Rev Saude Publica 2011;45(1):14-23

Claudiane Salles Daltio[I]

Jair Jesus Mari[II]

Marcos Bosi Ferraz[III]

Direct medical costs associated with schizophrenia relapses in health care services in the city of São Paulo

Custo direto médico-hospitalar de recaída em esquizofrenia em serviços de saúde na cidade de São Paulo

ABSTRACT

OBJECTIVE: To assess direct medical costs associated with schizophrenia relapses in mental health services.

METHODS: The study was conducted in three health facilities in the city of São Paulo: a public state hospital; a Brazilian National Health System (SUS)-contracted hospital; and a community mental health center. Medical records of 90 patients with schizophrenia who received care in 2006 were reviewed. Information on inpatient expenditures was collected and used for cost estimates.

RESULTS: Mean direct medical cost of schizophrenia relapses per patient was US$ 4,083.50 (R$ 8,167.58) in the public state hospital; US$ 2,302.76 (R$ 4,605.46) in the community mental health center; and US$ 1,198.50 (R$ 2,397.74) in the SUS-affiliated hospital. The main component was daily inpatient room rates (87% - 98%). Medication costs varied depending on the use of typical or atypical antipsychotic drugs. Atypical antipsychotic drugs were more often used in the community mental health center.

CONCLUSIONS: Costs associated with schizophrenia relapses support investments in antipsychotic drugs and strategies to reduce disease relapse and the need for mental health inpatient services. Treating patients in a community mental health center was associated with medium costs and added the benefit of not depriving these patients from family life.

DESCRIPTORS: Schizophrenia, economics. Recurrence. Direct Service Costs. Health Care Costs. Mental Health Services.

[I] Programa de Pós-Graduação em Psiquiatria. Escola Paulista de Medicina (EPM). Universidade Federal de São Paulo (Unifesp). São Paulo, SP, Brasil

[II] Departamento de Psiquiatria. EPM-Unifesp. São Paulo, SP, Brasil

[III] Centro Paulista de Economia da Saúde. EPM-Unifesp. São Paulo, SP, Brasil

Correspondence:
Claudiane Salles Daltio
R. Machado Bittencourt 222, Vila Clementino
04044-000 São Paulo, SP, Brasil
E-mail: csdaltio@yahoo.com

Received: 10/26/2009
Approved: 8/23/2010

Article available from: www.scielo.br/rsp

RESUMO

OBJETIVO: Avaliar o custo direto médico-hospitalar da recaída em esquizofrenia, em serviços em saúde mental.

MÉTODOS: Estudo conduzido em três serviços de saúde da cidade de São Paulo: um hospital público estadual, um hospital contratado conveniado ao Sistema Único de Saúde e um centro de atenção psicossocial. Foram analisados 90 prontuários de pacientes portadores de esquizofrenia atendidos durante o ano de 2006. Os recursos utilizados durante a permanência dos pacientes nos serviços foram obtidos e valorados para cálculos das estimativas.

RESULTADOS: O custo direto médico-hospitalar médio da recaída em esquizofrenia, por paciente, foi de R$ 8.167,58 (US$ 4.083,50) no hospital público estadual, R$ 4.605,46 (US$ 2.302,76) no centro de atenção psicossocial e de R$ 2.397,74 (US$ 1.198,50) no hospital conveniado. O principal componente foi o custo com diárias (87% a 98%). O custo com medicação diferiu quanto à utilização de antipsicóticos típicos ou atípicos. O uso de atípicos foi maior no centro de atenção psicossocial.

CONCLUSÕES: O investimento em medicações antipsicóticas e em estratégias que diminuam a recaída e a necessidade de diárias nos serviços, especialmente hospitalares, são justificáveis pela proporção dos custos que estas representam. Tratar a recaída no centro de atenção psicossocial apresentou um custo intermediário, com o benefício de não privar o paciente do convívio familiar.

DESCRITORES: Esquizofrenia, economia. Recidiva. Custos Diretos de Serviços. Custos de Cuidados de Saúde. Serviços de Saúde Mental.

