

BRIEF REPORT

COST VARIABILITY OF ANTIPSYCHOTICS ACCORDING TO PHARMACEUTICAL ESTABLISHMENTS IN LIMA, PERU

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ABSTRACT

The objectives of the study were to determine the cost variability of antipsychotics in public (hospitals) and private pharmaceutical establishments (pharmacies and clinics), calculate the cost variability of antipsychotics between establishments and estimate the cost of monthly maintenance treatment with antipsychotics. A cost analysis study was performed, unit costs of antipsychotics were obtained from the Peruvian Pharmaceutical Products Observatory. The results show that the cost variability of antipsychotics was greater in pharmacies and clinics than in hospitals, and the analysis of cost variability between pharmaceutical establishments showed that the cost of an antipsychotic in a pharmacy and clinic was 1.3 to 140 times and 2.8 to 124 times, respectively, the cost of the drug in a hospital. The cost of monthly maintenance treatment varied from S/ 3 to S/ 2130 according to the drug and pharmaceutical establishment.

Keywords: Costs and Cost analysis; Antipsychotic Agents; Schizophrenia; Mental Disorders; Peru (source: MeSH NLM).

INTRODUCTION

Antipsychotics are a group of drugs used in the treatment of various mental disorders. These drugs are considered the cornerstone of treatment for psychotic disorders⁽¹⁾. Some of these have been approved for the treatment of bipolar disorder⁽²⁾, or are used in an unapproved way in the obsessive-compulsive disorder and personality disorder^(3,4). Antipsychotics are effective in reducing the symptoms of psychosis and differ in the profile of side effects they can produce⁽⁵⁾. These drugs should be taken daily (oral) or periodically (deposit) to avoid relapses and to help in the recovery process^(6,7). It is therefore important that health systems can ensure access to these drugs.

Patients receiving antipsychotics, who are users of the Integral Health Insurance (SIS), receive the drugs free of charge in the Ministry of Health (MINSA) facilities. However, access to these drugs in MINSA institutions is limited since only 78% of the institutes, 64% of the hospitals, 8% of the centers, and 1% of the medical posts have antipsychotics⁽⁸⁾. This situation leads patients to buy their medicines in private pharmacies at a higher cost, with the consequent increase in out-of-pocket expenses⁽⁸⁾. Relapses can also occur because of reducing the dose or even discontinuing treatment because patients cannot afford it. Clinical relapses, in turn, lead to higher expenses for the health system due to the use of more expensive services such as emergency or hospitalization⁽⁹⁾.

The costs of antipsychotics vary widely in the marketplace. The cost variability (ratio of lowest to highest cost) of risperidone in India is 1 to 16, and olanzapine 1 to 12; the variability of these drugs in Brazil is 1 to 35,000 and 1 to 79, respectively^(10,11). Antipsychotics can have high costs, which results in less access to these drugs and the possibility that patients may not be able to continue treatment. In Peru, one report showed wide variations in the cost of drugs,

Citation: Valle R. Variabilidad de costos de antipsicóticos según establecimientos farmacéuticos en Lima, Perú. 2020;37(1):67-73. Doi: <https://doi.org/10.17843/rpmesp.2020.371.4899>

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Received: 20/10/2019
Approved: 12/02/2020
Online: 23/03/2020

with the cost of a drug being ten times higher in a private pharmacy than in a public one⁽¹²⁾. However, the variability of antipsychotic costs has not been specifically studied.

The objectives of the study are to determine the variability of antipsychotic costs in public (hospitals) and private (pharmacies and clinics) pharmaceutical establishments, to estimate the variability of antipsychotic costs between pharmaceutical establishments and to estimate the cost of monthly treatment maintenance with antipsychotics in monotherapy.

THE STUDY

This is a cost analysis partial economic study according to the user's perspective. The unit costs of antipsychotics were obtained from the Peruvian Observatory of Pharmaceutical Products (OPPF) of the General Directorate of Medicines, Supplies and Drugs (DIGEMID), where pharmaceutical establishments post information on the costs of drugs⁽¹³⁾. Peru's Single National Request for Essential Medicines contains the generic names of the antipsychotics entered into the search engine, other antipsychotics used in psychiatric care were also included⁽¹⁴⁾. The search provided information on the pharmaceutical establishment, date of data update, product name, laboratory name, unit cost, and technical information of the product.

