

Abstract

Analysis of the 2nd Quality assessment on tuberculosis care in Korea

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In order to reduce the gap in quality of tuberculosis (TB) care among hospitals and raise the quality of tuberculosis care to a certain level, the Quality assessment on tuberculosis care conducted 1st quality assessment in 2018 and the 2nd quality assessment in 2019.

In this article, we looked at differences between types of medical institutions, types of tuberculosis management (Private-Public Mix [PPM]/Non-PPM), major regional outcomes, and preliminary assessments, focusing on "primary TB assessment." The analysis data were utilized 1st quality assessment in 2018 and the 2nd quality assessment in 2019 with six evaluation indexes (performance rate of acid-fast bacilli smear, performance rate of acid-fast bacilli culture, performance rate of *M. tuberculosis*-polymerase chain reaction, compliance rate of standard treatment regimens, rate of visiting institution of TB patient, daily rate of TB prescription).

Looking at each type of medical institution, among the six evaluation indexes, the highest rate of compliance rate of standard treatment regimens and the lowest of visiting institution of TB patient were found. Among the three indicators of accuracy of diagnosis, performance rate of *M. tuberculosis*-polymerase chain reaction was the lowest and the clinics/hospitals performed lower than the general hospitals, and tertiary hospitals. Within each institution, the gap is widening by index, and the gap has widened from tertiary hospitals to clinics. The PPM agency showed higher results in five indicators (performance rate of acid-fast bacilli smear, performance rate of acid-fast bacilli culture, performance rate of *M. tuberculosis*-polymerase chain reaction, rate of visiting institution of TB patient, daily rate of TB prescription) compared to the Non-PPM agency. According to regional analysis, two indicators were low in Chunbuk, Jeonnam, where there are no PPM or very low share rates by PPM. The results of health insurance recipients were higher in all six indicators than those eligible for medical aid. Compared to the first evaluation, the results of the second evaluation were improved in five indicator and the deviation of each institution was reduced.

The results of Quality assessment of TB will be used as basic data useful for the promotion of the quality of TB treatment and establishment of national TB management policy.

Keywords: Tuberculosis, Quality assessment, Private-Public Mixed, Non-Private-Public Mixed

Table 1. Index, yield formula, code of ICD in quality assessment on tuberculosis care

Index of evaluation		Yield formula	Code of international classification of diseases (ICD)
Accuracy of diagnosis	Index1. performance rate of acid fast bacilli smear	(number carried out acid-fast bacilli smear/number of new cases of respiratory TB) × 100	Respiratory TB, Military TB (A15, A16, A19)
	Index2. performance rate of acid fast bacilli culture	(number carried out acid fast bacilli culture/number of new cases of respiratory TB) × 100	
	Index3. performance rate of <i>M. tuberculosis</i> -polymerase chain reaction	(number carried out <i>M. tuberculosis</i> -polymerase chain reaction/number of new cases of respiratory TB) × 100	
Compliance of standard treatment regimens	Index4. compliance rate of standard treatment regimens	(compliance number of standard treatment regimens /number of new cases of TB) × 100	Respiratory TB, TB of nervous system, TB of other organs, Military TB (A15, A16, A17, A18, A19)
TB patient management level	Index5. rate of visiting institution of TB patient	(average number of visiting institution per 1 TB patient /six times) × 100	
	Index6. daily rate of TB prescription	(total days of TB prescriptions/6 months [180day]) × 100	

Table 2. Distribution of medical institutions in quality assessment on tuberculosis care

Characteristics		Total	Type of medical institutions				N (%)
			Tertiary hospitals	General hospitals	Hospitals	Clinics	
Number of medical institutions		572 (100.0)	42 (7.4)	283 (49.5)	185 (32.3)	62 (10.8)	
Number of cases		9,293 (100.0)	3,451 (37.1)	5,212 (56.1)	527 (5.7)	103 (1.1)	
cases per medical institutions		16.2	82.2	18.4	2.8	1.7	
Number of medical institutions	Sub total	572 (100.0)					
	PPM	158 (27.6)	42 (26.6)	113 (71.5)	3 (1.9)	0 (0.0)	
	Non-PPM	414 (72.4)	0 (0.0)	170 (41.0)	182 (44.0)	62 (15.0)	
cases per medical institutions	Sub total	9,293 (100.0)					
	PPM	7,715 (83.0)	3,451 (44.7)	4,174 (54.1)	90 (1.2)	0 (0.0)	
	Non-PPM	1,578 (17.0)	0 (0.0)	1,038 (65.8)	437 (27.7)	103 (6.5)	

