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Direct Medical Costs for Patients with Schizophrenia: A 4-year Cohort Study from Health Insurance Claims Data in Guangzhou City, Southern China

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Outline

- Introduction
- Objectives
- Methodology
- Results
- Conclusions



Introduction

- Schizophrenia is one of the leading public health issues in psychiatry and is ranked among the top 25 leading causes of disability worldwide.
- In China, a large-scale study estimated a one-month prevalence rate of 0.78%, with similar rates found in rural (0.80%) and urban (0.72%) areas.
- Schizophrenia imposed a heavy financial burden on the healthcare systems.



Introduction

- China expands health insurance coverage to all urban residents with two social health insurance schemes.
- Two urban insurance schemes in China
 - UEBMI**: Urban **Employee** Basic Medical Insurance
(launched in 1998)
 - URBMI**: Urban **Resident** Basic Medical Insurance
(launched in 2007)



Objectives

- This study aims to examine the direct medical costs and the associated factors for patients with schizophrenia in Guangzhou city, Southern China.



Methodology

- This was a **retrospective 4-year cohort study**.
- Data were obtained from urban insurance claims databases of Guangzhou city (UEBMI+URBEMI).
- The study cohort (including all the reimbursement claims submitted for schizophrenia inpatient care during November 2010 and October 2014) was identified using the ICD Tenth version (F20).
- Their outpatient care information was merged from outpatient claims database.



Methodology

- The final sample included **2,971** patients, including 1,760 and 1,211 patients who were insured with the UEBMI and the URBMI, respectively.
- Descriptive analysis and the multivariate regression analysis based on Generalized Estimating Equations (GEE) model were conducted.



Results: Baseline patients characteristics

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Table 2 Baseline patients characteristics

Baseline (2010.11.01–2011.10.31)	Overall	UEBMI	URBMI
No. patients	n= 2971	n= 1760	n= 1211
Gender			
Female	1170.0 (39.4)	736.0 (41.8)	434.0 (35.8)
Male	1801.0 (60.6)	1024.0 (58.2)	777.0 (64.2)
Age (years)			
Mean \pm SD	50.3 \pm 12.7	52.4 \pm 11.8	47.3 \pm 13.5
Age group			
18 \leq age < 30	187.0 (6.3)	66.0 (3.8)	121.0 (10.0)
30 \leq age < 40	379.0 (12.8)	168.0 (9.5)	211.0 (17.4)
40 \leq age < 50	847.0 (28.5)	445.0 (25.3)	402.0 (33.2)
50 \leq age < 60	887.0 (29.9)	625.0 (35.5)	262.0 (21.6)
\geq 60	671.0 (22.6)	456.0 (25.9)	215.0 (17.8)
Hospital level			
Primary	76.0 (2.6)	45.0 (2.6)	31.0 (2.6)
Secondary	905.0 (30.5)	517.0 (29.4)	388.0 (32.0)
Tertiary	1990.0 (67.0)	1198.0 (68.1)	792.0 (65.4)
Length of stay (days)			
Mean \pm SD	254.7 \pm 135.1	244.9 \pm 137.9	268.9 \pm 129.8
Days \leq 100	737.0 (24.8)	482.0 (27.4)	255.0 (21.1)
100 < days \leq 300	501.0 (16.9)	315.0 (17.9)	186.0 (15.4)
> 300 days	1733.0 (58.3)	963.0 (54.7)	770.0 (63.6)
Follow-up no. patients			
First year (2011.11.01–2012.10.31)	2021	1145	876
Second year (2012.11.01–2013.10.31)	1901	1079	822
Third year (2013.11.01–2014.10.31)	1754	988	766



- The cohort had a mean age of 50.3 years old, 60.6% were male, and 67.0% received medical treatment in the tertiary hospitals.
- The average annual length of stay (LOS) was **254.7 days**.
- There were 2,021 patients in the first-year follow-up period, 1,901 patients in the second and 1,754 patients in the third follow-up periods respectively.