Public pharmaceutical establishments in MINSA and DIGEMID hospitals were categorized as "hospitals"; pharmaceutical establishments like apothecaries and private pharmacies were categorized as "pharmacies"; and pharmaceutical establishments such as private clinics were categorized as "clinics". In addition, antipsychotics whose name corresponded to the International Non-proprietary Names for Pharmaceutical Substances (INN) were categorized as "generics"; those whose name corresponded to the drug studied in a pharmacological research and which obtained the patent were categorized as "innovative drugs"; and antipsychotics which were listed under a trade name, but different from that of the innovative drugs, were categorized as "branded generics"⁽¹⁵⁾.

The descriptive analysis consisted of calculating the median, minimum and maximum value of the cost of the antipsychotic according to the type of drug and pharmaceutical establishment. The cost variability analysis by antipsychotic compared the minimum and maximum cost of an antipsychotic of the same formulation dispensed by the same type of pharmaceutical establishment. The analysis of cost variability between pharmaceutical facilities compared the median cost of an antipsychotic in a hospital with that of a pharmacy and a clinic. The estimate of the cost of monthly

KEY MESSAGES

Motivation for the study: Although antipsychotics are useful for the management of several mental disorders and must be taken for a long time, these can be expensive, making access to these medicines difficult.

Main findings: The unit cost and monthly treatment with antipsychotics is higher in pharmacies and clinics than in hospitals. The cost of monthly treatment varies from S/3 to S/2,130 depending on the drug and pharmaceutical establishment.

Implications: Public hospitals must ensure that they have enough antipsychotics supply so that users of these drugs do not have problems in obtaining them.

maintenance treatment with antipsychotics in monotherapy was made based on the upper limit of the maintenance dose range of each antipsychotic according to the international consensus study on dosage⁽¹⁶⁾. The analysis was performed with the statistical program Stata v12 (StataCorp LP, College Station, TX, USA).

RESULTS

Data on 11 antipsychotics was available from the OPPF as of July 5th, 2019: six of first-generation and five of second-generation. Data had been entered at the OPPF between May 5th and July 4th, 2019. Only three antipsychotics were available as innovative drugs: haloperidol decanoate (Haldol decanoes), quetiapine (Seroquel) and olanzapine (Zyprexa). The data were reported mostly by pharmacies (77.4%-99.9%), followed by hospitals (0.1%-100%) and clinics (0.1%-6.5%) (Table 1).

Antipsychotic costs

The median of the unit costs of oral antipsychotics was lower in hospitals than in pharmacies and clinics. Median costs of antipsychotics in hospitals ranged from S/ 0.1 (haloperidol) to S/ 1.3 (aripiprazole), in pharmacies from S/0.68 (chlorpromazine) to S/ 24.0 (olanzapine) and in clinics from S/ 0.5 (haloperidol) to S/ 38.9 (olanzapine). The median costs of generic antipsychotics were lower than branded generic ones (except for risperidone sold in hospitals), and their costs were lower than those of the innovative drugs. This trend was also observed for haloperidol decanoate. Fluphenazine decanoate was only available in hospitals at a (median) cost of S/ 9.5 (Table 2).

Cost variability by antipsychotic, and between pharmaceutical establishments

The greatest variability in hospital costs was 1 to 6.5 for generics (chlorpromazine) and 1 to 6 (olanzapine) for brand generics. In pharmacies, the greatest variability in generics was 1 to 24.5 (risperidone), in branded generics was 1 to 59 (olanzapine) and in innovative drugs was 1 to 1.6 (haloperidol decanoate). In clinics, the highest variability in generics was 1 to 30 (risperidone), in branded generics was 1 to 11 (olanzapine) and in innovative drugs was 1 to 5.1 (olanzapine).

The greatest variability in costs between hospitals and pharmacies was described for haloperidol (1 to 9) and in branded generics for risperidone (1 to 140). Between hospitals and clinics, the highest cost variability regarding generics, was for trifluoperazine (1 to 20.3) and in branded generics was for risperidone (1 to 124) (Table 3).

