antipsychotics. The 5mg/day (7.9%) of Haloperidol were prescribed each at monthly cost of ₦450.00 (\$1.06) with 0.3 day wage to pay for the medicine, while the 10 mg/day (92.1%) were prescribed at monthly cost of ₦900.00 (\$2.12) with 0.7 day wage to pay for the medicine. The mean monthly cost \pm STD of Haloperidol is ₦867.85 \pm 115.9. [Table 2]

Chlorpromazine prescriptions of 100mg/day (57.4%) gave monthly cost of ₦900.00 (\$2.12) with 0.7 day wage to pay; 200mg/day (5.0%) gave monthly cost of ₦1,800.00 (\$4.25) with 1.3 days wage to pay; while 300mg/day (37.6%) gave monthly cost of ₦2,700.00 (\$6.37) with 2 days wage to pay for chlorpromazine. The mean monthly cost \pm STD is ₦1621.78 \pm 859.2.[Table 2]

The least prescribed of oral typical antipsychotics is Trifluoperazine (14.8%). Trifluoperazine prescriptions of 5mg/day (8.2%) and 10 mg/day (91.8%) gave monthly costs of ₦600.00 (\$1.42) with 0.4 day wage to pay, and ₦900.00 (\$2.12) with 0.7 day wage to pay, respectively. The mean monthly cost \pm STD of Trifluoperazine is ₦875.51 \pm 82.1. [Table 2]

3.2.2. Oral atypical antipsychotics

Oral atypical antipsychotic for patients with Schizophrenia that were prescribed during the period were Risperidone (2mg & 3mg), Olanzapine (5mg & 10 mg), and Aripiprazole (5mg & 10mg).

The most prescribed oral atypical antipsychotic was Olanzapine, 43.8%. The prescriptions of 5mg/day (19.6%) and 10mg/day (80.4%) gave monthly costs of ₦3,000 (\$7.08) with 2.2 days wage to pay and ₦6,000 (\$14.6) with 4.4 days wage to pay, respectively. The mean monthly cost \pm STD of Olazepine is ₦5413.04 \pm 1190.1.

3.2.3. Parenteral antipsychotics

The parenteral antipsychotics prescribed within the studied period were Fluphenazine deconate (25mg & 50mg), Haloperidol (50mg & 100mg), Chlorpromazine (50mg), Flupenthixol (20mg & 40mg).

Fluphenazine was the most prescribed (64.6%). 25mg daily was mostly prescribed (88.1%) which gave the monthly cost of ₦900.00 (\$2.12) with day's wage to pay of 0.7 day; and 50 mg daily gave a monthly cost of ₦1,800.00 (\$ 4.24) with day's wage to pay of 1.3 days.

The least prescribed was Chlorpromazine (6.2%) with 50 mg daily as the only prescribed daily dose, with monthly cost of ₦700.00 (\$1.65) and day's wage to pay of 0.5 day.

Flupenthixol was the most expensive of the parenteral antipsychotics with ₦8,000 (\$18.88) and ₦10,000 (\$23.60) for 20mg/day and 40mg/day respectively for monthly costs. The day's wage to pay was 5.9 days for prescriptions of 20 mg/day, and day's wage to pay of 7.3 days for prescriptions of 40mg/day.

3.2.4. Parenteral anticholinergic(s)

Biperden was the only parenteral anticholinergic prescribed with prescribed daily doses of 5mg and 10mg. The monthly cost of 5mg was ₦1,500 (\$3.54) with day's wage to pay of 1.1 days; while the monthly cost of 10mg was ₦3,000 (\$7.08) with day's wage to pay of 2.2 days.

