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RESEARCH POSTER SESSION 3
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PIN: INFECTIOUS DISEASES
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ANALYSIS ON DIRECT MEDICAL EXPENSES OF PATIENTS WITH PULMONARY TUBERCULOSIS IN CHINA: BASED ON THE CASE OF 17,000 PATIENTS IN WUHAN

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BACKGROUND

The disease burden of tuberculosis (TB) in China is high, an estimated 1 million new cases of tuberculosis happened every year, more than any country except India.

In recent years, the Government has made great progress in TB control and prevention, resulting in a significant decline in the burden of TB. But to realize the End TB Strategy for eliminating TB by 2050, more investment is required.

OBJECTIVES

To analyze on the direct medical expenses and its influencing factors of patients with pulmonary tuberculosis (TB) from 2011 to 2018 in Wuhan, and to provide references for improving the medical assistance policy in China.

METHODS

- A total of 17,522 TB patients with 1,258,953 medical records were analyzed, which were extracted by ICD code A15~A19 from the public health insurance database in Wuhan province.
- Data analyzes using Stata 15.0 software.
- Records that did not meet the requirements were excluded. Which were: 1. Extrapulmonary TB patients; 2. Medical records for other disease; 3. Incomplete and logistically wrong records; 4. Patients paid by work-related injury insurance, childbirth insurance, and insurance for honorable discharged veteran; 5. Patients with malign tumor.
- Analyzing the different kinds of direct medical expenses and its influencing factors by descriptive statistics and quantitative methods: 1. Describing the demographic factors of TB patients and direct medical expenses; 2. The Wilcoxon signed-rank test and Kruskal-Wallis test were adopted for the univariate analysis; 3. Multivariable Linear Regression and Generalized Estimated Equation with a Gamma distribution and a log link were adopted for the multivariate analysis.

RESULTS

- The average total direct medical expenses was 9607.01 yuan per patient, 8849.57 yuan per outpatient visit, and 147.51 yuan per inpatient visit. The average reimbursement rate was 6.36% for outpatients and 67.56% for inpatients.
- Univariate analysis showed that the direct medical expenses was related to patients' age, sex, healthcare insurance type, medical institution levels and whether they had surgery, were hospitalized and used Chinese traditional medicine or not (P<0.01).
- Multivariate analysis showed that the average medical expenses per inpatient visit is related to patients' age, sex, healthcare insurance type, medical institution levels and whether they had surgery, the length of hospitalization days, used Chinese traditional medicine or not and visit year (P<0.01). Except for sex, all of the above factors related to the annual expenses per patient.
  - The average direct medical expenses of male was higher than that of female, and the expenses increased with age.
  - The average direct medical expenses (once and yearly) were higher for patients who had surgery or/and used Chinese traditional medicine.
  - The medical expenses for inpatient and outpatient patients became higher as medical institution levels increased.
  - The average medical expenses of outpatient was obviously lower than that of inpatient, longer inpatient period led to higher average direct expenses.
  - The average medical expenses per visit of patients paid by urban resident medical insurance was higher than those paid by urban employee medical insurance, but they had lower annual average medical expenses.

Table 1 Composition and distribution of TB patients' direct medical expenses per year

		Direct medical expenses				Average numbers of doctor visits		Average reimbursement rate	
Year[a]	N[b]	Average ($\bar{x}\pm Sd$) (Yuan)	Growth rate[c] (%)	Drug expenses proportion (%)	Diagnosis expenses proportion (%)	Inpatient	Outpatient	Inpatient (%)	Outpatient (%)
2012	9795	4221.27±10308.31	-	54.86	21.11	0.47	14.45	70.18	3.56
2013	10691	6363.37±14090.59	50.75	51.8	24.54	0.67	15.15	70.62	4.46
2014	11520	8042.04±15863.85	26.38	51.17	28.73	0.84	15.18	70.26	5.13
2015	12278	10889.17±19803.44	35.4	47.5	31.28	1.06	14.4	68.99	6.48
2016	12590	12263.21±23778.41	12.62	45.12	31.83	1.05	14.12	65.84	7.23
2017	12503	12721.4±24512.1	3.74	38.66	31.09	0.97	14.5	65.99	7.85
2018	13557	13607.26±21335.65	6.97	37.78	34.96	0.96	14.59	63.92	9.7
Overall	82934	9607.01±19751.7	-	44.65	30.63	0.86	14.63	67.56	6.36

a: records in 2011 were excluded because of missing in a few months; b: the sample size is the number of patients in the year; c: ratio of the increased expense to expenses in the last year.

