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Original Article

Application of KTH-integrated nursing model in care of patients with multi-drug resistant tuberculosis

Hanfen Wei[1], Xiaoqian Duan[2]

[1]The Five Tuberculosis Endemic Areas, The Public Health Clinical Center of Chengdu, Chengdu, Sichuan Province, China; [2]Department of Psychosomatic Medicine, Xijing Hospital, Air Force Military Medical University, Xi'an, Shaanxi Province, China

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Abstract: Objective: To evaluate the effect of the KTH-integrated nursing model of the knowledge-attitude-belief-practice model (KABP)-transtheoretical model (TTM)-as a health belief model (HBM) in nursing care of patients with multi-drug resistant tuberculosis (MDR-TB). Methods: Using a prospective study method, 102 patients with MDR-TB were randomly divided into two groups according to a random number table. The control group (n=51) received conventional nursing care, and the study group (n=51) received a KTH-integrated nursing model. The sputum negative conversion rate, effective rate of lesion absorption, level of disease cognition, compliance, self-efficacy (general self-efficacy scale, GSES score), healthy behavior (health-promoting lifestyle profile, HPLP), and quality of life (GQOL-74 scale score) were compared between the two groups. Results: Six months after enrollment, the sputum-negative conversion rate, total effective rate of lesion absorption, and total compliance rate of the study group were significantly higher than those of the control group (80.39% vs. 62.75%, 84.31% vs. 66.67%, 96.08% vs. 78.43%, P<0.05). 6 months after enrollment, the treatment plan, etiopathogenesis and harm, precautions, importance of treatment compliance, observation and follow-up, and total score of the study were all significantly higher than those of the control group (P<0.05). Six months after enrollment, the scores of GSES, HPLP and GQOL-74 in the study group were significantly higher than those of the control group (P<0.05). Conclusion: The implementation of a KTH integrated nursing model for patients with MDR-TB was beneficial to promote sputum-negative conversion and lesion absorption, and improved disease awareness, medication compliance, self-efficacy, healthy behavior, and quality of life.

Keywords: Multi-drug resistant tuberculosis, KTH integrated nursing model, sputum-negative conversion, quality of life

Introduction

Tuberculosis is a chronic infectious disease caused by M. tuberculosis infecting the lungs., It has the characteristics of strong infectivity, high incidence, and high relapse rate. The main clinical symptoms of the patients are dyspnea, hypodynamia, pectoralgia, and cough, and the prognosis is poor [1, 2]. Due to the need for long-term drug treatment, there are many drug adverse reactions and high treatment costs. Most patients have a low compliance with medical treatment, and often they miss their medications or take wrong medications, leading to repeated attacks and conversion to MDR-TB. This not only increases the difficulty of diagnosis and treatment, and affects the quality of life, but also increases the risk of epidemic prevention and health [3, 4].

At present, the clinical treatment plan for MDR-TB has not been perfected, and most patients are treated in accordance with the recommended plan for drug-resistant tuberculosis in the *Guidelines on the Chemotherapy of Drug-resistant Tuberculosis* [5]. Although this is helpful to promote the patients' sputum bacterial conversion and lesion absorption, it may easily be affected by many factors such as poor treatment compliance and poor self-care ability in the process of treatment. Thus the treatment effect cannot reach an ideal level. Therefore, it is particularly important to implement scientific and standardized nursing management accord-

ing to patients' psychologic, physiologic, and social function. A KTH-integrated nursing model, includes the knowledge attitude belief practice model (KABP), the transtheoretical model (TTM), and the health belief model (HBM). The integration of the three nursing concepts has both the characteristics of individual needs of patients and universality of disease nursing, which is helpful to improve patients' subjective feelings about their disease and treatment, and has benefits to improve their compliance behavior and quality of life [6, 7]. In recent years, a KTH-integrated nursing model has been gradually applied to the management of many chronic diseases with obvious benefit; but there are few reports on the feasibility of a KTH-integrated nursing model in MDR-TB [8, 9]. In view of this, for clinical application, this study explores the effect of a KTH-integrated nursing model on treatment compliance, self-care ability, healthy behavior, and quality of life in patients with MDR-TB.