Cost of monthly treatment

The maintenance cost of monthly treatment with antipsychotics was lower in hospitals than in pharmacies and clinics. The monthly treatment cost varied from S/ 3 (generic/ haloperidol) to S/ 144 (levomepromazine/branded generic) in hospitals, from S/ 27 (haloperidol/generic) to S/ 1,560 (olanzapine/innovative) in pharmacies from S/ 15 (haloperidol/generic) to S/ 2,130 (olanzapine/innovative) in clinics. Treatment cost in pharmacies and clinics with generic, risperidone, quetiapi-

ne and levomepromazine (pharmacies only) was higher than with their branded generics in hospitals. The cost of monthly treatment in hospitals with haloperidol decanoate (S/ 70.5) was almost double that of fluphenazine decanoate (S/ 38) (Table 4).

DISCUSSION

The study provides an economic perspective on the cost of antipsychotics and the treatment cost of these drugs. The results show that the cost variation is greater in private pharmaceutical establishments (pharmacies and clinics) rather than in public establishments (hospitals). The selling price of a drug in this sector cannot exceed 25% of its purchase price⁽¹⁷⁾ this could be the cause for the small variability of antipsychotic costs in hospitals. While the high variability of costs in pharmacies and clinics could be due to the lack of regulation in the antipsychotic drug costs⁽¹⁸⁾. Thus, the different type of regulation between the public and private sectors would explain the differences in the variability of the costs of antipsychotics.

It has been argued that the higher cost in private establishments is because these centers sell “brand” medicines with a purchase cost higher than that of the generic ones⁽¹²⁾, and because the public sector makes corporate purchases that allow the public sector to sell medicines at a low cost. In contrast, our study shows that some generic branded antipsy-

Table 1. Availability of antipsychotics by pharmaceutical establishment and type of drug in Lima

Antipsychotics	Pharmaceutical establishment						Drug type						
	Total ^a	Hospital		Pharmacy		Clinic		Generic		Branded generic		Innovative	
		n	%	n	%	n	%	n	%	n	%	n	%
First generation													
Haloperidol	548	12	2.2	535	97.6	1	0.2	548	100	0	0	0	0
Trifluoperazine	910	9	0.9	900	98.9	1	0.1	910	100	0	0	0	0
Clorpromazine	503	10	1.9	485	96.4	8	1.6	503	100	0	0	0	0
Levomepromazine	62	10	16.1	48	77.4	4	6.5	4	6.5	58	93.6	0	0
Sulpiride	2,007	12	0.6	1,985	98.9	10	0.5	0	0	2,007	100	0	0
Haloperidol d.	934	10	1.1	924	98.9	0	0	10	1.1	6	0.64	918	98.9
Fluphenazine d.	3	3	100	0	0	0	0	3	100	0	0	0	0
Second generation													
Risperidone	5,069	14	0.4	5,034	99.3	21	0.4	2,714	53.5	2,355	46.5	0	0
Quetiapine	2,883	10	0.4	2,869	99.9	10	0.1	107	3.7	2,771	96.1	5	0.2
Aripiprazole	1,899	1	0.1	1,898	99.9	0	0	0	0	1,889	100	0	0
Olanzapine	2,878	4	0.1	2,864	99.5	10	0.4	0	0	1,971	68.5	907	31.5
Clozapine	82	12	14.6	68	82.9	2	2.4	12	14.6	70	85.4	0	0

^a Establishments that supply antipsychotics according to the Peruvian Observatory of Pharmaceutical Products. d: decanoate.

Table 2. Unit cost of antipsychotics according to pharmaceutical establishment and type of drug in Lima