Table 3. Gender, age, types of the National Health Insurance, Number of hospitals used of patients in quality assessment on tuberculosis care

		N (%)
	Index	No. of patients (%)
Total		9,293 (100.0)
Gender	Male	5,359 (57.7)
	Female	3,934 (42.3)
Age	<20	148 (1.7)
	20-29	648 (7.0)
	30-39	768 (8.3)
	40-49	984 (10.6)
	50-59	1,553 (16.7)
	60-69	1,557 (16.7)
	70-79	1,825 (19.5)
	≥80	1,810 (19.5)
Types of the National Health Insurance	Health Insurance	8,740 (94.0)
	Medical Aid	552 (5.9)
	Veterans	1 (0.1)
Number of hospitals used	1	7,999 (86.1)
	2	1,153 (12.4)
	3	132 (1.4)
	≥4	9 (0.1)

Table 4. Outcome per patient, distribution of institution type in quality assessment on tuberculosis care

%

Index of evaluation			Outcome per patient		Distribution of institution type					
			Average	Average	Standard deviation	Minimum	Q1	Median	Q3	Maximum
Accuracy of diagnosis	Performance rate of acid-fast bacilli smear	Total	96.2	94.1	18.0	0.0	98.1	100.0	100.0	100.0
		Tertiary hospitals	97.2	97.2	2.2	92.6	95.6	97.3	98.8	100.0
		General hospitals	95.9	94.5	15.5	0.0	96.5	100.0	100.0	100.0
		Hospitals	94.0	91.6	23.9	0.0	100.0	100.0	100.0	100.0
		Clinics	94.6	97.2	11.6	50.0	100.0	100.0	100.0	100.0
	Performance rate of acid-fast bacilli culture	Total	96.4	92.6	19.4	0.0	96.5	100.0	100.0	100.0
		Tertiary hospitals	97.1	97.1	2.1	90.7	95.6	97.2	98.5	100.0
		General hospitals	96.6	94.3	13.8	0.0	94.9	100.0	100.0	100.0
		Hospitals	91.4	88.9	26.3	0.0	100.0	100.0	100.0	100.0
		Clinics	89.1	91.8	23.4	0.0	100.0	100.0	100.0	100.0
	Performance rate of <i>M. tuberculosis</i> -polymerase chain reaction	Total	94.4	87.9	25.0	0.0	91.1	100.0	100.0	100.0
		Tertiary hospitals	96.0	95.9	4.0	77.1	94.1	96.8	98.4	100.0
		General hospitals	95.1	92.0	15.9	0.0	91.7	100.0	100.0	100.0
		Hospitals	81.7	83.0	31.9	0.0	76.4	100.0	100.0	100.0
		Clinics	77.2	76.5	38.0	0.0	50.0	100.0	100.0	100.0
Compliance of standard treatment regimens	Compliance rate of standard treatment regimens	Total	97.1	97.8	7.9	0.0	100.0	100.0	100.0	100.0
		Tertiary hospitals	96.8	96.9	2.4	91.1	95.2	97.2	98.3	100.0
		General hospitals	97.5	97.8	6.2	50.0	98.9	100.0	100.0	100.0
		Hospitals	96.4	97.7	10.5	0.0	100.0	100.0	100.0	100.0
		Clinics	92.9	98.9	8.8	33.3	100.0	100.0	100.0	100.0
TB patient management level	Rate of visiting institution of TB patient	Total	88.3	87.8	12.7	16.7	83.3	90.7	97.5	100.0
		Tertiary hospitals	86.8	87.2	5.8	72.7	83.5	88.0	92.0	95.7
		General hospitals	89.5	88.0	10.5	50.0	83.3	90.5	94.8	100.0
		Hospitals	88.0	87.9	14.5	25.0	83.3	91.7	100.0	100.0
		Clinics	86.8	86.2	18.9	16.7	83.3	91.7	100.0	100.0
	Daily rate of TB prescription	Total	95.9	93.9	10.9	7.8	93.7	97.3	100.0	100.0
		Tertiary hospitals	96.4	96.3	1.7	91.3	95.1	96.5	97.7	98.7
		General hospitals	95.9	94.9	8.1	24.4	94.4	96.8	99.1	100.0
		Hospitals	93.4	92.5	13.5	25.0	90.7	99.3	100.0	100.0
		Clinics	91.5	91.7	15.7	7.8	91.7	99.4	100.0	100.0

Table 5. Outcome per patient, distribution of institution of PPM/Non-PPM in quality assessment on tuberculosis care