3.2.5. Parenteral Benzodiazepines

Diazepam (10mg/day and 20mg/day) was the only parenteral benzodiazepine prescribed. The 10mg of diazepam (28.6%) IM to repeat in 3-4 hours as needed, gave a monthly cost of ₦500.00 (\$1.18) with a day's wage to pay of 0.4 days, and 20 mg of diazepam (71.4%) IM to repeat in 3 – 4 hours as needed, gave a monthly cost of ₦1,500.00 (\$3.54) with day's wage to pay of 1.1 days. The mean monthly cost \pm STD is ₦1, 214.00 \pm 451.8

3.2.6. Oral anticholinergic

Trihexyphenidyl (5mg/day, 10mg/day, and 15mg/day) was the only anticholinergic prescribed to calm the possible side effects of the antipsychotics. 5mg/day (5.9%) at monthly cost of ₦1,500.00 (\$3.54), 10 mg/day (93.1%) at monthly cost of ₦3,000.00 (\$7.08), 15mg/day (2.8%) at monthly cost of ₦4,500 (\$10.62), with day's wage to pay of 1.1 days, 2.2days, and 3.3 days respectively.

3.2.7. Oral Benzodiazepines

The oral benzodiazepines prescribed were ; Diazepam (40.0%), Nitrazepam (3.7%) and Clonazepam (51.6%).

Diazepam prescribed were 5mg/day (7.9%) at monthly cost of ₦1,400.00 (\$3.30) with day's wage to pay of 1.0 day and 10mg/day (92.1%) at monthly cost of ₦2,800.00 (\$6.60) with day's wage to pay of 2.0 days. The mean \pm STD is ₦2,689.47 \pm 377.5.

Nitrazepam prescriptions were 10 mg/day and 20 mg/day. 10mg/day (53.9%) had a monthly cost of ₦500.00 (\$1.18) with day's wage to pay of 0.4 day and 20 mg daily (46.1%) had a monthly cost of ₦1,000 (\$ 2.36) with day's wage to pay of 0.7 day. The mean monthly cost \pm STD is ₦730.77 \pm 249.3.

Clonazepam dose strengths prescribed were 1mg/day and 2mg/day. 1mg daily (30.6%) had monthly cost of ₦12,600.00 (\$29.73) with day's wage to pay of 9.2 days, while 2mg daily (69.4%) had monthly cost of ₦25,200.00 (\$59.46) with day's wage to pay of 18.5 days. The mean \pm STD is ₦21,342.86 \pm 5807.10.

Table 2 Doses and Costs of psychotropic medications

Class of Drug	Prescribing frequency (N) (%)	Strength (N) (%)	Monthly drug cost (₦)	Monthly drug cost (\$)	Daily drug cost (₦)	Day's Wages to Pay for Medicine	Prescribed daily dose	Mean Monthly cost ± STD (₦)
<i>Oral Antipsychotics</i>								
Typical antipsychotics	(N = 332)							
T. Haloperidol	182 (54.8)	5mg (13) (7.1)	450	1.06	15	0.3	5 mg to 10 mg daily	867.85 ± 115.9
		10mg(169) (92.9)	900	2.12	30	0.7		
T.Chlorpromazine	101 (30.4)	100mg(58) (57.4)	900	2.12	30	0.7	100 mg to 300 mg daily	1621.78 ± 859.2
		200mg (5) (5.0)	1,800	4.25	60	1.3		
		300mg(38) (37.6)	2,700	6.37	90	2.0		
T. Trifluoperazine	49 (14.8)	5mg (4)(8.2)	600	1.42	20	0.4	5 mg to 10 mg daily	875.51 ± 82.1
		10mg (45) (91.8)	900	2.12	30	0.7		
Atypicals antipsychotics	N = 315							
T. Risperidone	131 (41.6)	2mg(113) (86.3)	3,000	7.08	100	2.2	2 mg to 3 mg daily	3206.10 ± 516.4
		3mg (18) (13.7)	4,500	10.62	150	3.3		
T. Olanzapine	138 (43.8)	5mg (27) (19.6)	3,000	7.08	100	2.2	5 mg to 10 mg daily	5413.04 ± 1190.1
		10mg(111) (80.4)	6,000	14.16	200	4.4		
T. Aripiprazole	46 (14.6)	5 mg (5) (10.9)	4,500	10.62	150	3.3	5 mg to 10 mg daily	5836.95 ± 466.9
		10mg (41) (89.1)	6,000	14.16	200	4.4		
<i>Parenteral Antipsychotics</i>								
Inj. Fluphenazine decanoate	42 (64.6)							
		25mg (37) (88.1)	900	2.12	30.0	0.7	25 mg to 50 mg IM every 2 weeks	1007.14 ± 291.5
		50mg (5) (11.9)	1,800	4.24	60.0	1.3		
Inj. Haloperidol deconoate	08 (12.3)	50mg (2) (25.0)	600	1.42	20.0	0.4		1050.00 ± 259.8