Materials and methods

Baseline materials

This study was approved by the Medical Ethics Committee of our hospital. Using a prospective study method, 102 patients with MDR-TB treated in our hospital from August 2018 to January 2020 were selected as study subjects, including 60 males and 42 females, aged from 36 to 69 years old with an average age of 48.6±5.2 years. According to the random number table method, they were divided into two groups.

Inclusion criteria: (1) Patients who met the diagnostic criteria for tuberculosis in the *Guidelines for Primary Diagnosis and Treatment of Tuberculosis* and the sputum smear was confirmed positive by pathologic examination [10]. (2) The patients'communication ability was normal. (3) All patients received the recommended treatment for drug-resistant tuberculosis in the *Guidelines for chemotherapy of Drug-resistant Tuberculosis* [5]. (4) Patients were resistant to rifampicin, isoniazid, and others. (5) The patient was aware of the study and signed a consent form voluntarily.

Exclusion criteria: (1) The patient had a history of epilepsy or mental disorder. (2) The patient also had cognitive deficit or communication impairment. (3) The patients had the complications of organic pathologic changes of important organs such as heart, liver, or kidney. (4) The patient had a malignancy. (5) The patient had severe diabetes mellitus and dystrophia. (6) The patient withdrew part-way and could not be followed-up. (7) The patient was in gestation or lactation.

Methods

Control group: Patients in the control group received conventional nursing care, such as clinical guidance about anti-tuberculosis drugs, oral health education, daily life disinfection, and isolation guidance, notice of precautions, strengthening condition monitoring, and discharge guidance.

Study group: The KTH-integrated nursing model was applied to patients in the study group, and the specific measures were as follows: (1) Established a KTH group. The members of the group were composed of 1 head nurse, 1 attending doctor, 1 chief nurse, and 3 responsible nurses. The head nurse served as the group leader to organize the team members to learn the related theory knowledge of KABP, TTM, and HBM, combining KTH theory with patients' disease characteristics to formulate specific nursing measures. All group members had received unified training and passed the examination before they could take up the post. (2) KABP model. The group members had fully communicated with the patients, comprehensively evaluated the patients' education level, disease characteristics, and treatment plan recognition, and understood their behavior change intention, health beliefs, treatment compliance, and family function, to integrate the KABP, TTM, and HBM models to compile the handbook of *KTH integrated nursing intervention manual for MDR-TP* with illustrations and text. This involved the pathogenesis, and inducement, complications, clinical symptoms and physical signs, treatment plan, treatment adverse reactions, regular exercise, self-protection knowledge, special countermeasures, and psychologic adaptability of MDR-TP. One handbook was given for each patient to read and carry. (3) HBM: 1) Reconstruction of cognition: Since they were limited by family economic conditions, educational level and other factors, some patients lacked knowledge about the disease. So, the nurses needed to help patients

re-establish a correct understanding of the disease. 2) Individualized health education: team members had discussed with patients and family members how to formulate individualized health education programs, including health education, psychologic counseling, sputum care, pressure sore care, medication guidance, discharge nursing, and so on, and adjust the plan at any time according to the dynamic changes of the disease. 3) Health education: To enhance patients' awareness of the disease by issuing health manuals, popular science lectures, one-on-one interviews, videos and other forms, including: a. common sense of medication, such as the type of anti-tuberculosis drug, adverse reaction, usage and dosage, and informing patients of the harmfulness of changing the dose and times without authorization. b. common knowledge of pulmonary tuberculosis, such as pathogenesis, transmission route, clinical symptoms and preventive measures; c. preventive isolation, such as improving disinfection measures, wearing masks, sputum treatment; (4) TTM. On the basis of family visits and telephone follow-up, online education forms such as establishing WeChat groups, or official accounts were adopted to publicize related knowledge such as: risk early warning, medication, diet and functional exercise, to check and fill leaks, and improve the content of health education in a timely manner. Doctors logged into WeChat groups every week to communicate disease-related knowledge with patients online.

