A Survey of Specialist Physicians about the" Taiwan Guidelines for TB Diagnosis & Treatment" Issued by the Centers for Disease Control, Ministry of Health and Welfare

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Abstract

This survey collected opinions and feedback from pulmonologists, infectious disease specialists, and tuberculosis specialists on the "Taiwan Guidelines for TB Diagnosis & Treatment" issued by the Centers for Disease Control, Ministry of Health and Welfare（Taiwan CDC） and about the policy of tuberculosis (TB) management as a reference for future policy making. The study was approved by Research Ethics Committee, National Taiwan University Hospital, in advance. The anonymous questionnaires were sent to members of Taiwan Society of Pulmonary and Critical Care Medicine, The Infectious Diseases Society of Taiwan, and Taiwan Society of Tuberculosis from December 2012 to April 2013.

In total, 477 questionnaires were collected. Most respondents were attending physicians with more than five years of seniority or specialist physicians who were experienced in TB diagnosis and treatments. More than 85% of physicians believed the recommendations in the "Taiwan Guidelines for TB Diagnosis & Treatment " were helpful for diagnosis and treatment. Compared to other pulmonary or infectious diseases, 33.1% of the respondents reported being "very willing" or "willing" to continually provide TB treatments, while 13.8% reported being "never willing" or "unwilling" to keep providing TB treatments. Further analysis found that the significant factors which affected physicians' willingness to diagnose and treat TB cases were the "inspection and management of TB drug prescriptions" (OR 7.21, P <0.001) and "the load of medical paperwork" (OR 3.88, P = 0.001). Moreover, "the availability of assistance from epidemic preventing system in treating critical cases" was the significant factor that affected physicians' experience on TB diagnosis and treatment.

The "Taiwan Guidelines for TB Diagnosis & Treatment " did provide useful recommendations for most specialist physicians. Nevertheless, the authorities should pay more attention to the "inspection and management of TB drug prescriptions", the

“assistance from epidemic preventing system”, and the “rational load of medical paperwork,” and should keep improving and communicating with medical practitioners for their recognition and cooperation, thus further upgrading Taiwan’s quality of medical care for tuberculosis.

Keywords: tuberculosis, Guidelines for TB Diagnosis & Treatment, policy of tuberculosis management, opinion survey

Foreword

Tuberculosis, caused by *Mycobacterium tuberculosis*, is a major chronic infectious disease in the world. According to Global Tuberculosis Report 2012 issued by World Health Organization (WHO), there were an estimated 8.7 million new cases of TB and 1.4 million deaths from TB in 2011, mainly in undeveloped and developing countries. About 60% of the disease burden of TB was in the Southeast Asian and Western Pacific regions [1]. Thus, TB is an important global issue on public health, society, and economy. In Taiwan, TB is the notifiable disease with the highest annual case number and deaths. With the epidemic prevention measures gradually showing effects, especially under the "Directly observed treatment, short-course (DOTS) program" and "Halving TB incidence in a decade” initiative, TB epidemic has gradually declined from 16,000 new cases in 2005 to 12,600 in 2012 [2]. In view of the current TB control policy in Taiwan, there are still some dimensions which can be largely improved, such as the general unwillingness of medical institutions to treat TB cases, considerable doubts about the treatment of "latent tuberculosis infection (LTBI)" from medical practitioners, difficulty in curing cases infected with multidrug-resistant tuberculosis (MDR-TB); and complexity and difficulty involved in case management. All of these need the epidemic prevention authorities to target the problems and implement more effective strategies to further curb the TB epidemic in Taiwan.

Since the national health insurance system has been implemented, TB cases are no longer treated only by the assigned hospitals, but patients can choose any medical institutions countrywide. Therefore, guaranteeing every TB patient can access the standard and complete medical services, improving TB treatment success rate, and reducing the TB epidemic effectively have become important issues for TB control [3]. In order to make medical practitioners well informed about the main points of TB diagnosis and treatments and to effectively improve TB treatment success rate, the Taiwan CDC invited experts and referred to the WHO’s standard in TB diagnosis and treatments to compile the first edition of the “Taiwan Guidelines for TB Diagnosis & Treatment ” in 2004. So far, it has been updated to the fifth edition. The contents contain the essential dimensions of TB diagnosis and treatments, including elaborate basic knowledge of TB, diagnosis, treatments, anti-tuberculosis agents, and treatments of LTBI [4-5]. Specialist physicians can obtain the explicit recommendations of TB treatments with the guidelines.