%

Index of evaluation	Type	Outcome per patient	Distribution of institution type						
		Average	Average	Standard deviation	Minimum	Q1	Median	Q3	Maximum
Performance rate of acid-fast bacilli smear	Total	96.2	94.1	18.0	0.0	98.1	100.0	100.0	100.0
	PPM	96.6	96.4	9.0	26.1	95.8	98.5	100.0	100.0
	Non-PPM	94.3	93.1	20.4	0.0	100.0	100.0	100.0	100.0
Performance rate of acid-fast bacilli culture	Total	96.4	92.6	19.4	0.0	96.5	100.0	100.0	100.0
	PPM	97.2	96.9	4.7	60.0	95.7	98.1	100.0	100.0
	Non-PPM	92.6	90.8	22.5	0.0	100.0	100.0	100.0	100.0
Performance rate of <i>M. tuberculosis</i> -polymerase chain reaction	Total	94.4	87.9	25.0	0.0	91.1	100.0	100.0	100.0
	PPM	95.5	94.6	8.3	33.3	93.3	96.6	100.0	100.0
	Non-PPM	89.3	85.2	28.7	0.0	83.3	100.0	100.0	100.0
Compliance rate of standard treatment regimens	Total	97.1	96.6	13.4	0.0	100.0	100.0	100.0	100.0
	PPM	97.1	97.4	3.0	87.0	95.4	98.1	100.0	100.0
	Non-PPM	97.1	96.3	15.7	0.0	100.0	100.0	100.0	100.0
Rate of visiting institution of TB patient	Total	88.3	87.8	12.7	16.7	83.3	90.7	97.5	100.0
	PPM	88.5	88.9	6.5	72.7	85.5	90.2	93.8	100.0
	Non-PPM	88.0	87.3	14.5	16.7	83.3	91.7	100.0	100.0
Daily rate of TB prescription	Total	95.9	93.9	10.9	7.8	93.7	97.3	100.0	100.0
	PPM	96.2	95.9	3.1	78.8	94.7	96.4	98.0	100.0
	Non-PPM	94.3	93.1	12.6	7.8	92.6	98.6	100.0	100.0

Table 6. Distribution of region in quality assessment on tuberculosis care

%

Region	Performance rate of acid-fast bacilli smear	Performance rate of acid-fast bacilli culture	Performance rate of <i>M. tuberculosis</i> -polymerase chain reaction	Compliance rate of standard treatment regimens	Rate of visiting institution of TB patient	Daily rate of TB prescription
Total	96.2	96.4	94.4	97.1	88.3	95.9
Seoul	95.7	96.6	93.5	96.8	85.3	96.0
Busan	98.1	97.3	96.1	96.7	90.3	96.5
Incheon	97.3	97.1	96.0	96.2	91.2	96.8
Daegu	98.1	96.4	97.1	97.4	89.8	96.7
Gwangju	99.1	97.8	96.9	99.1	88.0	96.5
Daejeon	95.3	95.7	95.7	97.6	89.0	95.8
Ulsan	98.4	97.9	95.8	93.1	91.0	95.1
Gyeonggy	97.2	96.9	94.9	97.4	89.0	95.9
Gangwon	95.5	93.8	91.6	94.8	90.5	95.9
Chungbuk	95.8	95.8	92.7	97.6	85.0	94.2
Chungnam	95.3	95.7	91.9	97.5	88.5	94.9
Jeonbuk	96.5	94.7	96.8	97.2	91.5	95.9
Jeonnam	80.4	94.9	86.6	97.1	90.5	94.6
Gyeongbuk	97.9	95.6	95.6	99.5	89.2	95.7
Gyeongnam	95.4	94.7	92.0	97.9	87.3	95.1
Jeju	97.5	98.3	96.7	96.6	85.8	95.0

No cases in sejong city

Table 7. Distribution of types of the National Health Insurance in quality assessment on tuberculosis care

%

Index of evaluation	Total	Health Insurance	Medical Aid
Index1. performance rate of acid fast bacilli smear	96.2	96.2	95.6
Index2. performance rate of acid fast bacilli culture	96.4	96.5	94.9
Index3. performance rate of <i>M. tuberculosis</i> -polymerase chain reaction	94.4	94.5	92.4
Index4. compliance rate of standard treatment regimens	97.1	97.2	95.7
Index5. rate of visiting institution of TB patient	88.3	89.2	76.2
Index6. daily rate of TB prescription	95.9	96.1	92.8