Outcome measurements

Main outcomes: (1) A negative conversion rate of sputum bacteria and the total effective rate of lesion absorption. The negative conversion rate of sputum bacteria and the total effectiveness rate of lesion absorption were evaluated with reference to the *Work Plan for the Management of Multidrug-resistant Tuberculosis Prevention and Control* [11]. The sputum smear test results were negative 6 months after enrollment, and no recovery of positive sputum for 8 weeks, was considered as sputum bacteria turning negative. Six months after enrollment, the examination results of chest X-ray showed that a lesion absorption of ≥50% was regarded as significant absorption. A lesion absorption <50% was regarded as absorption. The lesions that were not absorbed or enlarged or when there were new lesions were considered non-absorption. Total absorption rate = (number of cases of significant absorption + number of cases of absorption)/total number of cases * 100%. (2) Self-efficacy and healthy behavior. The GSES and the HPLP were used to evaluate the self-efficacy and health behavior of patients at the time of enrollment and 6 months after enrollment [12, 13]. The GSES includes 10 items, with 1-4 points for each item and 10-40 points for the total score. It showed a positive correlation between self-efficacy and scores. The HPLP included 52 items in 6 dimensions, with a total score of 52-208 points. There was a positive correlation between healthy behavior and score. (3) Quality of life. At the time of enrollment and 6 months after enrollment, GQOL-74 scale was used to evaluate the quality of life of the patients based on four dimensions of social function, psychological function, physical function and material life. The score of each dimension was 0-100, and there was a positive correlation between the quality of life and the scores [14].

Secondary outcome: (1) Level of disease awareness. At the time of enrollment and 6 months after enrollment, a self-designed disease cognition questionnaire was issued to the patients, including 5 items of treatment plan, etiopathogenesis and harm, precautions, importance of treatment compliance, disease observation, and follow-up. Each item had 20 points with a total score of 100 points, and the cognitive level was positively correlated with the scores. The Cronbach's α coefficient of the questionnaire was 0.85 and the test-retest reliability was 0.81. (2) Compliance. According to the Morisky Drug Compliance scale, the patients' medication compliance was evaluated. The total score was 8; <6 is non-compliance, 6-7 is partial compliance, and >7 is complete compliance [15]. The total compliance rate = (number of cases of complete compliance + number of cases of partial compliance)/total number of cases * 100%.

Statistical methods

The data were processed by SPSS 23.0. Measured data in accordance with normal distribution were expressed by ($\bar{x}$ ± sd). An independent sample t test and paired t test were used for inter-group and intra-group comparisons, respectively. Enumerated data were expressed

Table 1. Comparison of baseline data between the two groups of patients (n, $\bar{x} \pm sd$)

Group	Control group (n=51)	Study group (n=51)	χ^2/t	P
Male/Female	28/23	32/19	0.648	0.421
Age (years)	48.0±5.6	49.2±5.1	1.131	0.261
Course of pulmonary tuberculosis (months)	25.1±4.2	26.4±5.6	1.326	0.188
Lung disease (lung field)	2.62±0.51	2.53±0.84	0.654	0.515
Degree of education			0.491	0.782
Junior high school and below	20	18		
High school and technical secondary school	20	19		
College degree and above	11	14		
Drinking	26	29	0.355	0.551
Smoking	19	17	0.172	0.679

Table 2. Comparison of negative conversion of sputum bacteria and the total effective rate of lesion absorption between the two groups, at 6 months after enrollment (n, %)

Group	Control group (n=51)	Study group (n=51)	χ^2	P
Negative conversion of sputum bacteria	32 (62.75)	41 (80.39)	3.903	0.048
Lesion absorption				
Significant absorption	12 (23.53)	20 (39.22)		
Absorption	22 (43.14)	23 (45.10)		
Non-absorption	17 (33.33)	8 (15.69)		
Total absorption rate	34 (66.67)	43 (84.31)	4.292	0.038

by (n/%) and tested by χ^2 test. P<0.05 was considered a significant difference.

Results

Baseline data

There was no significant difference in baseline data between the two groups (P>0.05), and they were comparable. The details are shown in **Table 1**.

Negative conversion rate of sputum bacteria and the total effective rate of lesion absorption

Six months after enrollment, the negative conversion rate of sputum bacteria and the total effective rate of lesion absorption in the study group were higher than those in the control group (80.39% vs. 62.75%, 84.31% vs. 66.67%), and the difference was significant (P<0.05). Details are shown in **Table 2**.

Cognitive level of disease

There was no significant difference in the score of cognitive level of disease between the study group and the control group (P>0.05). The scores of cognitive levels of various diseases in the two groups 6 months after enrollment were significantly higher than those at the time of enrollment, and the treatment plan, etiopathogenesis, and harm, precautions, importance of treatment compliance, disease observation and follow-up, and the total score in the study group were significantly higher than those of the control group. The difference was significant (P<0.05). Details are shown in **Table 3**.