		100mg (6) (75.0)	1,200	2.83	40.0	0.9	50 mg to 100mg IM monthly	
Inj. Chlorpromazine	04 (06.2)	50mg (4) (100.0)	700	1.65	23.3	0.5	50 mg IM monthly	700.00 ± 0.0
Inj.Flupenthixol	11 (16.9)	20mg (5) (45.5)	8,000	18.88	226.7	5.9	20 mg to 40 mg IM every 2 weeks	9090.90 ± 995.9
		40mg (6) (54.5)	10,000	23.60	333.3	7.3		
<i>Parenteral Anticholinergic(s)</i>	N = 19							
Inj. Biperiden	19 (100.0)	5mg (14) (73.7)	1500	3.54	50.0	1.1	5mg to 10 mg IM Monthly	1894.74 ± 660.5
		10 mg (5) (26.3)	3000	7.08	100.0	2.2		
<i>Parenteral Benzodiazepines</i>	N = 07							
Inj.Diazepam	07 (100.0)	10mg (2) (28.6)	500	1.18	16.7	0.4	10 mg IM, then repeat in 3-4 hrs as needed.	1214 ± 451.8
		20mg (5) (71.4)	1500	3.54	50.0	1.1		
<i>Oral Anticholinergic(s)</i>	N = 289							
T. Trihexyphenidyl	289 (100.0)	5mg (17) (5.9)	1500	3.54	50.0	1.1	5 mg to 15 mg daily	2953.29 ± 438.7
		10mg(264) (91.3)	3000	7.08	100.0	2.2		
		15mg (8) (2.8)	4,500	10.62	150.0	3.3		
<i>Oral Benzodiazepines</i>	N = 95							
*Diazepam	38 (40.0)	5mg (3) (7.9)	1,400	3.30	46.7	1.0	5mg to 10mg daily for 14 days	2689.47 ± 377.5
		10mg (35) (92.1)	2,800	6.60	93.3	2.0		
*Nitrazepam	13 (3.7)	10mg (7) (53.9)	500	1.18	16.7	0.4	10mg to 20mg daily for 10 days	730.77 ± 249.3
		20mg (6) (46.1)	1,000	2.36	33.3	0.7		
*Clonazepam	49 (51.6)	1mg (15) (30.6)	12,600	29.73	420.0	9.2	1mg to 2mg daily for 14 days	21342.86± 5807.1
		2mg (34) (69.4)	25,200	59.46	840.0	18.5		

STD – Standard deviation, T – Tablet, Inj – Injection, * - Medicines not taken up to one month.

4. Discussions

The medication costs and affordability of the psychotropic medicines are of great importance in management of patients with schizophrenia, since the illness is mostly life-long. High prices and unaffordability of the medications by the patients can lead to non-adherence to the medication use.

4.1. Antipsychotics

Antipsychotics are the main stay in management of patients with schizophrenia; they are grouped into typical and atypical antipsychotics. In terms of efficacy, none of the groups are better, but the typical antipsychotics have more side effects compared to the atypical antipsychotics. The typical antipsychotics were frequently prescribed in the hospital and were quite affordable for Nigeria patients except in cases of high doses. However, none of the atypical antipsychotics were affordable for the patients. This result is similar to the result of a study conducted in Benin city Nigeria to assess the affordability of antipsychotics for management of Schizophrenia [10] which showed that the atypical antipsychotics are far less affordable. Majority of the parenteral antipsychotics were affordable except Flupenthixol which seemed to be very expensive and unaffordable.