In order to make all clinicians achieve the standard of TB treatments and avoid improper prescriptions that worsen patients' conditions, the epidemic prevention authorities have launched the "inspection and management of TB drug prescriptions" measure. Through this mechanism, the authorities invited experts in TB diagnosis and treatments to establish the TB Advisory Committee which helped clinicians to diagnose suspected TB cases or to treat refractory cases, and also provided consultation for TB relevant issues as a communicating channel between epidemic prevention system and medical practitioners. To motivate physicians to follow the Diagnosis and treatment guidelines and treating TB patients with appropriate prescriptions, the epidemic prevention authorities have also collaborated with National Health Insurance and Administration on administrative reviews to disallow the applications of medical expenses for improper TB prescriptions and have held educational trainings and case discussions to maintain a high quality of medical care [3].

Nevertheless, many clinicians have raised their doubts and objections to the "Taiwan Guidelines for TB Diagnosis & Treatment " and the "inspection and management of TB prescriptions" measure. To clarify the practicality of the "Taiwan Guidelines for TB Diagnosis & Treatment " and to gather medical profession's reflection on TB control policy, this study surveyed pulmonologists, infectious disease specialists and tuberculosis specialists as a reference for future revisions of the "Taiwan Guidelines for TB Diagnosis & Treatment " and relevant policy making.

Materials and Methods

The subjects of this study were mainly pulmonologists and tuberculosis specialists. The study was approved by Research Ethics Committee, National Taiwan University Hospital in advance. The anonymous questionnaires were sent via E-mail or print to members of Taiwan Society of Pulmonary and Critical Care Medicine, The Infectious Diseases Society of Taiwan, and Taiwan Society of Tuberculosis from December 2012 to April 2013. After filling out the questionnaires, the respondents returned their replies via the Internet or by post. The questionnaire was designed to cover seven topics, including professional background, experience in TB diagnosis and treatment, willingness to offer TB treatments, TB cases management, treatments for refractory TB cases, the inspection of TB prescriptions, and the opinions on the fourth edition of the "Taiwan Guidelines for TB Diagnosis & Treatment ". Except professional background and the opinions on the "Taiwan Guidelines for TB Diagnosis & Treatment ", the remaining five parts of the questionnaire used either three or five point scales.

We used SAS 9.2 statistical software to analyze survey responses. The respondents' backgrounds and the experience in TB diagnosis and treatment were demonstrated as descriptive data. Chi-square test was used for the distributions and correlation between respondents' backgrounds and their experience in TB diagnosis and treatment, and also for

the experience in TB diagnosis and treatment and the willingness to offer TB treatments, while univariate and multivariate logistic regression was used for analysis of the main factors associated with the respondents' backgrounds, their experience in TB diagnosis and treatment, and their willingness to offer TB treatments. The variables in the analysis were divided into two groups for performing binary logistic regression. We merged the three willingness levels of "no difference", "willing", and "very willing" into one group, and the other two willingness levels of "never willing" and "unwilling" were merged into another group. As for the experience in TB diagnosis and treatment, we combined the three accomplishment levels of "no difference", "rewarding" and "very rewarding" into one group, and the other two accomplishment levels of "very frustrated" and "frustrated" were combined into another group. In multivariate analysis, we adjusted for the statistically relevant variables of respondents' backgrounds and the experience in TB diagnosis and treatment. The statistically significant level was set at $P < 0.05$.

Results

We sent out a total of 2,228 questionnaires. The highest response rate was 27.5% (378 responses) from members of Taiwan Society of Pulmonary and Critical Care Medicine, while the lowest rate of 3.8% (19 responses) was from members of The Infectious Diseases Society of Taiwan. The survey had 477 responses in total from the three medical associations with an overall response rate of 21.4% (Table 1).