INTRODUCTION

The mean incidence of schizophrenia is one to two cases per 10,000 people per year and its prevalence is 0.7% in adults worldwide.[17] In Brazil, the literature shows inconsistent data, but schizophrenia prevalence is likely higher than that reported, and close to that reported in a meta-analysis by McGrath et al.[18,23] Schizophrenia has a chronic course with an estimated improvement of 40% after five to six years of follow-up.[7]

To assess schizophrenia burden, Knapp et al (2004) reviewed 62 studies and found three major studies on costs associated to schizophrenia from the United States, Canada, and England.[10] The US study estimated a total cost of US$ 62.7 billion in 2002, of which US$ 22.7 billion in direct costs; US$ 7.6 billion in non-medical direct costs and US$ 32.4 billion in indirect costs.[27] The Canadian study estimated a cost of schizophrenia of C$ 6.5 billion in 2004, of which C$ 2.02 billion in direct medical and non-medical costs and C$ 4.83 billion in indirect costs.[5] The English study estimated total schizophrenia-related costs in 2004 and 2005 were £ 6.7 billion, £ 2 billion in direct and £ 4.7 billion in indirect costs.[14] In all three studies the main component of indirect cost was loss of productivity. According to the Global Burden of Disease Assessment, schizophrenia causes a high degree of disability and accounts for 1.1% of all disability-adjusted life years (DALYs), and for 2.8% of all years lived with disability (YLDs).[26]

In Brazil, Leitão et al[12] assessed direct medical-hospital burden of schizophrenia in public health services in the state of São Paulo, Southeastern Brazil, in 1998 and found 81.5% of patients with schizophrenia were covered by the National Health System (SUS). Of these, 3.7% were temporarily admitted to hospitals, 2.3% were permanently admitted, 23% were treated on an outpatient basis and 71% received no regular care. Total direct cost burden of schizophrenia was US$ 191 million, accounting for 2.2% of total health care expenditures. Of this amount, 9.8% went to patients who did not receive regular care, 11% to outpatient care, 30.5% to permanent admissions and 48.7% to temporary admissions.[12]

There are significant differences in resource allocation to mental health between developing and developed countries. In Brazil, in 2005, federal funds to SUS were around US$ 15 billion (US$ 82.7 per capita), of which US$ 358 millions (US$ 1.95 per capita) were allocated to mental health care. The expenditures on mental health were US$ 2.66 per capita in 1995 and US$ 1.95 per capita in 2005, a 26.7% reduction. Mental health expenditures in relation to the total health budget were reduced from 5.8% to 2.3% in Brazil, while in England, mental health expenditures were £ 3.38 billion in 2002–2003 and increased by 22% in 2005–2006.[1,6]

Schizophrenia relapses are directly related to failure to comply with treatment.[8,22] In fact, this is one of the most expensive aspects of the disease. In 2005, re-hospitalization costs in the United States resulting from treatment noncompliance were US$ 1,479 million dollars.[24,21] A similar study in England showed that noncompliance accounted for an almost three-fold increase in service costs.[9] However, there is no consensus on the definition of relapse in schizophrenia. Lader claims that the patient's condition before disease onset, his or her level of functionality before a given episode, episode severity, development of new symptoms, duration and extent to which symptoms affect functioning should all be considered in the event of a new episode.[11] A Delphi Consensus involving experts from the United Kingdom and Ireland did not manage to come to a unanimous agreement regarding the definition of schizophrenia relapse such as recurrence of positive symptoms.[2,4]

The objective of the present study was to assess direct medical costs of schizophrenia relapses in mental health services.

METHODS

Three mental health services from the city of São Paulo, Southeastern Brazil, were selected based on convenience and data accessibility: a public state hospital (PH); a SUS-contracted hospital (CH); and a community mental health center (CMHC). The differences between these three services are type of care provided (full admission in hospitals and partial admission in CMHC) and funding sources. The PH and CMHC are funded by the state while the psychiatric CH has a fee-for-service contract with the state. The highest costs are expected to be seen in the PH.

Relapsed patients were those who required full-time hospitalization in any of the study hospitals or who were undergoing psychiatric intensive care at the CMHC. According to the Brazilian Ministry of Health, psychiatric intensive care involves 13 to 25 visits/month. Inclusion criteria included patients who were diagnosed with schizophrenia regardless of subtype and treated between January 1 and December 31, 2006. CMHC patients were selected from first quarter (2006) records since care authorization for high cost/high complexity procedures describing the type of treatment regimen are filled out on a quarterly basis. Exclusion criteria included: different admission and release diagnoses (90 CH); inconsistencies between admission diagnosis recorded in the database and medical chart (8 PH, 20 CH, 9 CMHC); associated neurological disease (2 PH, 5 CH), hospital stay longer than 90 days (6 PH, 27 CH); and hospital stays starting in 2005 and extending into 2006 (7 PH, 17 CH). The 90-day limit for hospital stay was set to exclude people living in the hospital and those admitted for social reasons. For CMHC patients we also excluded patients who had been hospitalized or dropped out (n = 4), as well as those for whom there were no notes in their medical records (n = 2) during the study period.