Compliance

The total compliance rate of the study group (96.08%) was higher than that of the control group (78.43%) (P<0.05). The details are shown in **Table 4**.

Self-efficacy and healthy behavior

There was no significant difference in scores of GSES and HPLP between the study group and the control group at the time of enrollment (P>0.05). After 6 months of enrollment. The scores of GSES and HPLP of the 2 groups were significantly higher than those at the time of enrollment. The scores of GSES and HPLP of the study group were higher than those of the control group, and the difference was signifi-

Table 3. Comparison of the level of disease cognition between the two groups ($\bar{x}$ ± sd, score)

Group	Control group (n=51)	Study group (n=51)	t	P
Treatment plan				
Time at enrolment	10.39±3.16	11.64±4.05	1.738	0.085
6 months after enrollment	13.64±4.25***	16.94±3.02***	4.520	<0.001
Etiology and harm				
Time at enrolment	9.12±3.67	9.64±3.55	0.727	0.469
6 months after enrollment	12.67±4.57***	16.34±2.88***	4.852	<0.001
Precautions				
Time at enrolment	8.31±3.16	8.94±3.54	0.948	0.345
6 months after enrollment	11.18±4.31***	15.52±3.37***	5.665	<0.001
Importance of treatment compliance				
Time at enrolment	11.03±2.25	11.16±2.36	0.285	0.776
6 months after enrollment	14.16±3.37***	17.26±2.19***	5.508	<0.001
Disease observation and follow-up				
Time at enrolment	10.17±2.94	9.98±3.05	0.320	0.750
6 months after enrollment	13.39±2.64***	17.16±2.26***	7.747	<0.001
The total score				
The time at enrolment	56.31±6.38	57.79±7.25	1.094	0.277
6 months after enrollment	72.16±7.95***	88.61±5.37***	12.245	<0.001

Note: Compared with the time when this group was enrolled, ***P<0.001.

Table 4. Comparison of compliance between the two groups (n, %)

Group	Complete compliance	Partial compliance	Non-compliance	Total compliance
Control group (n=51)	16 (31.37)	24 (47.06)	11 (21.57)	40 (78.43)
Study group (n=51)	29 (56.86)	20 (39.22)	2 (3.92)	49 (96.08)
χ^2				7.141
P				0.008

Table 5. Comparison of GSES score and HPLP score between the two groups ($\bar{x}$ ± sd, score)

Group	Control group (n=51)	Study group (n=51)	t	P
GSES score				
Time of enrolment	24.61±4.26	23.19±4.33	1.669	0.098
6 months after enrollment	27.61±4.06**	31.26±3.07***	5.121	<0.001
HPLP score				
The time of enrolment	97.26±10.28	96.34±11.46	0.427	0.670
6 months after enrollment	106.34±11.78***	118.62±13.30***	4.936	<0.001

Note: Compared with the time when this group was enrolled, **P<0.01, ***P<0.001. GSES: general self-efficacy scale; HPLP: health-promoting lifestyle profile.

cant (P<0.05). The details are shown in **Table 5** and **Figure 1**.

Quality of life

There was no significant difference in the scores of all dimensions of GQOL-74 scale between the study group and control group (P>0.05). Six months after enrollment of the two groups, the scores of all dimensions of GQOL-74 scale were increased, and the scores of social function, psychologic function, physical function, and material life in the study group were higher than those in the control group, (P<0.05). The details are shown in **Table 6** and **Figure 2**.