Table 1. The questionnaire collection by each medical association

Medical association	No. of questionnaires sent	No. of responses received	Response rate (%)
Taiwan Society of Pulmonary and Critical Care Medicine	1,377	378	27.5
Taiwan Society of Tuberculosis	351	80	22.8
The Infectious Diseases Society of Taiwan	500	19	3.8
Total	**2,228**	**477**	**21.4**

1. The respondents' backgrounds and the experience in TB diagnosis and treatment:

Among the 477 respondents, most had more than five attending years, were pulmonologists or internal medicine specialists, practiced in medical centers or regional hospitals; and had treated more than 10 TB patients within one year (Table 2). Compared with treating other pulmonary or infectious diseases, 33.6% of the respondents thought treating TB cases were "very rewarding" or "rewarding", but 14.5% felt "very frustrated" or " frustrated". About 33.1% of the respondents reported being "very willing" or "willing" to keep on treating TB cases, but 13.8% reported being "never willing" or "unwilling" to treat TB cases any more (Table 2).

Table 2. The respondents' backgrounds and the experience in TB diagnosis and treatment

Respondents' background	No. of respondents (N=477)	Proportion (%)
Seniority of attending years		
> 10 years	211	44.2
6 - 10 years	120	25.2
1 - 5 years	108	22.6
Fellow / Resident	35	7.3
Missing data	3	0.6
Specialist qualification (Multiple Choice)		
Pulmonologist	386	80.9
Infectious disease specialist	26	5.5
TB specialist	78	16.4
Internal medicine specialist	348	73
Pediatric specialist	8	1.7
Surgical specialist	20	4.2
Family medicine specialist	45	9.4
Thoracic and Cardiovascular Surgery Specialist	40	8.4
Missing data	3	0.6
Practicing place		
Medical center	154	32.3
Regional hospital	161	33.8
Local hospital	101	21.2
Clinic	57	11.9
Pharmacy	1	0.2
Missing data	3	0.6
Ever treating any TB patient within one year		
Yes, > 100 cases	9	1.9
Yes, 51- 100 cases	51	10.7
Yes, 11- 50 cases	226	47.4
Yes, 1- 10 cases	166	34.8
No	24	5
Missing data	1	0.2
Experience in TB treatment (Compared to other pulmonary or infectious diseases)		
Very rewarding	38	8.0
Rewarding	122	25.6
No difference	247	51.8
Frustrated	61	12.8
Very frustrated	8	1.7
Missing data	1	0.2
Willingness to offer TB treatments (Compared to other pulmonary or infectious diseases)		
Very willing	92	19.3
Willing	66	13.8
No difference	252	52.8
Unwilling	64	13.4
Never willing	2	0.4
Missing data	1	0.2

2. Cross-analysis of respondents' backgrounds and the experience in TB diagnosis and treatment:

For all respondents, greater seniority of attending years brought greater levels of rewarding feeling in TB treatment, and also higher willingness to offer TB treatments. Conversely, fellows or residents more likely felt frustrated in treating TB cases, and were less willing to offer TB treatments (statistically significant with P <0.001 and P = 0.003 respectively). Among all specialist physicians, TB specialists felt more rewarding in TB treatment and also reported greater willingness to offer TB treatments. On the contrary, infectious disease specialists were more likely felt frustrated in treating TB cases, and were less willing to offer TB treatments (statistically significant with P = 0.003 and P = 0.002, respectively). Moreover, of all respondents, those had treated more TB cases within one year felt significantly more rewarding in TB treatment (P < 0.001), and also significantly more willing to offer TB treatments (P < 0.001). Statistic results shown in Table 3 suggested that different practicing places for physicians had no significant correlation with the level of rewarding feeling in TB treatments (P = 0.216) or the degree of willingness to offer TB treatments (P = 0.058).

Table 3. Cross-analysis of respondents' backgrounds and the experience in TB diagnosis and treatment