Table 2 Univariate analysis of patients' direct medical expenses

		Inpatient		Outpatient		Total	
Varieble		Expenses per time (Yuan)	*Z*	Expenses per time (Yuan)	*Z*	Expenses per year (Yuan)	*Z*
Sex	Female	7850.76±10605.71	22.7***	145.06±317.49	19.01***	8691.54±16489.03	5.66***
	Male	9368.67±14255		148.64±363.38		10071.52±21201.18	
Age	~30	7956.55±9136.23	49.96***	130.33±325.6	3411.87***	7123.74±13701.46	3204.07***
	30~60	8922.37±13762.59		151.65±391.67		9100.62±20065.96	
	60~	9224.35±13924.56		146.61±266.99		12819.57±22577.02	
Healthcare insurance type	Urban employee insurance	8765.29±13382.86	15.71***	146.26±350.33	84.41***	9066.76±19594.95	57.33***
	Urban residents insurance	9296.66±11768.42		214.13±300.35		15509.85±20482.77	
Hospital classification	Level A	2164.64±2094.88	12231.94***	80.02±146	261000***		
	Level B	5188.38±4989.02		242.11±479.6			
	Level C	9750.78±13883.42		314.72±578.48			
Hospitalization	N					1769.05±5034.92	235.28***
	Y					20285.89±26256.34	
Surgery	N	7216.6±9081.46	90.07***			6985.24±14550.29	119.01***
	Y	18822.94±24658.25				33815.67±37258.78	
Chinese traditional	N	7730.8±11642.17	28.85***	146.71±353.1	5.04***	5358.48±15938.82	44.57***
	Y	9695.09±14110.97		148.78±344.06		10116.21±20100.26	
Total		8849.57±13141.37		147.51±349.59		9607.01±19751.7	

***：P<0.001

Table 3 Multivariate analysis of direct medical expenses for tuberculosis patients

Variable		Expenses per inpatient visit			Annual expenses per patient		
		β	*Se*	*t*	*β*	*Se*	*t*
Cons		6.002	0.012	509.08***	6.398	0.048	133.34***
Sex	Female	ref					
	Male	0.05	0.004	12.85***	0.043	0.03	1.46
Age	~30	ref					
	30~60	0.112	0.005	21.17***	0.355	0.042	8.55***
	60~	0.202	0.006	35.5***	0.54	0.038	14.37***
Insurance type	Urban employee insurance	ref					
	Urban residents insurance	0.034	0.005	6.5***	-0.06	0.022	-2.71***
Hospital classification	Level B	ref					
	Level A	-0.535	0.01	-53.71***			
	Level C	0.458	0.008	56.9***			
Hospitalization days (per visit)		0.764	0.003	297.1***	0.714	0.006	122.41***
Surgery	N	ref					
	Y	0.59	0.005	111.58***	0.509	0.013	38.85***
Chinese traditional medicine	N	ref					
	Y	0.065	0.004	17.54***	0.29	0.043	6.75***
Year[a]		0.078	0.001	76.16***	0.109	0.004	26.35***

a: all records in 2011-2018 were analyzed for expenses per inpatient visit, but records in 2011 were excluded in analysis of annual expenses.
***：P<0.001

CONCLUSION

- The current direct medical expenses of TB patients are relatively affordable, but for low-income patients and patients in severe condition, such as MDR-TB patients, the financial burden is still heavy. Improved medical assistance policies are in need.
- The outpatient reimbursement is not enough for TB patients. With a long treatment period, TB patients need to take drugs every month. A higher outpatient reimbursement rate is required.
- The Chinese Traditional Medicine is commonly used in TB treatment, which lacks clinical evidence. The standardized treatment methods should be promoted, and more stringent regulatory measures should be taken by the medical regulatory authorities.

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