Results: Annual direct medical costs per patient-Four periods



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Table 3 Annual direct medical costs per patient by insurance type (Four Periods)

Baseline	Overall n=2971	UEBMI n=1760	URBMI n=1211	P-value
Total costs				
Mean (CNY)	41,972.4	42,543.1	41,143.0	0.021
SD (CNY)	22,741.3	24,250.8	20,330.0	
Out-of-pocket (%)	13.0%	12.7%	13.5%	
Inpatient costs	n=2971	n=1760	n=1211	
Mean (CNY)	41,780.9	42,375.1	40,917.3	0.018
SD (CNY)	22,909.3	24,390.3	20,547.0	
Out-of-pocket (%)	14.3%	14.0%	14.7%	
Reimbursement (%)	76.1%	85.8%	61.5%	
Aid (%)	9.6%	0.2%	23.8%	
Outpatient costs	n=329	n=216	n=113	
Mean (CNY)	191.5	168.0	225.7	0.031
SD (CNY)	747.5	607.2	913.0	
Out-of-pocket (%)	63.6%	53.9%	74.1%	
Reimbursement (%)	36.4%	46.1%	25.9%	
Follow-up: first year	Overall n=2021	UEBMI n=1145	URBMI n=876	P-value
Total costs				
Mean (CNY)	55,934.5	57,369.7	54,058.6	< 0.001
SD (CNY)	19,779.9	21,320.6	17,397.7	
Out-of-pocket (%)	12.3%	10.7%	14.5%	
Inpatient costs	n=2021	n=1145	n=876	
Mean (CNY)	55,887.6	57,332.8	53,998.5	< 0.001
SD (CNY)	19,851.0	21,376.4	17,492.4	
Out-of-pocket (%)	12.9%	11.2%	15.2%	
Reimbursement (%)	77.6%	88.8%	62.1%	
Aid (%)	9.5%	0.0%	22.7%	
Outpatient costs	n=69	n=41	n=28	
Mean (CNY)	47.0	36.9	60.1	0.676
SD (CNY)	339.7	273.3	410.5	
Out-of-pocket (%)	67.0%	55.5%	76.4%	
Reimbursement (%)	32.9%	44.6%	23.6%	

Follow-up: second year	Overall n=1901	UEBMI n=1079	URBMI n=822	P-value
Total costs				
Mean (CNY)	55,778.4	57,326.6	53,746.0	< 0.001
SD (CNY)	18,646.0	20,107.1	16,323.7	
Out-of-pocket (%)	8.7%	10.7%	5.9%	
Inpatient costs	n=1901	n=1079	n=822	
Mean (CNY)	55,732.3	57,287.6	53,690.7	< 0.001
SD (CNY)	18,725.5	20,178.4	16,416.4	
Out-of-pocket (%)	8.7%	10.7%	5.9%	
Reimbursement (%)	77.7%	88.9%	62.1%	
Aid (%)	13.6%	0.4%	32.0%	
Outpatient costs	n=44	n=22	n=22	
Mean (CNY)	46.1	39.0	55.3	0.356
SD (CNY)	379.8	360.5	403.8	
Out-of-pocket (%)	68.6%	58.1%	78.4%	
Reimbursement (%)	31.3%	41.9%	21.6%	
Follow-up: third year	Overall n=1754	UEBMI n=988	URBMI n=766	P-value
Total costs				
Mean (CNY)	56,544.1	60,163.7	51,875.6	< 0.001
SD (CNY)	21,283.6	22,155.4	19,130.6	
Out-of-pocket (%)	8.2%	9.5%	6.1%	
Inpatient costs (n=1229)	n=1754	n=988	n=766	
Mean (CNY)	56,502.7	60,145.2	51,804.5	< 0.001
SD (CNY)	21,346.2	22,195.0	19,218.0	
Out-of-pocket (%)	8.1%	9.5%	6.0%	
Reimbursement (%)	77.6%	88.1%	61.9%	
Aid (%)	14.3%	2.4%	32.1%	
Outpatient costs	n=34	n=14	n=20	
Mean (CNY)	41.4	18.4	71.1	0.069
SD (CNY)	480.4	273.5	656.4	
Out-of-pocket (%)	76.6%	57.4%	83.0%	
Reimbursement (%)	23.4%	42.8%	17.0%	