Variables	The experience in TB diagnosis and treatment compared to other pulmonary or infectious diseases						*P* value	The willingness to offer TB treatments compared to other pulmonary or infectious diseases						*P* value
	Very rewarding or rewarding		No difference		Very frustrated or frustrated			Very willing or willing		No difference		Never willing or unwilling		
	No.	%	No.	%	No.	%		No.	%	No.	%	No.	%	
	160	33.3	247	52.2	69	14.5		158	33.1	252	53.3	66	13.6	
Seniority of attending years														
>10 years (n=211)	89	42.2	96	45.5	26	12.3	**< 0.001**	88	41.7	97	46.0	25	11.8	**0.003**
6-10 years (n=120)	37	30.8	69	57.5	14	11.7		40	33.3	62	51.7	18	15.0	
1-5 years (n=108)	27	25.0	59	54.6	22	20.4		22	20.4	69	63.9	17	15.7	
Fellow/Resident (n=35)	4	11.4	23	65.7	7	20.0		6	17.1	24	68.6	5	14.3	
Missing data	3		0		0			2		0		1		
Specialist qualification (Multiple Choice)														
Pulmonologist (n=386)	130	33.7	209	54.1	47	12.2	**0.003**	122	31.6	210	54.4	54	14.0	**0.002**
Infectious disease specialist (n=26)	8	30.8	10	38.5	8	30.8		10	38.5	13	50.0	3	11.5	
TB specialist (n=78)	37	47.4	31	39.7	9	11.5		42	53.8	30	38.5	5	6.4	
Internal medicine specialist (n=348)	119	34.2	189	54.3	40	11.5		123	35.3	187	53.7	38	10.9	
Other specialist (n=113)	28	23.1	60	49.6	24	19.8		27	22.3	63	52.1	22	18.2	
Missing data	3		0		0			1		0		2		
Practicing place														
Medical center (n=154)	45	29.2	79	51.3	30	19.5	**0.216**	51	33.1	80	51.9	23	14.9	**0.058**
Regional hospital (n=161)	60	37.3	86	53.4	15	9.3		65	40.4	80	49.7	16	9.9	
Local hospital (n=101)	31	30.7	55	54.5	15	14.9		21	20.8	62	61.4	18	17.8	
Clinic (n=57)	22	38.6	27	47.4	8	14.0		18	31.6	30	52.6	9	15.8	
Missing data	2		0		1			3		0		0		
Ever treating TB patients within one year														
≧51 cases (n=60)	34	56.7	17	28.3	9	15.0	**< 0.001**	37	61.7	15	25.0	8	13.3	**< 0.001**
11-50 cases (n=226)	84	37.2	118	52.2	24	10.6		68	30.1	138	61.0	20	8.9	
0-10 cases (n=190)	41	22.1	112	58.9	36	19.0		53	27.9	99	52.1	38	20.0	
Missing data	1		0		0			0		0		0		

[a] There was a missing value in the "experience in TB diagnosis and treatment" and the "willingness to offer TB treatments". In which a same missing value was in "ever treating TB patients within one year" and the "willingness to offer TB treatments".

3. Factors associated with respondents' experience in TB diagnosis and treatment and their willingness to offer TB treatments:

Table 4 showed a statistically significant correlation ($P = 0.015$) between feeling "very frustrated or frustrated in TB diagnosis and treatment compared to other pulmonary or infectious diseases" and the "assistance from epidemic prevention system in treating refractory TB cases". In addition, "never willing or unwilling to offer TB treatments compared to other pulmonary or infectious diseases infections" was significantly associated with "physicians' load of medical paperwork" ($P = 0.006$) and "inspection and management of TB drug prescriptions" ($P < 0.001$).

Table 4. Factors associated with respondents' experience in TB diagnosis and treatment and their willingness to offer TB treatments