Antipsychotics	Pharmaceutical Establishment (S/) ^b								
	Hospital			Pharmacy			Clinic		
	Median	Min.	Max.	Median	Min.	Max.	Median	Min.	Max.
First generation									
Haloperidol (10 mg)									
Generic	0.10	0.07	0.34	0.90	0.31	6.5	0.50 ^a	0.50	0.50
Trifluoperazine (5 mg)									
Generic	0.36	0.31	0.39	1.3	0.15	1.6	7.3 ^a	7.3	7.3
Chlorpromazine (100 mg)									
Generic	0.55	0.1	0.65	0.68	0.20	1.3	1.8	0.70	2.7
Levomepromazine (100 mg)									
Generic	-	-	-	2.4	2.4	2.4	-	-	-
Branded generic	1.2	0.55	1.2	3.1	2.7	3.8	3.3	2.9	4.4
Sulpiride (200 mg)									
Branded generic	0.15	0.1	0.2	3.9	1.9	5.7	4.4	2.1	6.7
Haloperidol d. (50 mg)									
Generic	23.5	23.5	26.3	-	-	-	-	-	-
Branded generic	-	-	-	49.8	45.5	54.1	-	-	-
Innovative	-	-	-	58.4	51.9	81.9	-	-	-
Fluphenazine d. (25 mg)									
Branded generic	9.5	9.5	9.6	-	-	-	-	-	-
Second generation									
Risperidone (2 mg)									
Generic	0.19	0.05	0.31	1.56	0.33	8.1	2.5	0.31	9.3
Branded generic	0.05	0.03	0.05	7.0	1.4	12.3	6.2 ^a	6.2	6.2
Quetiapine (200 mg)									
Generic	-	-	-	5.7	1.6	5.7	3.5	2.2	4.7
Branded generic	0.58	0.49	2.4	9.2	1.0	19.7	7.9	1.5	10.8
Innovative	-	-	-	13.0	12.8	13.0	-	-	-
Aripiprazole (15 mg)									
Genérico de marca	1.3 ^a	1.3	1.3	10.0	8.0	30.1	-	-	-
Olanzapine (10 mg)									
Branded generic	0.79	0.35	2.1	13.8	0.4	23.7	19.8	4.5	51.4
Innovative	-	-	-	24.0	7.0	35.5	38.9	32.1	41.6
Clozapine (100 mg)									
Generic	0.33	0.15	0.68	-	-	-	-	-	-
Branded generic	-	-	-	6.4	5.8	7.9	7.3 ^a	7.3	7.3

^a There was only one observation; ^b costs less than S/1 are represented with two decimals.
d: decanoate; Min.: minimum; Max.: maximum; hyphen (-): no data was reported.

chotics in hospitals cost less than their generic counterparts sold in pharmacies and clinics. In addition, private pharmacies in Peru have had a merger process that allows them to manage a large part of the market and therefore make corporate purchases⁽¹⁸⁾. In this sense, the high cost of antipsychotics in pharmacies and clinics seems to be exclusively due to market laws and the search for higher profit margins.

The estimate of the cost of monthly maintenance treatment was made based on a monotherapy scheme when polypharmacy,

the joint use of more than one psychotropic drug, is more common⁽¹⁹⁾. Polypharmacy is not supported by evidence and adds higher treatment costs by adding an antipsychotic or other psychiatric drug to the therapeutic scheme; however, it is widely used in our setting. For example, two studies in patients with schizophrenia showed that 40.5% of outpatients and 57% of inpatients received more than one antipsychotic^(20,21). Therefore, the treatment costs in our study only apply to monotherapy treatment and not to polypharmacy treatments whose cost would be higher.

Table 3. Cost variability by antipsychotic and among pharmaceutical facilities in Lima

Antipsychotics	Variability by antipsychotic (ratio between maximum and minimum cost)			Variability between establishments (ratio between medians)	
	Hospital	Pharmacy	Clinica	Pharmacy/Hospital	Clinic/Hospital
First generation					
Haloperidol					
Generic	4.9	21.0	a	9.0	5.0
Trifluoperazine					
Generic	1.3	10.7	a	3.6	20.3
Chlorpromazine					
Generic	6.5	6.5	3.9	1.3	3.3
Levomepromazine					
Generic	-	1.0	-	-	-
Branded generic	2.2	1.4	1.5	2.6	2.8
Sulpiride					
Branded generic	2.0	3.0	3.2	26.0	29.3
Haloperidol d.					
Generic	1.1	-	-	-	-
Branded generic	-	1.2	-	-	-
Innovative	-	1.6	-	-	-
Fluphenazine d.					
Generic	1.0	-	-	-	-
Second generation					
Risperidone					
Generic	6.2	24.5	30.0	8.2	13.2
Branded generic	1.7	8.8	a	140.0	124.0
Quetiapine					
Generic	-	3.6	2.1	-	-
Branded generic	4.9	19.7	7.2	16.0	14.0
Innovative	-	1.0	-	-	-
Aripiprazole					
Branded generic	a	3.8	-	7.7	-
Olanzapine					
Branded generic	6.0	59.0	11.4	17.0	25.0
Innovative	-	1.3	5.1	-	-
Clozapine					
Generic	5.0	-	-	-	-
Branded generic	-	1.4	1.0	-	-

^a There was only one observation.

d: decanoate, Min.: minimum, Max.: maximum; hyphen (-): no data was reported.