We randomly drew medical records for review as follows: 70 medical records from PH (only relapsed patients), 226 from CH (only SUS patients, 85% of all), and 47 from CMHC. We reviewed 53 medical records from PH, 58 from CH and 45 from CMHC until we had a total of 30 medical records for each service that met all inclusion and exclusion criteria.

We collected the following patient data from medical records: socioeconomic condition; clinical status and treatment prior to admission to the service; resources used by each patient in terms of number of psychiatric, psychological and occupational therapy visits; social worker and nursing resources used; clinical consultations; group and family therapy; outside activities; home visits; multidisciplinary team meetings; tests performed and medication taken. These costs where then evaluated along with general and emergency costs related to food, cleaning, safety, laundry, maintenance and administration.

Resource values were obtained from each service. The costs of state-funded standard drugs were obtained from Price Registration and State Health Department website. For non-standard drugs we used average selling price; for medical tests we used the official SUS table. Drug cost was taken from the price list submitted by the seller, except for atypical psychotropic drug olanzapine that was obtained through the government program for high-cost drugs. Human resource costs were obtained from CMHC. These costs include personnel assigned to other locations but included in the CMHC payroll. For currency conversion purposes US$ 1 is approximately R$ 2.00 (R$ 2.16 on June 30, 2006).

Direct medical costs (DMC) were calculated as follows:

DMC = MCM + MCT + MCDR where:
Mean cost of medication (MCM) = Total cost of medication/30 patients; mean cost of tests (MCT) = Total cost of testing/30 patients; mean cost of daily rates (MCDR) = (Human resource costs per month/total patients/30 days + monthly general costs/total patients/30 days + monthly emergency costs/total patients/30 days) x mean length of stay in the service (days)

Since the study was conducted from the point of view of society at large, and because the study period was no longer than one year, no discount rate was applied. The study was approved to the Research Ethics Committee at Universidade Federal de São Paulo (Protocol No. 1782/06, in 12/15/2006). Patient confidentiality was ensured.

Table 1. Clinical and sociodemographic characteristics of relapsed schizophrenia patients by type of health care services. City of São Paulo, Southeastern Brazil, 2006.

Variable	PH n = 30		CMHC n = 30		CH n = 30	
	n	%	n	%	n	%
Gender						
Male	30	100.0	18	60.0	0	0.0
Female	0	0.0	12	40.0	30	100.0
Skin color						
White	22	73.3	24	80.0	20	66.7
Black	7	23.3	2	6.7	4	13.3
Asian	0	0.0	2	6.7	0	0.0
Mixed	1	3.3	2	6.7	6	20.0
Marital status						
Single	24	80.0	18	60.0	22	73.4
Divorced	3	10.0	6	20.0	1	3.3
Married	3	10.0	1	3.3	5	16.7
Widow	0	0.0	0	0.0	1	3.3
Unknown	0	0.0	5	16.7	1	3.3
Children						
Yes	6	20.0	8	26.7	16	53.3
No	21	70.0	18	60.0	13	43.4
Unknown	3	10.0	4	13.3	1	3.3
Education						
Elementary School	13	43.3	16	53.3	10	33.3
High School	9	30.0	10	33.3	3	10.0
Undergraduate	0	0.0	3	10.0	1	3.3
Illiterate	2	6.7	0	0.0	0	0.0
Unknown	6	20.0	1	3.3	16	53.4
Employment status						
Retired	13	43.3	14	46.7	7	23.3
Unemployed	13	43.3	5	16.7	20	66.6
Informal employment	2	6.7	2	6.7	1	3.3
Never worked	1	3.3	2	6.7	0	0.0
Prolonged medical leave	1	3.3	0	0.0	0	0.0
Unknown	0	0.0	7	23.3	2	6.7
Prior outpatient care						
Regular	8	26.7	2	6.7	0	0.0
Irregular	13	43.3	1	3.3	21	70.0
Unknown	9	30.0	27	90.0	9	30.0
Other clinical diseases						
No	18	60.0	23	76.7	16	53.3
Yes	12	40.0	7	23.3	14	46.7
Age (years)						
Mean (SD) Median	36.2 (11.4) 37.0		43.5 (11.7) 45.5		44.4 (11.5) 44.5	
Minimum–Maximum	19–60		19–65		19–73	
Duration of disease (years)						
Mean (SD) Median	15.7 (10.9) 13.5		20.9 (11.1) 20.0		17.8 (11.8) 18.0	
Minimum–Maximum	3–42		4–45		2–50	