Results: Annual direct medical costs per patient-Four periods



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- In the baseline period, the mean annual total direct medical costs per patient was **CNY41,972.4 (US\$6,852.5)** and the vast majority was inpatient costs: mean inpatient costs (CNY41,780.9, US\$6,821.3) versus mean outpatient costs (CNY191.5, US\$31.3).
- During the three-year follow-up periods, the per capita total medical costs (constant 2014 price) increased to CNY55,934.5 (US\$9,132.0), CNY55,778.4 (US\$9,106.5) and **CNY56,544.1 (US\$9,231.5)**.
- The inpatient costs remained as the key component of the total medical costs in the follow-up three periods.

Results: Annual medical costs by insurance types



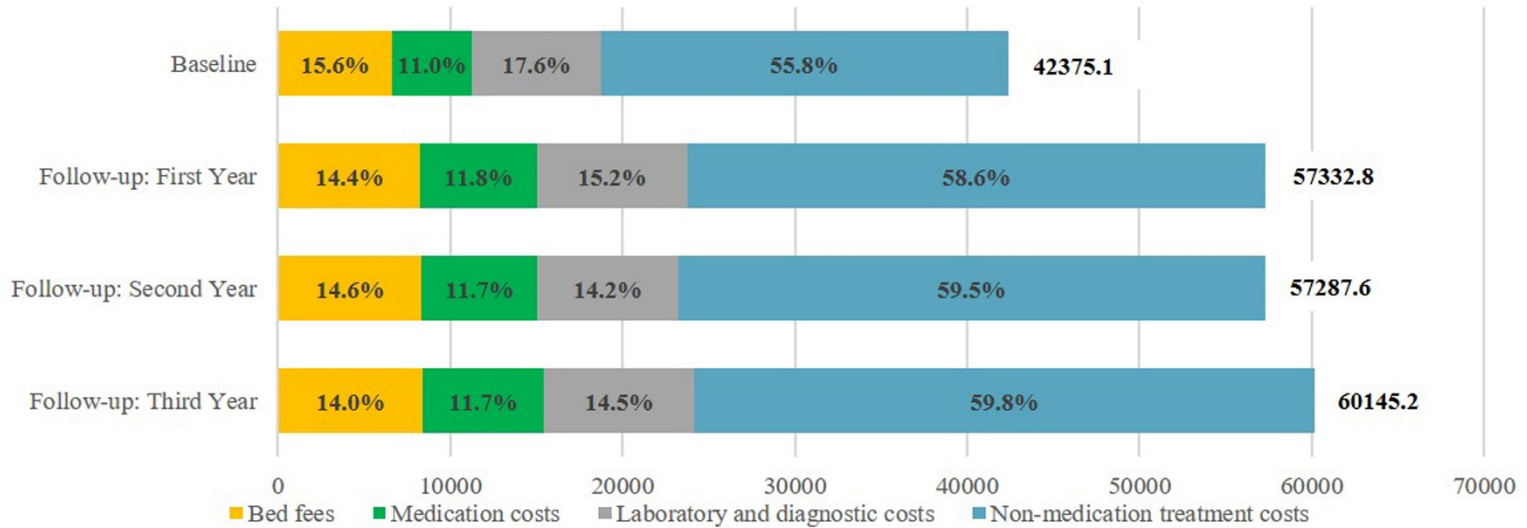
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- The mean total medical costs for the UEBMI group was **higher** than the URBMI group during the baseline and three-year follow-up periods ($P < 0.05$).
- In the baseline period, the UEBMI enrollees with schizophrenia had **higher** average costs for hospitalization (CNY42,375.1) than the URBMI enrollees (CNY40,917.3), and had higher reimbursement rate (85.8% and 61.5%).



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Results: Inpatient costs and composition



Composition of inpatient costs (CNY) (UEBMI)



Composition of inpatient costs (CNY) (URBMI)



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Results: Inpatient costs and composition

- Regarding cost composition, **the non-medication treatment costs accounted for the biggest proportion** of total inpatient costs for both UEBMI (55.8%) and URBMI (64.7%) schemes.
- However, the smallest cost component in the UEBMI group was medication costs (11.0%), while the smallest cost component in the URBMI group was laboratory and diagnostic costs (7.2%).