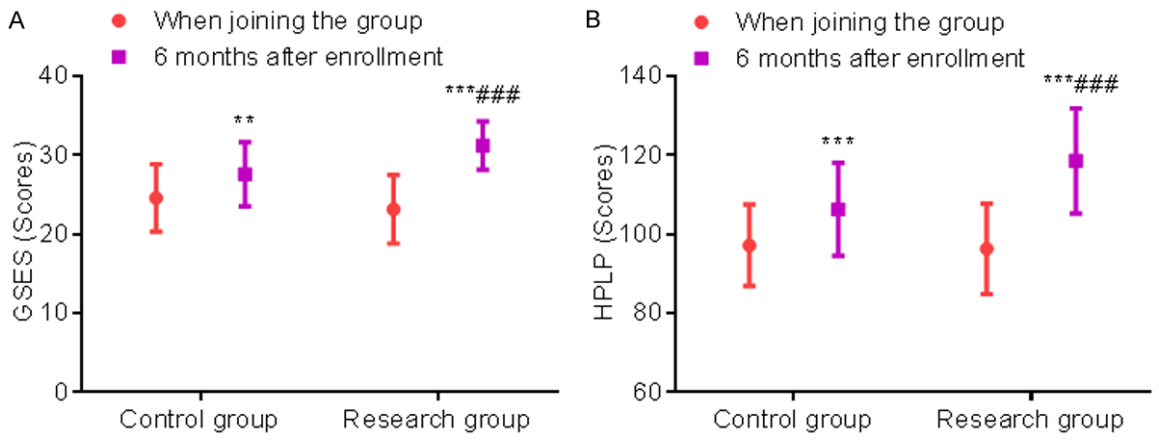

Figure 1. Comparison of GSES score and HPLP score between the 2 groups. A: GSES score; B: HPLP score. Compared with this group at the time when it was enrolled, **P<0.01, ***P<0.001; compared with the control group at 6 months after it was enrolled, ###P<0.001. GSES: general self-efficacy scale; HPLP: health-promoting lifestyle profile.

Table 6. Comparison of the scores of GQOL-74 scale between the two groups ($\bar{x}$ ± sd, score)

Group	Control group (n=51)	Study group (n=51)	t	P
Social function				
Time at enrolment	62.15±5.24	61.19±5.78	0.879	0.381
6 months after enrollment	76.38±6.38***	86.31±7.28***	7.326	<0.001
Psychologic function				
Time at enrolment	70.36±5.17	71.29±6.31	0.814	0.418
6 months after enrollment	75.29±6.08***	83.62±7.61***	6.107	<0.001
Physical function				
Time at enrolment	65.39±5.17	66.19±5.28	0.773	0.441
6 months after enrollment	73.28±6.22***	80.62±7.18***	5.518	<0.001
Material life				
Time at enrolment	76.68±5.59	77.73±6.02	0.913	0.363
6 months after enrollment	82.29±6.69***	90.03±5.57***	6.350	<0.001

Note: Compared with the time when the group was enrolled, ***P<0.001.

Discussion

The condition of multi-drug resisant (MDR-TB) is protracted and difficult to cure. MDR-TB patients often have negative emotions such as worry and scruples, which lead to poor compliance behavior and low self-care ability under a double blow of mental and physical disease, affecting the treatment effect. As a component element that cannot be ignored in the process of treatment, nursing services have a definite impact on the effect of disease treatment. Conventional nursing follows the concept of "disease-centeredness", resulting in nursing staff being overloaded lacking a subjective initiative. It isdifficult to achieve the nursing concept of "Patient-centered", ignoring patients' psychologic and health education needs. Therefore, the nursing plan needs to be improved to promote quality of life and healthy behavior. In this study, KTH integrated nursing care was applied to patients with MDR-TB. At the time of paying attention to KABP, the models of TTM and HBM were integrated to form a KTH integrated nursing model. This provided professional nursing guidance for patients from two aspects of behavior and concept with respect for the psychologic law of patients. This enabled promoting patients' cognition of the disease, and explained the severity and susceptibility of the disease, and gradually establishes health beliefs, and corrected adverse behaviors, and improved self-management ability and treatment compliance.