PH: public state hospital;
CH: Brazilian National Health System-contracted hospital;
CMHC: community mental health center.

RESULTS

Table 1 shows sociodemographic and clinical status of patients. We found similar age profiles in all three services: mean age of patients 36.2 years old in PH, 43.5 in CMHC, and 44.4 in CH patients. Most were white and single with no differences among services studied. In three services most of patients were out of work – unemployed/not active or retired. The PH only had beds for male patients and the CH had beds for females only; the CMHC served both males and females and 60% of its patients were male. Patients in the three services studied had chronic schizophrenia with mean disorder duration between 15 and 20 years.

Table 2. Components of direct medical costs used in schizophrenia relapse by type of health care services. City of São Paulo, Southeastern Brazil, 2006.

Variable	PH n=30	CMHC n=30	CH n=30
Length of stay (days)			
Mean (SD)	48.2 (17.3)	90.0 (0.0)	49.7 (18.6)
Median	51.0	90.0	48.5
Minimum–Maximum	18–73	90–90	16–88
No. psychiatric visits			
Mean (SD)	16.8 (7.8)	8.3 (5.9)	11.9 (6.3)
Median	16.0	8.0	10.0
Minimum–Maximum	3–34	0–27	4–30
No. psychological sessions (individual)			
Mean (SD)	3.7 (2.6)	1.4 (3.3)	0.3 (1.3)
Median	3.0	0.0	0.0
Minimum–Maximum	0–11	0–12	0–7
No. occupational therapy sessions (individual)			
Mean (SD)	2.1 (1.6)		0.2 (1.3)
Median	2.0	0.0	0.0
Minimum–Maximum	0–7		0–7
No. social worker visits			
Mean (SD)	6.2 (2.8)		1.8 (1.1)
Median	6.0	0.0	2.0
Minimum–Maximum	2–11		0–5
No. group sessions			
Mean (SD)	1.9 (2.3)	0.8 (3.2)	6.3 (2.7)
Median	2.0	0.0	6.5
Minimum–Maximum	0–11	0–15	0–12
No. nursing visits			
Mean (SD)	100.7 (41.1)		31.0 (16.0)
Median	108.0	0.0	27.5
Minimum–Maximum	1–161		0–62
No. family care visits			
Mean (SD)	2.1 (1.1)	1.5 (3.9)	0.8 (1.2)
Median	2.0	0.0	0.0
Minimum–Maximum	0–5	0–14	0–4
No. team meetings for case discussion			
Mean (SD)	6.7 (2.6)		0.2 (0.4)
Median	7.0	0.0	0.0
Minimum–Maximum	2–11		0–1

PH: public state hospital; CH: Brazilian National Health System-contracted hospital; MHC: community mental health center.

There was no record of prior treatment for 90% of patients in CMHC, while 43.3% of patients in PH and 70% in CH had received intermittent prior treatment. Concurrent conditions with the relapse episode were more frequently seen in the hospitals (40% in PH and 46.7% in CH) than in the CMHC (23.3%).

The mean length of stay was similar in both hospitals (48.2 and 49.7 days in PH and CH, respectively), but almost two-fold for CMHC patients included in the quarterly authorization for high cost/high complexity procedures. The number of psychiatric visits, individual therapy, individual occupational therapy, social worker and nursing visits are listed in Table 2. We found no record of occupational therapy, social worker or nursing services in CMHC medical records. Group activities were more often found in CH and team meetings to discuss cases in PH. Family services such as family support provided by the same providers providing care to the patient were available in all three services.