The study has some limitations. A report from the Ombudsman's Office found that the coincidence between the cost of medicines in pharmacies and the OPPF was 69.3%⁽¹²⁾, so it is likely that a percentage of the costs of antipsychotics from the OPPF may be different from the costs they have in pharmacies due to a lack of an update or under-reporting by pharmacies. The estimate of the cost of monthly maintenance treatment was made on the basis of recommended doses and not the prescribed doses, so our estimates may differ from the actual cost of treatment. The inference of our results could be

affected if establishments selling antipsychotics do not report them to the OPPF; however, this probability is low since only 6.2% of pharmacies are not registered in the OPPF⁽¹²⁾. On the other hand, the data from the OPPF allowed to overcome problems of reluctance on the part of pharmacies to provide information on the costs of medicines⁽²²⁾, and allowed to know the cost of antipsychotics from a large number of pharmacies that otherwise would have taken high resources.

In conclusion, the results show that the cost variability of antipsychotics is greater in pharmacies and clinics than in

Table 4. Estimate of monthly cost of maintenance treatment with antipsychotics

Antipsychotics	Maintenance Dose (mg) ^a	Monthly cost (S/)			Monthly cost (USD) ^b		
		Hospital	Pharmacy	Clinic	Hospital	Pharmacy	Clinic
First generation							
Haloperidol	10						
Generic		3.0	27.0	15.0	0.9	8.2	4.5
Trifluoperazine	20						
Generic		43.2	156.0	876.0	13.1	47.3	265.5
Chlorpromazine	600						
Generic		99.0	122.4	324.0	30.0	37.1	98.2
Levomepromazine	400						
Generic		-	288.0	-	-	87.3	-
Branded generic		144.0	372.0	396.0	43.6	112.7	120.0
Sulpiride	600						
Branded generic		13.5	351.0	396.0	4.1	106.4	120.0
Haloperidol d.	150						
Generic		70.5	-	-	21.4	-	-
Branded generic		-	149.4	-	-	45.3	-
Innovative		-	155.4	-	-	47.1	-
Fluphenazine d.	100						
Generic		38.0	-	-	11.5	-	-
Second generation							
Risperidone	6						
Generic		17.1	140.4	225.0	5.2	42.5	68.2
Branded generic		4.5	360.0	558.0	1.4	190.9	169.1
Quetiapine	800						
Generic		-	684.0	420.0	-	207.3	127.3
Branded generic		69.6	1,104.0	948.0	21.1	334.5	287.3
Innovative		-	1,560.0	-	-	472.0	-
Aripiprazole	30						
Branded generic		78.0	600.0	-	23.6	181.8	-
Olanzapine	20						
Branded generic		47.4	828.0	1,188.0	14.4	250.9	360.0
Innovative		-	1,440.0	2,130.0	-	436.4	645.5
Clozapine	500						
Generic		49.5	-	-	15.0	-	-
Branded generic		-	960.0	1,095.0	-	290.9	331.8

^a Based on the international consensus study on antipsychotic dosage ⁽¹⁶⁾. The doses are not necessarily comparable. ^b Exchange rate: 1 USD= S/3.3.
d: decanoate; hyphen (-): no data was reported.

hospitals, and the analysis of cost variability between pharmaceutical establishments shows that the cost of an antipsychotic in a pharmacy and clinic can be as much as 1.3 to 140 times and 2.8 to 124 times the cost of the drug in a hospital, respectively. The cost of monthly treatment with antipsychotics in monotherapy varies from S/ 3 to S/ 2,130 depending on the type of drug and pharmaceutical establishment. The

wide variability of antipsychotic costs identified in our study demands that some measures should be taken. The mental health authorities must ensure the supply of antipsychotics in MINSA institutions so that the SIS-affiliated population using these drugs can always receive them, and that users not affiliated to the SIS can buy them at these centers. In addition, health authorities should consider regulating the cost

of antipsychotics in the private market, as is the case in other countries. Finally, physicians who prescribe antipsychotics should know the costs of these drugs, assess the cost of antipsychotics before prescribing them and comply with the technical standard of prescribing generic drugs.

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