4.2. Anticholinergics/Benzodiazepines

In psychiatry, anticholinergics are mostly prescribed to reduce or prevent unwanted extrapyramidal side effects that are often associated with antipsychotics [11] while the benzodiazepines are considered in patients agitation, severe anxiety, insomnia, catatonia, akathisia and alcohol withdrawal [12]. The anticholinergics (oral and parenteral) and oral clonazepam (benzodiazepine) were not affordable to Nigeria patients with Schizophrenia, whereas other benzodiazepines can be considered affordable to this group of patients.

5. Conclusion

Apart from the typical (First generation) antipsychotics and few classes of benzodiazepines, all the psychotropic medicines for management of patients with schizophrenia in Nigeria are expensive and unaffordable.

Limitations of the study

Although the research was diligently done, there were few limitations. Firstly, there are variations that can put the patients at risk of catastrophic pharmaceutical expenditure considering cases of polypharmacy, and disease conditions of the individuals. Secondly, there was no other structured wage for assessment of affordability except the Nigeria government workers minimum wage payment. Thirdly, the cost of medicines in Nigeria varies and changes with time.

Recommendations

We recommend Nigeria government and Non-governmental organizations intervention on the use of Psychotropic medicines in Nigeria, by finding means of reimbursement or make psychotropic medicines free for all the patients with schizophrenia.

Compliance with ethical standards

Acknowledgement

Authors thank all the Staff of the institution for the support. Special thanks go to Dr. K. Obiechina (Consultant Psychiatrist) and all the staff of the pharmacy unit of the institution.

Disclosure of conflict of interest

No conflict of interest identified.

Statement of informed consent

Informed consent was received from the hospital management before the study.

References

- [1] Oloniniyi IO, Akinsulore A, Aloba OO, Mapayi BM, Oginni OA, Makanjuola R,. Economic Cost of Schizophrenia in a Nigerian Teaching Hospital. *J Neurosci Rural Pract.* 2019 Jan-Mar; 10(1): 39-47. doi: 10.4103/jnrp.jnrp_210_18.PMID: 30765969; PMCID: PMC6337973.
- [2] Nigeria population (2024) – Worldometer. www.worldometers.info> Nigeria.population
- [3] Okeke, V. How out-of-pocket medical bills render sick Nigerians poor. Centre for Social Justice. 2022 April 13.
- [4] Moshood, Y. High drug cost major challenge for mental health care- psychiatrist. *Punch* 2021,10th October.
- [5] Onyeiwu, S. Nigeria’s minimum wage has never protected workers from poverty: here’s why. *The conversation*, 2024 May 5.
- [6] US Dollar (USD) To Nigerian Naira (NGN) Exchange Rate History for September 2, 2022. www.exchange-rates.org.
- [7] World Health Organization. *Measuring medicine prices, availability, affordability and price components.* 20082nd Edition
- [8] Niens LM., Van de PoelE, Camero A, Ewen M, Laing R, & Brouwer WB. Practical measurement of affordability; an application to medicines. *Bulletin of the World Health Organization* 2012; 90 : 219 – 227.
- [9] Krejcie R, Morgan D,. Determining sample size for research activities. *Education and Psychological Measurement.* 1970; 30 (3): 607 – 610.
- [10] Edefo JW, Usifo SF, Udezi AW, Egharevba J. Affordability of Antipsychotic Medications of Respondents who are being managed for Schizophrenia in Benin city, Nigeria. *South Asia Research Journal of Pharmaceutical Sciences.*2020; 2(6) : 94 – 102.
- [11] Pereira SR, Albert M. Anticholinergic discontinuation for antipsychotic induced extra-pyramidal symptoms. *Cochrane Database Syst Rev.* 2017; 22 (3): CD012525.
- [12] The RoyalAustralian&New Zealand College of Psychiatrists. *Guidance for the use of benzodiazepines in psychiatric practice. Professional Practice Guideline 5.* 2019.