The most common typical antipsychotic drug was haloperidol (76.7% in PH and 80% in CH) while 50% of CMHC patients were on haloperidol decanoate. Of atypical antipsychotics, risperidone was the most prescribed, followed by olanzapine (Table 3). The total amount spent on medication ranged from R$ 42.93 (US$ 21.46) (CH) to R$ 555.06 (US$ 277.53) (CMHC), largely spent on atypical antipsychotic drugs. (Tables 4 and 5)

Of costs that make up the daily rate charged per patient, human resources costs were higher in the PH (R$ 70.83 / US$ 35.41) than in CH and CMHC (R$ 36.32 / US$ 18.16 and R$ 32.08 / US$ 16.04, respectively). Also, general costs per patient per day in the PH were at least seven-fold higher compared to CMHC and CH.

The mean annual direct medical costs of schizophrenia relapses per patient ranged from R$ 2,397.00 (US$ 1,198.50) to R$ 8,167.00 (US$ 4,083.50) for patients treated in the PH, CMHC or CH.

DISCUSSION

The highest individual mean direct medical costs of schizophrenia relapses were seen for patients treated in the PH, followed by CMHC and CH. The major cost component was daily rate, which was higher in the PH. Drug costs varied according to the type of antipsychotic drug used. Low-cost typical antipsychotics were most often used in the CH and atypical antipsychotics were more commonly used in the CMHC.

Table 3. Antipsychotic drug components of direct medical costs used in schizophrenia relapse by type of health care services. City of São Paulo, Southeastern Brazil, 2006.

Antipsychotic	PH		CMHC		CH	
	n	%	n	%	n	%
Typical						
Clorpromazine 100 mg (tb)	12	40.0	3	10.0	6	20.0
Haloperidol 5 mg (tb)	23	76.7	6	20.0	24	80.0
Haloperidol decanoate (amp)	13	43.3	15	50.0	2	6.7
Levomepromazine 100 mg (tb)	7	23.3	1	3.3	4	13.3
Pipotazine 25 mg (amp)	0	0.0	2	6.7	0	0.0
Tioridazine 100 mg (tb)	0	0.0	1	3.3	0	0.0
Periciazine 4% (amp)	1	3.3	0	0.0	2	6.7
Atypical						
Aripiprazol 10 mg (tb)	0	0.0	0	0.0	0	0.0
Clozapine 100 mg (tb)	1	3.3	2	6.7	0	0.0
Olanzapine 10 mg (tb)	6	20.0	9	30.0	2	6.7
Quetiapine 100 mg (tb)	0	0.0	0	0.0	0	0.0
Risperidone 2 mg (tb)	7	23.3	5	16.7	9	30.0
Ziprazidone 40 mg (tb)	0	0.0	1	3.3	0	0.0
Emergency						
Chlorpromazine 25 mg (amp)	2	6.7	0	0.0	2	6.7
Haloperidol 5 mg (amp)	2	6.7	0	0.0	9	30.0
Levomepromazine (amp)	0	0.0	0	0.0	4	13.3

PH: public state hospital;
CH: Brazilian National Health System-contracted hospital;
CMHC: community mental health center; tb: tablet; amp: ampule.

Relapses are often associated with patient failure to comply with maintenance treatment, and this risk is higher among those with prior history of noncompliance. A recent review by Marcus et al[15] found that 87,000 patients with schizophrenia are admitted to hospitals every year in the United States at a cost of US$ 806 million; most of these admissions are due to failure to comply with outpatient care.[15]

Regarding the use of resources during schizophrenia relapses, we found that, although patients stayed longer in the CMHC (90 days, almost twice the stay in the other two services), the use of professional/activity resources was notably lower. However, this may be explained by poor record keeping. Other possible explanation could be that community center patients have less severe disease compared to other inpatients or that these

Table 4. Price (in US$) of psychotropic drugs components of direct medical costs in schizophrenia relapse by type of health care services. City of São Paulo, Southeastern Brazil, 2006.