The factors that affected the willingness to offer TB treatments	The experience in TB diagnosis and treatment compared to other pulmonary or infectious diseases						*P* value	The willingness to offer TB treatments compared to other pulmonary or infectious diseases infections						*P* value
	Very rewarding or rewarding		No difference		Very frustrated or frustrated			Very willing or willing		No difference		Never willing or unwilling		
	No.	%	No.	%	No.	%		No.	%	No.	%	No.	%	
	160	33.3	247	52.2	69	14.5		158	33.1	252	53.3	66	13.6	
Physicians' load of medical paperwork														
No influence (n=173)	65	37.6	86	49.7	22	12.7	**0.367**	68	39.3	90	52.0	15	8.7	**0.006**
Some influence (n=246)	79	32.5	132	53.7	34	13.8		74	30.1	136	55.3	36	14.6	
Great influence (n=56)	15	26.8	29	51.8	12	21.4		15	26.8	26	46.4	15	26.8	
Missing data	1		0		1			1		0		0		
Inspection and management of TB drug prescriptions														
No influence (n=148)	58	39.2	74	50.0	16	10.8	**0.085**	61	42.0	77	52.0	10	6.8	**<0.001**
Some influence (n=280)	90	32.1	150	53.6	40	14.3		81	28.9	158	56.4	41	14.7	
Great influence (n=47)	12	25.5	23	48.9	12	25.6		15	31.9	17	36.2	15	31.9	
Missing data	0		0		1			1		0		0		
Assistance from epidemic prevention system in treating refractory TB cases														
No influence (n=65)	25	38.5	38	58.4	2	3.1	**0.015**	30	46.2	30	46.2	5	7.6	**0.070**
Some influence (n=249)	89	35.7	116	47.0	43	17.3		81	32.5	128	51.4	40	16.1	
Great influence (n=161)	46	28.6	23	57.7	22	13.7		46	28.6	94	58.4	21	13.0	
Missing data	0		0		2			1		0		0		
Assistance from medical professions in treating refractory TB cases														
No influence (n=74)	32	43.2	31	41.9	11	14.9	**0.336**	31	41.9	35	47.3	8	10.8	**0.316**
Some influence (n=249)	82	32.9	131	52.6	36	14.5		81	32.5	129	51.8	39	15.7	
Great influence (n=147)	44	29.9	82	55.8	21	14.3		43	29.3	85	57.8	19	12.9	
Missing data	2		3		1			3		3		0		

[a] There was a missing value in the "experience in TB diagnosis and treatment" and the "willingness to offer TB treatments". The same case had missing values in "inspection and management of TB drug prescriptions", "assistance from medical professions in treating refractory TB cases" and the "experience in TB diagnosis and treatment"; another same case had missing value in "inspection and management of TB drug prescriptions", "assistance from epidemic prevention system in treating refractory TB cases", "assistance from medical professions in treating refractory TB cases", "physicians' load of medical paperwork" and the "willingness to offer TB treatments".

4. Multivariate logistic regression analysis for factors associated with the respondents' experience in TB diagnosis and treatment, and their willingness to offer TB treatments:

Table 5 showed the crude odds ratio (OR) for the odds of feeling "very frustrated and frustrated" in the. experience in TB diagnosis and treatment compared to other pulmonary or infectious diseases was 2.83 ($P = 0.015$) between those reporting "great influence" and those reporting "no influence" regarding the effect of the "inspection and management of TB drug prescriptions" measure on their willingness to offer TB treatments. After adjusting for the two variables of "seniority of attending years" and "the number of treated TB patients within one year", the OR remained 2.52 ($P = 0.031$). The crude OR for the odds of feeling "never willing and unwilling" to offer TB treatments compared to other pulmonary or infectious diseases infections was 2.37 ($P = 0.019$) between those reporting "some influence" and those reporting "no influence" regarding the effect of the "inspection and management of TB drug prescriptions" measure on their willingness to offer TB treatments, and the odds ratio was 6.47 ($P < 0.001$) between those reporting "great influence" and those reporting "no influence" regarding the effect of the "inspection and management of TB drug prescriptions" measure. After adjusting for the two variables of "seniority of attending years" and "the number of treated TB patients within one year", the OR remained as high as 2.63 ($P = 0.011$) and 7.21 ($P < 0.001$), respectively. These results revealed that "inspection and management of TB drug prescriptions" had significant influence on "frustrating experience in TB diagnosis and treatment" and the "willingness to offer TB treatments" for some physicians.

Table 5. Multivariate logistic regression analysis for factors associated with the respondents' experience in TB diagnosis and treatment, and their willingness to offer TB treatments