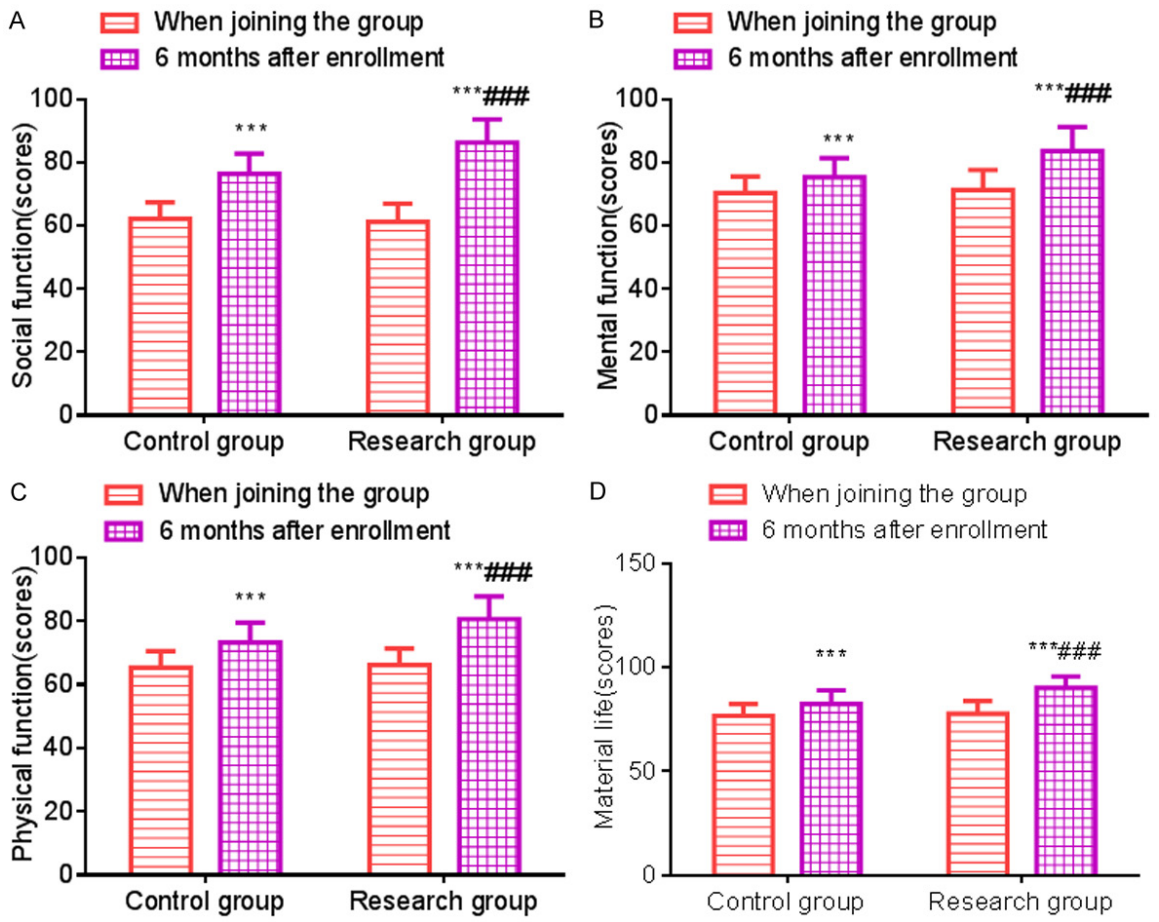

Figure 2. Comparison of scores of the GQOL-74 scale between 2 groups. A: Social function score; B: Mental function score; C: Physical function; D: Material life. Compared with this group when it was enrolled, ***P<0.001; compared with the control group 6 months after enrollment, ###P<0.001. GQOL-74: Generic Quality of Life-74.

KTH integrated nursing care is a nursing model that combines the advantages of three models KABP, TTM, and HBM, which can ensure that the nursing content is more scientific, systematic, and targeted [16, 17]. Among these, the KABP model holds that human behavior is composed of three stages: the acquisition of knowledge, the establishment of beliefs, and the formation of behavior. The TTM model holds that the changes of individual behavior belong to a dynamic cycle stage, that can be divided into an unintentional phase, intentional phase, action phase, and maintenance phase. The first two phases are aimed at self-evaluation and awakening consciousness, and the latter two phases are implemented to strengthen management, help relationship, stimulus control, and self-liberation. The HBM holds that health belief is a key link for individuals to change adverse behavior, and it emphasizes the key role of subjective psychology such as individual belief, thinking, expectation, and reasoning in changing of human behavior [18, 19]. Chun's and other studies reported that KTH integrated nursing intervention helps to improve patients' self-efficacy and quality of life, reduce the incidence of postoperative complications, and show higher patient satisfaction [20]. In this study, the negative conversion rate of sputum bacteria, total effective rate of lesion absorption, and the total compliance rate for treatment in the study group were higher than those in the control group. Six months after enrollment, the scores of disease knowledge, GSES, HPLP, and GQOL-74 in the treatment group were higher than those of the control group. Thus it can be seen that giving a KTH integrated nursing model to MDR-TB patients is helpful in promoting the outcome of disease, enhancing disease awareness, and improving