Variable	PH n = 30	CMHC n = 30	CH n = 30
Mood stabilizer			
Mean (SD)	0.71 (0.99)	0.24 (0.69)	2.52 (9.31)
Median	0.00	0.00	0.00
Minimum–maximum	0.00–3.53	0.00–3.07	0.00–44.55
Typical antipsychotics			
Mean (SD)	5.19 (7.51)	6.25 (11.18)	5.84 (8.38)
Median	2.02	2.23	2.4
Minimum–maximum	0.00–29.81	0.00–49.76	0.00–14.90
Atypical antipsychotics			
Mean (SD)	70.88 (158.50)	268.5 (394.46)	5.01 (11.82)
Median	0.00	3.70	0.00
Minimum–maximum	0.00–634.08	0.00–1287.24	0.00–57.21
Anticholinergics			
Mean (SD)	1.53 (1.11)	1.42 (1.96)	2.36 (2.19)
Median	1.22	0.87	2.03
Minimum–maximum	0.00–4.04	0.00–851	0.00–9.39
Antidepressants			
Mean (SD)	0.17 (0.96)	0.00 (0.00)	0.29 (1.15)
Median	0.00	0.00	0.00
Minimum–maximum	0.00–5.27	0.00	0.00–6.18
Benzodiazepines			
Mean (SD)	0.20 (0.29)	0.15 (028)	0.72 (0.63)
Median	0.00	0.00	0.67
Minimum–maximum	0.00–092	0.00–0.69	0.00–2.01
Injectable antipsychotics (fast action)			
Mean (SD)	0.15 (0.71)	0.00 (0.00)	0.67 (1.26)
Median	0.00	0.00	0.00
Minimum–maximum	0.00–3.93	0.00	0.00–4.57
Injectable anticholinergics			
Mean (SD)	0.04 (0.11)	0.00 (0.00)	0.22 (0.40)
Median	0.00	0.00	0.00
Minimum–maximum	0.00–0.47	0.00	0.00–1.39
Injectable benzodiazepines			
Mean (SD)	0.01(0.06)	0.00 (0.00)	0.06(0.17)
Median	0.00	0.00	0.00
Minimum–maximum	0.00–0.24	0.00	0.00–0.74

PH: public state hospital; CH: Brazilian National Health System-contracted hospital; CMHC: community mental health center.

Table 5. Direct medical costs in schizophrenia relapse by type of health care services. City of São Paulo, Southeastern Brazil, 2006.

COST (US$)	PH N = 30	CMHC N = 30	CH N = 30
Medication			
Psychotropic drugs			
Mean (SD)	78.7 (158.03)	276.94 (390.97)	16.75 (15.56)
Median	-96	23.72	8.97
Minimum–maximum	1.39–635.25	1.45–1292.1	1.51–61.34
Injectable psychotropic drugs (immediate action)			
Mean (SD)	0.21(0.73)	0.00	0.95(1.60)
Median	0.00		0.00
Minimum–maximum	0.00–3.93		0.00–4.8
Clinical medications			
Mean (SD)	7.90(12.35)	0.59(2.01)	3.76(8.46)
Median	1.04	0.00	0.00
Minimum–maximum	0.00 –50.9	0.00 –9.67	0.00 –37.97
Subtotal			
Mean (SD)	86.81 (156.64)	277.53 (390.92)	21.46 (19.3)
Median	17.52	23.72	13.06
Minimum–maximum	2.43–635.25	1.45–1292.1	1.67–74.43
Tests			
Mean (SD)	14.85 (30.39)	2.72 (9.96)	0.15 (0.81)
Median	0	0	0
Minimum–maximum	0–153.43	0–53.07	0–4.46
Daily rate[a]			
Mean (SD)	3,982.00 (1,424.50)	2,022.50 (0.00)	1,177.51 (439.64)
Median	4,210.75	2,022.50	1,148.25
Minimum–maximum	1,486.00–6,027.00	2,022.00–2,022.00	379.00–2,083.50
Total direct medical costs			
Mean	4083.79	2302.73	1198.87
(SD)	(1478.62)	(389.52)	(445.08)
Median	4361.11	2053.01	1158.68
Minimum–maximum	1489.09–6545.78	2023.93–3314.57	380.73–2106.71

PH: public state hospital; CH: Brazilian National Health System-contracted hospital; CMHC: community mental health center.
[a] Daily rate (cost of room/day) = cost with RH + general costs + emergency costs. PH: US$ 35.41 + US$ 44.02 + US$ 3.12 =US$ 82.56. CMHC: US$ 16.04 + US$ 6.43 + US$ 0.005 = US$ 22.47. CH: US$ 18.16$ + US$ 5.50 + U$ 0.01 = U$ 23.67

patients receiving psychiatric intensive treatment were not actually experiencing a crisis.