The factors that affected the willingness to offer TB treatments	The experience in TB diagnosis and treatment compared to other pulmonary or infectious diseases: [a](Very frustrated + frustrated) / (No difference + rewarding + very rewarding)				The willingness to offer TB treatments compared to other pulmonary or infectious diseases infections: [b](Never willing + unwilling) / (No difference + willing + very willing)			
	crude OR	*P* value	[c]OR	*P* value	crude OR	*P* value	[c]OR	*P* value
Physicians' load of medical paperwork								
No influence (Reference base)	1.0		1.0		1.0		1.0	
Some influence VS. No influence	1.10 (0.62-1.96)	0.744	0.96 (0.54-1.74)	0.903	1.81 (0.96-3.41)	0.069	1.78 (0.92-3.45)	0.088
Great influence VS. No influence	1.87 (0.86-4.09)	0.115	1.66 (0.75-3.67)	0.207	3.85 (1.74-8.52)	<0.001	3.88 (1.71-8.81)	0.001
Inspection and management of TB drug prescriptions								
No influence	1.0		1.0		1.0		1.0	
Some influence VS. No influence	1.38 (0.74-2.55)	0.312	1.32 (0.71-2.47)	0.371	2.37 (1.15-4.87)	0.019	2.63 (1.23-5.63)	0.011
Great influence VS. No influence	2.83 (1.23-6.53)	0.015	2.52 (1.08-5.91)	0.031	6.47 (2.67-15.71)	<0.001	7.21 (2.85-18.25)	<0.001
Assistance from epidemic prevention system in treating refractory TB cases								
No influence	1.0		1.0		1.0		1.0	
Some influence VS. No influence	6.57 (1.55-27.90)	0.011	6.76 (1.57-29.03)	0.010	2.30 (0.87-6.08)	0.094	3.34 (1.13-9.91)	0.029
Great influence VS No influence	5.25 (1.20-22.90)	0.028	5.04 (1.14-22.29)	0.033	1.80 (0.65-5.00)	0.259	2.42 (0.78-7.46)	0.123
Assistance from medical professions in treating refractory TB cases								
No influence	1.0		1.0		1.0		1.0	
Some influence VS. No influence	0.97 (0.47-2.01)	0.930	1.05 (0.50-2.22)	0.908	1.53 (0.68-3.44)	0.302	2.09 (0.88-5.00)	0.088
Great influence VS. No influence	0.95 (0.43-2.10)	0.908	0.91 (0.40-2.03)	0.806	1.22 (0.51-2.95)	0.652	1.42 (0.56-3.60)	0.443

[a] The three accomplishment levels of "no difference", "rewarding" and "very rewarding" were merged into one group, and the other two accomplishment levels of "very frustrated" and "frustrated" were merged into another group.

[b] The three willingness levels of "no difference", "willing", and "very willing" were merged into one group, and the other two willingness levels of "never willing" and "unwilling" were merged into another group.

[c] The OR of the two variables of "seniority of attending years" and "the number of treated TB patients within one year" in multivariate analysis were adjusted.

Table 5 also showed the crude OR for the odds of feeling “very frustrated and frustrated” in the experience in TB diagnosis and treatment compared to other pulmonary or infectious diseases was 6.57 (P = 0.011) between those reporting “some influence” and those reporting “no influence” regarding the effect of assistance from epidemic prevention system in treating refractory TB cases on their willingness to offer TB treatments, whereas the odds ratio was 5.25 (P = 0.028) between those reporting “great influence” and those reporting “no influence” regarding the effect of “assistance from epidemic prevention system in treating refractory TB cases.” After adjusting for the two variables of "seniority of attending years" and "the number of treated TB patients within one year", the OR remained as high as 6.76 (P = 0.010) and 5.04 (P = 0.033), respectively. The crude OR for the odds of feeling “never willing and unwilling” to offer TB treatments compared to other pulmonary or infectious diseases infections was 3.85 (P < 0.001) between those reporting “great influence” and “no influence” regarding the effect of “physicians’ load of medical paperwork” on their willingness to offer TB treatments. After adjusting for the two variables of "seniority of attending years" and "the number of treated TB patients within one year", the OR remained 3.88 (P = 0.001). These results revealed that “assistance from epidemic prevention system in treating refractory TB cases” and “physicians’ load of medical paperwork” had significant influence on “frustrating experience in TB diagnosis and treatment” and the “willingness to offer TB treatments” for some physicians.