self-efficacy and quality of life. The rationale for the analysis is that in the KABP model, a comprehensive assessment of patients' education, characteristics of the disease, and recognition of treatment plans, and the formulation of targeted health manuals can help patients establish positivity and correct beliefs and attitude. It abandons the form of "duck-feeding" education in traditional nursing care, so as to give full play to their subjective initiatives, and prompts patients to shift from passive to active treatment, and actively form healthy behaviors [21, 22]. In the HBM model, strengthening the education of knowledge about medication, tuberculosis, and preventive isolation can correct patients' previous misunderstandings, improve the ability of disease cognition and self-management, and show adaptation to role changes as soon as possible. This ensures the effect of rehabilitation. In the TTM model, through the establishment of a WeChat platform to establish close communication with patients, to break through the restrictions of region, time, and other factors on medical services. Through text, voice, video, and other diversified forms, this integrates the relevant knowledge of health education into daily life, and gradually improves the level of patients' health knowledge. This cannot only answer patients' questions in time, but also provides them with professional guidance, and avoids the lack of pertinence of centralized health education [23-25].

In sum, the implementation of a KTH integrated nursing model for MDR-TB patients is helpful to promote sputum bacteria negative conversion and lesion absorption, and improves disease cognition, medication compliance, and improves self-efficacy, healthy behavior and quality of life. However, there are still some shortcomings of this study, such as a small number of samples, short follow-up time, and lack of relevant clinical research support. Thus, it is still necessary to use a large sample size and multicenter prospective study in further studies.

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Disclosure of conflict of interest

None.

Address correspondence to: Xiaoqian Duan, Department of Psychosomatic Medicine, Xijing Hospital, Air Force Military Medical University, No. 127 Changle West Road, Xincheng District, Xi'an 710032, Shaanxi Province, China. Tel: +86-029-84771141; E-mail: duanxiaoqian27xj@163.com

References

[1] Lange C, Chesov D, Heyckendorf J, Leung CC, Udwadia Z and Dheda K. Drug-resistant tuberculosis: an update on disease burden, diagnosis and treatment. Respirology 2018; 23: 656-673.

[2] Kendall EA, Azman AS, Cobelens FG and Dowdy DW. MDR-TB treatment as prevention: the projected population-level impact of expanded treatment for multidrug-resistant tuberculosis. PLoS One 2017; 12: e0172748.

[3] Muniyandi M and Ramachandran R. Current and developing therapies for the treatment of multi drug resistant tuberculosis (MDR-TB) in India. Expert Opin Pharmacother 2017; 18: 1301-1309.

[4] Al-Mutairi NM, Ahmad S and Mokaddas EM. Molecular characterization of multidrug-resistant mycobacterium tuberculosis (MDR-TB) isolates identifies local transmission of infection in Kuwait, a country with a low incidence of TB and MDR-TB. Eur J Med Res 2019; 24: 38.

[5] Xiao HP. Chemotherapy guidelines for drug resistant tuberculosis. In: Xiao HP, editor. Beijing: People's Medical Publishing House; 2011.

[6] Tola HH, Shojaeizadeh D, Tol A, Garmaroudi G, Yekaninejad MS, Kebede A, Ejeta LT, Kassa D and Klinkenberg E. Psychological and educational intervention to improve tuberculosis treatment adherence in ethiopia based on health belief model: a cluster randomized control trial. PLoS One 2016; 11: e0155147.

[7] Zein RA, Suhariadi F and Hendriani W. Estimating the effect of lay knowledge and prior contact with pulmonary TB patients, on health-belief model in a high-risk pulmonary tb transmission population. Psychol Res Behav Manag 2017; 10: 187-194.