Results: Predictors of inpatient costs

Table 6 Factors associated with total inpatient costs (GEE Model)

	Overall			UEBMI			URBMI		
	n = 2971			n = 1760			n = 1211		
	Coef.	Std. err.	Marginal effect	Coef.	Std. err.	Marginal effect	Coef.	Std. err.	Marginal effect
Follow-up years									
Baseline (reference group)									
First year	0.097***	0.007	4964.3	0.081***	0.010	4277.5	0.120***	0.010	5885.0
Second year	0.087***	0.007	4443.3	0.075***	0.010	3973.3	0.102***	0.010	5027.3
Third year	0.124***	0.008	6356.6	0.126***	0.011	6618.8	0.125***	0.011	6135.1
Age									
18 ≤ age < 30 (reference group)									
30 ≤ age < 40	0.162***	0.030	8280.9	0.223***	0.057	11,751.0	0.115***	0.035	5670.0
40 ≤ age < 50	0.042**	0.018	2148.3	0.074**	0.034	3886.1	0.002	0.018	116.0
50 ≤ age < 60	- 0.001	0.010	- 56.9	- 0.003	0.015	- 172.2	- 0.016	0.012	- 795.9
≥ 60	0.018**	0.008	900.3	0.028***	0.010	1470.9	- 0.011	0.012	- 536.1
Gender									
Female (reference group)									
Male	- 0.016	0.008	- 815.8	- 0.004	0.012	- 203.7	- 0.032***	0.011	- 1565.8
Insurance type									
URBMI (reference group)									
UEBMI	0.103***	0.008	5270.0	-	-	-	-	-	-
Hospital levels									
Primary (reference group)									
Secondary	0.091	0.047	4655.8	0.179**	0.076	9423.8	0.0003	0.047	-14.1
Tertiary	0.447***	0.047	22,894.6	0.576***	0.075	30,330.8	0.299***	0.047	14,701.1
Length of stay (days)									
Days ≤ 100 (reference group)									
100 < days ≤ 300	1.161***	0.019	59,471.0	1.155***	0.025	60,862.5	1.165***	0.029	57,349.4
> 300 days	1.707***	0.017	87,481.9	1.705***	0.022	89,848.1	1.714***	0.025	84,387.9
Wald chi ²	17,506.97			9853.84			8309.63		
P-value	< 0.0001			< 0.0001			< 0.0001		



Results: Predictors of inpatient costs

- Regarding the full sample, **insurance type, age, hospital levels, and LOS** were significantly associated with inpatient costs of schizophrenia.
- Compared with patients with the URBMI scheme, the inpatient costs of schizophrenia were CNY5,270.0 higher for patients with the UEBMI scheme ($P < 0.01$).
- There exists a non-linear relationship between age and total annual inpatient costs, with patients aged 30-40 had the highest inpatient costs among all categories of age.



Discussions

- This is **the first** cohort study using sample from the claims database of an entire city to examine the direct medical costs of schizophrenia patients and compare the healthcare costs under two different urban insurance schemes in China.
- The total direct medical costs and the percentage of reimbursement expenses out of inpatient costs for those covered by the UEBMI scheme were higher than those covered by the URBMI scheme, mostly because the UEBMI had a higher benefit level for its beneficiaries.



Discussions

- The findings of this study suggested that **strategies to reduce hospitalization rates and LOS** might be an effective method to contain the costs of schizophrenia.
- Currently, China has **limited** community psychiatric centers and many hospitals **rarely** provide services for schizophrenia patients in the outpatient sector.
- Thus, efforts to increase usage of community-based treatment programs and psychosocial rehabilitation for schizophrenia patients in China, may reduce the high costs and overuse of medical resources in the hospitals as well as the burden of health insurance funds.



Conclusions

- The direct medical costs of schizophrenia were high and varied by types of insurance in China.
- The findings of this study provide vital information to understand the burden of schizophrenia in China.
- Such information can also be used by decision makers in program evaluation and health resources allocation.



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Thank you very much!