5. The evaluation of the “Taiwan Guidelines for TB Diagnosis & Treatment ” by the respondents based on their profession and experience:

Among the respondents, 90.4% believed that the recommendations for the side effects of the anti-tuberculosis drugs in the “Taiwan Guidelines for TB Diagnosis & Treatment ” were very helpful or helpful. There were 85.2% of the respondents who believed that the guidelines were very helpful or helpful for the treatment of drug-resistant TB (Table 6). The results indicated that most physicians could get effective recommendations for TB diagnosis and treatment from the “Taiwan Guidelines for TB Diagnosis & Treatment”. However, in the fourth edition of the “Taiwan Guidelines for TB Diagnosis & Treatment”, lots of respondents thought that Chapter IV (12.2%), Chapter V (10.9%), Chapter VI (8.6%) and Chapter X (13.1%) needed to be written and compiled more clearly, and Chapter IV (9.2%), Chapter V (7.6%) and Chapter X (11.0%) were difficult to put into practice. This study provided relevant comments and feedback to the health authorities and served as a reference for future revisions of the “Taiwan Guidelines for TB Diagnosis & Treatment”.

Table 6. The evaluation of the “Diagnosis and treatment guidelines of tuberculosis” by the respondents

Questions in the questionnaire	No. of respondents(N=477)	Proportion (%)
Are the recommendations for the side effects of the anti-tuberculosis drugs in the “Taiwan Guidelines for TB Diagnosis & Treatment” helpful in treating TB patients?		
Very helpful	91	19.1%
Helpful	340	71.3%
No comments	21	4.4%
Not very helpful	23	4.8%
Not helpful at all	1	0.2%
Missing data	1	0.2%
Are the recommendations for the treatment of drug-resistant TB in the “Taiwan Guidelines for TB Diagnosis & Treatment” helpful in treating TB patients?		
Very helpful	79	16.6%
Helpful	327	68.6%
No comments	41	8.6%
Not very helpful	25	5.2%
Not helpful at all	4	0.8%
Missing data	1	0.2%

6. The evaluation of the "inspection and management of TB drug prescriptions" by the respondents:

Of the respondents, 70% thought the current "post-prescription review of medical records by TB experts to make physicians propose explanation for prescription deficiencies" was "appropriate" or "very appropriate" accounted for 70.0%; 23.7% had no comments; and 5.4% thought it was "inappropriate" or "very inappropriate". For the measure of "disallowing the applications of improper medical expenses for cases that violated the principles of TB diagnosis and treatment", only 30.8% of the respondents believed it was "appropriate" or "very appropriate"; 31.0% had no comments; and 37.1% thought it was "inappropriate" or "very inappropriate" (Table 7).

Table 7. The evaluation of the various schemes of the "inspection and management of TB drug prescriptions" by the respondents

Items in the questionnaire	No. of respondents (N=477)	Proportion (%)
Post-prescription review of medical records by TB experts to make physicians propose explanation for prescription deficiencies		
Very appropriate	84	17.6%
Appropriate	250	52.4%
No comments (neutral)	113	23.7%
Inappropriate	22	4.6%
Very inappropriate	4	0.8%
Missing data	4	0.8%
Disallow the applications of improper medical expenses for cases that violated the principles of TB diagnosis and treatment		
Very appropriate	29	6.1%
Appropriate	118	24.7%
No comments (neutral)	148	31.0%
Inappropriate	129	27.0%
Very inappropriate	48	10.1%
Missing data	5	1.0%
More clearly define the common conditions which are applicable standard prescriptions and the exceptions of clinicians' discretion based on individual patient's condition in the "Taiwan Guidelines for TB Diagnosis & Treatment"		
Very appropriate	108	22.6%
Appropriate	282	59.1%
No comments (neutral)	75	15.7%
Inappropriate	9	1.9%
Very inappropriate	0	0.0%
Missing data	3	0.6%
Physicians report refractory cases to nosocomial TB management committee for making medical decisions and leaving written records for physicians to follow		
Very appropriate	78	16.4%
Appropriate	273	57.2%
No comments (neutral)	101	21.2%
Inappropriate	16	3.4%
Very inappropriate	3	0.6%
Missing data	6	1.3%

For other possible solutions, Table 7 showed that a high proportion of respondents agreed that the Taiwan CDC should more clearly define the common conditions which are applicable standard prescriptions and the exceptions of clinicians' discretion based on individual patient's condition in the "Taiwan Guidelines for TB Diagnosis & Treatment" (81.7% believed it would be "appropriate" or "very appropriate"; 15.7% had no comments;

and only 1.9% thought it would be “inappropriate”). As for the other scheme of “reporting refractory cases to nosocomial TB management committee for making medical decisions and leaving written records for physicians to follow”, results were similar to those regarding “post-prescription review” (73.6% believed it would be “appropriate” or “very appropriate”; 21.2% had no comments; and 4.0% thought it would be “inappropriate” or “very inappropriate”).