[8] Prasetya H, Murti B, Anantanyu S and Syamsulhadi M. The effect of hypnosis on adherence to antituberculosis drugs using the health belief model. Int J Clin Exp Hypn 2018; 66: 211-227.
[9] Azizi N, Karimy M and Salahshour VN. Determinants of adherence to tuberculosis treatment in Iranian patients: application of health belief model. J Infect Dev Ctries 2018; 12: 706-711.
[10] Chinese Medical Association. Guidelines for Primary Diagnosis and Treatment of Tuberculosis (2018). Chin J Gen Pract 2019; 18: 709-717.
[11] Wang Y. Multi drug resistant tuberculosis prevention and management program. In: Wang Y, editor. Beijing: Military Medical Science Press; 2012.
[12] Salsman JM, Schalet BD, Merluzzi TV, Park CL, Hahn EA, Snyder MA and Cella D. Calibration and initial validation of a general self-efficacy item bank and short form for the NIH PROMIS. Qual Life Res 2019; 28: 2513-2523.
[13] Rathnayake N, Alwis G, Lenora J and Lekamwasam S. Impact of health-promoting lifestyle education intervention on health-promoting behaviors and health status of postmenopausal women: a quasi-experimental study from Sri Lanka. Biomed Res Int 2019; 2019: 4060426.
[14] Seung KJ, Keshavjee S and Rich ML. multidrug-resistant tuberculosis and extensively drug-resistant tuberculosis. Cold Spring Harb Perspect Med 2015; 5: a017863.
[15] Moon SJ, Lee WY, Hwang JS, Hong YP and Morisky DE. Accuracy of a screening tool for medication adherence: a systematic review and meta-analysis of the morisky medication adherence scale-8. PLoS One 2017; 12: e0187139.
[16] Jaber AAS and Ibrahim B. Health-related quality of life of patients with multidrug-resistant tuberculosis in Yemen: prospective study. Health Qual Life Outcomes 2019; 17: 142.
[17] Farley JE, Kelly AM, Reiser K, Brown M, Kub J, Davis JG, Walshe L and Van der Walt M. Development and evaluation of a pilot nurse case management model to address multidrug-resistant tuberculosis (MDR-TB) and HIV in South Africa. PLoS One 2014; 9: e111702.
[18] Nellums LB, Rustage K, Hargreaves S and Friedland JS. Multidrug-resistant tuberculosis treatment adherence in migrants: a systematic review and meta-analysis. BMC Med 2018; 16: 27.
[19] Olaru ID, Lange C and Heyckendorf J. Personalized medicine for patients with MDR-TB. J Antimicrob Chemother 2016; 71: 852-855.
[20] Bai YC and Chen C. Effect of KTH integrated nursing intervention on self-efficacy and quality of life of patients after liver transplantation. Nnrsing Prac Res 2017; 14: 54-56.
[21] Alene KA, Clements ACA, McBryde ES, Jaramillo E, Lönnroth K, Shaweno D, Gulliver A and Viney K. Mental health disorders, social stressors, and health-related quality of life in patients with multidrug-resistant tuberculosis: a systematic review and meta-analysis. J Infect 2018; 77: 357-367.
[22] Mukati S, Julka A, Varudkar HG, Singapurwala M, Agrawat JC, Bhandari D and Jain A. A study of clinical profile of cases of MDR-TB and evaluation of challenges faced in initiation of second line anti tuberculosis treatment for MDR-TB cases admitted in drug resistance tuberculosis center. Indian J Tuberc 2019; 66: 358-363.
[23] Vo NX, Xuan Doan TB, Kha Vo DN, Tran TK and Vo TQ. Assessing quality of life for multidrug-resistant and extensively drug-resistant tuberculosis patients. J Pak Med Assoc 2019; 69: S137-S157.
[24] Zheng XB, Diwan VK, Zhao Q, Hu Y, Bruchfeld J, Jiang WL, Hoffner S and Xu B. Treatment quality and outcome for multidrug-resistant tuberculosis patients in four regions of China: a cohort study. Infect Dis Poverty 2020; 9: 97.
[25] Migliori GB, Tiberi S, Zumla A, Petersen E, Chakaya JM, Wejse C, Muñoz Torrico M, Duarte R, Alffenaar JW, Schaaf HS, Marais BJ, Cirillo DM, Alagna R, Rendon A, Pontali E, Piubello A, Figueroa J, Ferlazzo G, García-Basteiro A, Centis R, Visca D, D'Ambrosio L and Sotgiu G. MDR/XDR-TB management of patients and contacts: challenges facing the new decade. The 2020 clinical update by the Global Tuberculosis Network. Int J Infect Dis 2020; 92S: S15-S25.