The component that most influenced direct medical costs was daily rate charged per patient, with significant variations between services. One possible explanation for these differences would be the efficiency of public versus private management. Another explanation would be the fact that SUS pays the CH for a package of services rather than per procedure, encouraging the CH to keep its costs down. CMHC human resources and general expenses were similar to those in the CH, though lengths of stay in the former were longer, probably because this is not an inpatient situation and therefore there is no pressure to release patients. A study showed that treatment in a community mental health center is less expensive than conventional hospital care and can be more beneficial to the patient's quality of life.[25]

Medication was the second largest component of direct medical costs in all three mental health services, although these costs were much lower than those of daily rates in all cases. The main differences are attributed to the use of typical or atypical antipsychotic drugs and they explain varying costs of care found in the three services. There is no consensus about the superiority of atypical over typical antipsychotic drugs.[13]

Consistent with the literature,[19] none of the three services studied performed a significant number of complementary laboratory tests and their associated costs were relatively insignificant.

The present study has some limitations. We could not confirm the diagnosis of schizophrenia as it requires a personal interview with the patient, which was not feasible in this type of study. Also, we adopted a practical criterion to define schizophrenia relapse. It is also possible that the CMHC sample included relapsed patients but also non-relapsed patients who were institutionalized and remained under psychiatric intensive care. The fact that services are for one sex only can introduce a sampling bias as there are gender differences in schizophrenia prognosis.[3] Another limitations are incomplete records, which may underestimate resource use and costs, and potential bias in cost spreadsheets supplied by the services studied, which were not audited. In addition, it was difficult to obtain certain information from the State Health Department such as cleaning and food costs and in some cases we had to use indirect means to assess costs or approximate costs.

The costs of treating schizophrenia relapses in community mental health centers are at a medium level between those of state and contracted hospitals, with the additional benefit of not depriving patients of their family life. Besides, the use of drugs with fewer potential side effects (atypical antipsychotic) has a positive impact on their quality of life.[16]

Direct medical costs associated with schizophrenia treatment support the investment in strategies that target improved treatment compliance and fewer relapses, as well as the development of antipsychotic drugs aiming at reducing the need for daily care, especially inpatient service. In addition, patients with schizophrenia should undergo routine medical assessment as they usually have concurrent conditions such as weight gain, metabolic syndromes and cardiovascular diseases.[20]

In conclusion, further prospective studies including interviews with patients and their family are needed for better estimating non-medical/hospital direct (e.g., expenditures with transportation, accommodation) and indirect costs (loss of productivity of patients and their family).