Discussion

The most effective way of TB control is to block the infection chain. Early detection, providing a standardized medical care for patients, and improving treatment success rate can reduce the infection sources in the community. Thus, the quality of TB diagnosis and treatment is an important part of epidemic prevention. Undeniably, there are difficulties and uncertainties to treat tuberculosis, especially for cases with side effects or multi-drug resistant. In order to ensure the quality of TB treatment and take patients’ individual differences into account, Taiwan CDC, took TB experts’ recommendations to compile the “Taiwan Guidelines for TB Diagnosis & Treatment”, and constantly collected feedback and refined the contents of the guidelines to meet the needs of both physicians and patients. This study collected the opinions and feedback from 477 specialist physicians on the fourth edition of the “Taiwan Guidelines for TB Diagnosis & Treatment”. It is found that more than 85% of the physicians believed that the recommendations in the “Taiwan Guidelines for TB Diagnosis & Treatment” for treating patients with side effects of the anti-tuberculosis drugs and for the treatment of drug-resistant TB were very helpful or helpful. The results indicated that most physicians could get useful information about TB diagnosis and treatment from the guidelines.

To maintain the quality of TB prescriptions, the epidemic prevention authorities collaborated with National Health Insurance and Administration on administrative reviews of TB prescriptions to disallow the applications of medical expenses for improper TB prescriptions. However, this policy also increased physicians’ work load. These guidelines are not applicable to some refractory TB patients due to comorbidities or drug allergy, so that clinicians will put the patients’ individual conditions as a top priority, while the epidemic prevention system usually prioritizes the overall performance of public health. These two approaches are not always consistent, and both sides often have different opinions on inspection of prescriptions. Moreover, the epidemic prevention system is only concerned about the administrative indicators even when physicians bear the legal responsibility of toxicity from standard prescription medications in some cases. That may affect physicians’ willingness to offer TB treatments. The authorities should face the negative feedback on the “inspection and management of TB drug prescriptions” from some physicians, and continue to seek balance between epidemic prevention and social acceptance. More clearly defining the common conditions which are applicable standard prescriptions and the exceptions of clinicians’ discretion based on individual patient's condition in the future revision of the “Taiwan Guidelines for TB Diagnosis & Treatment” may be a feasible solution.

The results of this study also revealed that “assistance from epidemic prevention system

in treating refractory TB cases" had significant influence on the experience in TB diagnosis and treatment for some physicians. If the epidemic prevention officers can offer information about treating refractory TB cases to clinicians about past prescriptions, sputum culture results, antimicrobial susceptibility, and medication compliance at clinical attending, that will be greatly helpful for TB diagnosis and treatment. In addition, we found that "physicians' load of medical paperwork" had significant influence for some physicians on their willingness to offer TB treatments". The authorities should pay attention to the "assistance from epidemic preventing system" and the "rational load of medical paperwork" and should keep improving and communicating with medical practitioners for their recognition and cooperation, thus further upgrading Taiwan's quality of medical care for tuberculosis.

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References

1. WHO. Global tuberculosis control 2012. Available at: http:// www.who.int/iris/bitstream/ 10665/75938/1/9789241564502_eng.pdf
2. Centers for Disease Control, Ministry of Health and Welfare, Taiwan. Taiwan tuberculosis control report 2012. 2012; 3-4.
3. Centers for Disease Control, Ministry of Health and Welfare, Taiwan. Nationwide mobilization of the "Halving TB incidence in a decade" project, phase II. 2012; 13: 26-7.
4. Centers for Disease Control, Ministry of Health and Welfare, Taiwan. Taiwan Guidelines for TB Diagnosis & Treatment - Fourth edition, 2011.
5. Centers for Disease Control, Ministry of Health and Welfare, Taiwan. Taiwan Guidelines for TB Diagnosis & Treatment - Fifth Edition, 2013.

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