Table 8. Difference between 1st evaluation and 2nd evaluation of institutions type in quality assessment on tuberculosis care

% (%p)

Index of evaluation	Total		Tertiary hospitals		General hospitals		Hospitals		Clinics	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
Performance rate of acid-fast bacilli smear	95.8	96.2 (0.4 ↑)	96.1	97.2	96.0	95.9	94.1	94.0	90.7	94.6 (3.9 ↑)
Performance rate of acid-fast bacilli culture	95.5	96.4 (0.9 ↑)	96.6	97.1	96.2	96.6	85.9	91.4 (5.5 ↑)	87.1	89.1 (2.0 ↑)
Performance rate of <i>M. tuberculosis</i> -polymerase chain reaction	93.0	94.4 (1.4 ↑)	94.3	96.0	94.4	95.1	80.9	81.7	64.7	77.2 (12.5 ↑)
Compliance rate of standard treatment regimens	96.8	97.1 (0.3 ↑)	96.4	96.8	97.2	97.5	96.0	96.4	93.4	92.9 (0.5 ↓)
Rate of visiting institution of TB patient	88.2	88.3 (0.1 ↑)	87.3	86.8 (0.5 ↓)	88.7	89.5	88.0	88.0	89.3	86.8 (2.5 ↓)
Daily rate of TB prescription	95.9	95.9 -	96.4	96.4	95.8	95.9	93.4	93.4	94.6	91.5 (3.1 ↓)

Table 9. Institutional deviation in quality assessment on tuberculosis care

% (%p)

Index of evaluation	Total		Tertiary hospitals		General hospitals		Hospitals		Clinics	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
Performance rate of acid-fast bacilli smear	17.0	18.0 (1.0 ↑)	3.7	2.2 (1.5 ↓)	13.1	15.5 (2.4 ↓)	18.5	23.9 (5.4 ↑)	26.9	11.6 (15.3 ↓)
Performance rate of acid-fast bacilli culture	24.5	19.4 (5.1 ↓)	2.4	2.1 (0.3 ↓)	14.1	13.8 (0.3 ↓)	31.2	26.3 (4.9 ↓)	35.7	23.4 (12.3 ↓)
Performance rate of <i>M. tuberculosis</i> -polymerase chain reaction	29.1	25.0 (3.9 ↓)	4.5	4.0 (0.5 ↓)	14.7	15.9 (1.2 ↑)	31.5	31.9 (0.4 ↑)	47.9	38.0 (9.9 ↓)
Compliance rate of standard treatment regimens	14.5	7.9 (6.6 ↓)	2.6	2.4 (0.2 ↓)	7.6	6.2 (1.4 ↓)	18.2	10.5 (7.7 ↓)	23.4	8.8 (14.6 ↓)
Rate of visiting institution of TB patient	13.7	12.7 (1.0 ↓)	5.9	5.8 (0.1 ↓)	9.9	10.5 (0.6 ↑)	17.6	14.5 (3.1 ↓)	16.8	18.9 (2.1 ↑)
Daily rate of TB prescription	11.0	10.9 (0.9 ↓)	1.8	1.7 (0.1 ↓)	8.1	8.1 -	13.6	13.5 (0.1 ↓)	14.4	15.7 (1.3 ↑)

Table 10. Difference between 1st evaluation and 2nd evaluation of PPM/Non-PPM in quality assessment on tuberculosis care

% (%p)

Index of evaluation	Total		PPM		Non-PPM	
	1st	2nd	1st	2nd	1st	2nd
Performance rate of acid-fast bacilli smear	95.8	96.2 (0.4 ↑)	96.3	96.6 (0.3 ↑)	94.5	94.3 (0.2 ↓)
Performance rate of acid-fast bacilli culture	95.5	96.4 (0.9 ↑)	97.0	97.2 (0.2 ↑)	91.0	92.6 (1.6 ↑)
Performance rate of <i>M. tuberculosis</i> -polymerase chain reaction	93.0	94.4 (1.4 ↑)	94.7	95.5 (0.8 ↑)	87.7	89.3 (1.6 ↑)
Compliance rate of standard treatment regimens	96.8	97.1 (0.3 ↑)	96.7	97.1 (0.4 ↑)	97.1	97.1 -
Rate of visiting institution of TB patient	88.2	88.3 (0.1 ↑)	88.1	88.5 (0.4 ↑)	88.3	88.0 (0.3 ↓)
Daily rate of TB prescription	95.9	95.9 -	96.4	96.2 (0.2 ↓)	94.4	94.3 (0.1 ↓)