REFERENCES

1. Andreoli SB, Almeida-Filho N, Martin D, Mateus MD, Mari JJ. Is psychiatric reform a strategy for reducing the mental health budget? The case of Brazil. *Rev Bras Psiquiatr.* 2007;29(1):43-6. DOI:10.1590/S1516-44462006005000032
2. Burns T, Fiander M, Audini B. A delphi approach to characterising "relapse" as used in UK clinical practice. *Int J Soc Psychiatry*. 2000;46(3):220-30. DOI:10.1177/002076400004600308
3. Chaves AC. Diferenças entre os sexos na esquizofrenia**.** *Rev Bras Psiquiatr.* 2000;22(Suppl 1):21-2. DOI:10.1590/S1516-44462000000500008
4. Fiander M, Burns T. Essential components of schizophrenia care: a Delphi approach. *Acta Psychiatr Scand.* 1998;98(5):400-5. DOI:10.1111/j.1600-0447.1998.tb10105.x
5. Goeree R, Farahati F, Burke N, Blackhouse G, O'Reilly D, Pyne J, et al. The economic burden of schizophrenia in Canada in 2004. *Curr Med Res Opin.* 2005;21(12):2017-28. DOI:10.1185/030079905X75087
6. Goldberg D. Improved investment in mental health services:value for money*? Br J Psychiatry*. 2008;192(2):88-91. DOI:10.1192/bjp.bp.107.042879
7. Hegarty JD, Baldessarini RJ, Tohen M, Waternaux C, Oepen G. One hundred years of schizophrenia: a meta-analysis of the outcome literature. *Am J Psychiatry*. 1994;151(10):1409-16.
8. Kane JM. Treatment adherence and long-term outcomes. *CNS Spectr*. 2007;12(10 Suppl 17):21-6.
9. Knapp M, King D, Pugner K, Lapuerta P. Non-adherence to antipsychotic medication regimens: associations with resource use and costs. *Br J Psychiatry*. 2004;184(6):509-16. DOI:10.1192/bjp.184.6.509
10. Knapp M, Mangalore R, Simon J. The global costs of schizophrenia. *Schizophr Bull.* 2004;30(2):279-93.
11. Lader M. What is relapse in schizophrenia? *Int Clin Psychopharmacol.* 1995;9(Suppl 5):5-9. DOI:10.1097/00004850-199501005-00002
12. Leitão RJ, Ferraz MB, Chaves AC, Mari JJ. Cost of schizophrenia: direct costs and use of resources in the State of São Paulo. *Rev Saude Publica*. 2006;40(2):304-9. DOI:10.1590/S0034-89102006000200017
13. Lieberman JA, Stroup TS, McEvoy JP, Swartz MS, Rosenheck RA, Perkins DO, et al. Effectiveness of antipsychotic drugs in patients with chronic schizophrenia. *N Engl J Med*. 2005;353(12):1209-23. DOI:10.1056/NEJMoa051688
14. Mangalore R, Knapp M. Cost of schizophrenia in England. *J Ment Health Policy Econ*. 2007;10(1):23-41.
15. Marcus SC, Olfson M. Outpatient antipsychotic treatment and inpatient costs of schizophrenia. *Schizophr Bull*. 2008;34(1):173-80. DOI:10.1093/schbul/sbm061
16. Marshall M, Crowther R, Almaraz-Serrano A, Creed F, Sledge W, Kluiter H, et al. Systematic reviews of the effectiveness of day care for people with severe mental disorders: (1) acute day hospital versus admission; (2) vocational rehabilitation; (3) day hospital versus outpatient care. *Health Technol Assess*. 2001;5(21):1-75.
17. McGrath J, Saha S, Chant D, Welham J. Schizophrenia: a concise overview of incidence, prevalence, and mortality. *Epidemiol Rev*. 2008;30(1):67-76. DOI:10.1093/epirev/mxn001
18. Menezes PR, Rodrigues LC, Mann AH. Predictors of clinical and social outcomes after hospitalization in schizophrenia. *Eur Arch Psychiatry Clin Neurosci.* 1997;247(3):137-45. DOI:10.1007/BF03033067
19. Neirinck G, Eneman M, De Cort P. Somatisch onderzoek bij nieuw opgenomen psychiatrische patiënten in Vlaamse algemene psychiatrische ziekenhuizen. *Tijdschr Psychiatr*. 2006;48(3):175-83. DOI:10.4088/JCP.v66n0906
20. Newcomer JW. Antipsychotic medications: metabolic and cardiovascular risk. *J Clin Psychiatry*. 2007;68 (Suppl 4):8-13.
21. Sun SX, Liu GG, Christensen DB, Fu AZ. Review and analysis of hospitalization costs associated with antipsychotic nonadherence in the treatment of schizophrenia in the United States**.** *Curr Med Res Opin*. 2007;23(10):2305-12. DOI:10.1185/030079907X226050
22. Svestka J, Bitter I. Nonadherence to antipsychotic treatment in patients with schizophrenic disorders. *Neuro Endocrinol Lett*. 2007;28(Suppl 1):95-116.
23. Theme-Filha MM, Szwarcwald CL, Souza-Júnior PRB. Socio-demographic characteristics, treatment coverage, and self-rated health of individuals who reported six chronic diseases in Brazil, 2003. *Cad Saude Publica*. 2005;21(Suppl 1):S43-53. DOI:10.1590/S0102-311X2005000700006
24. Weiden PJ, Olfson M. Cost of relapse in schizophrenia. *Schizophr Bull*. 1995;21(3):419-29. DOI:10.1093/schbul/21.3.419
25. Williams R, Dickson RA. Economics of schizophrenia. *Can J Psychiatry*. 1995;40(7 Suppl 2):S60-7.
26. World Health Organization. Mental health: new understanding, new hope. Geneva; 2001.
27. Wu EQ, Birnbaum HG, Shi L, Ball DE, Kessler RC, Moulis M, et al. The economic burden of schizophrenia in the United States in 2002. *J Clin Psychiatry*. 2005;66(9):1122-9. DOI:104088/JCPv66n0906

The authors declare that there are no conflicts of interests.