A study on foreign students' preventive behavior, knowledge and attitude towards tuberculosis

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Abstract. The purpose of this study is to grasp foreign students' knowledge, attitude and preventive behavior with regard to tuberculosis (Tb) and to discern the direct and indirect effect between each variables so as to provide baseline data to develop a health education program for the effective Tb management of foreign students in Korea. In the analysis of Pearson's correlation among knowledge about Tb, attitude towards Tb, and preventive behavior towards Tb, it was verified that there was a positive correlation among them. And on the basis of this, a mediating effect between variables was tested. And attitude towards Tb had a positive mediating effect in the relationship between knowledge about Tb and prevention behavior toward Tb.

1 Introduction

Since 2006, the number of patients with tuberculosis has decreased globally. However, there were about 9 million affected patients in the world in 2013, and the number of deaths amounted to 1.5 million. In particular, the number of people with latent tuberculosis is 2 billion, which is about 30% of the world’s population. WHO declared tuberculosis as a global health emergency and it requires intensive and continuous management [1]. In Korea, although the incidence of tuberculosis has decreased continuously, it is much higher than the average incidence of tuberculosis for OECD member countries (12.9 per 100,000 persons), and the number of new patients is no longer decreasing in recent years [2].

Through the ‘Global Education Service Activation Plan’ of the Ministry of Education and Science Technology [3], the number of foreign students has increased rapidly in Korea, most of them coming from the countries with high risk of tuberculosis. So it is urgent to manage tuberculosis for foreign students. According to previous
research, patients’ knowledge about tuberculosis was an important element affecting compliance with treatment procedures for tuberculosis [4], and thus it is essential to implement tuberculosis-related health education for foreign students. Jeong reported that 57.2% of Chinese foreign students were in need of health education, and 60.3% indicated an intention to participate in health education, supporting the necessity of health education [5]. However, for health education to bring about appropriate health behavior, knowledge and attitude toward tuberculosis need to be understood, and education based on the characteristics and level of the subjects should be provided. But there has been no study about tuberculosis focusing on college students especially, foreign students. The purpose of this study is to grasp knowledge, attitude, and preventive behavior toward tuberculosis of foreign students.

2 Method

2.1 Samples

The research participants were a total of 228 foreign students from a local, private university in B and Y city. The data collection was mostly performed during foreign student meeting, Korean classes, and liberal arts classes from April 15 to June 30, 2015. The questionnaire was translated into Chinese and English in consideration of the nationalities of the students.

2.2 Measures

Knowledge, attitude, and preventive behavior about tuberculosis were measured using the tool devised by Cha(2012)[6]. The questionnaire was translated into Chinese and English in consideration of the nationalities of foreign students.

2.3 Data analysis

The data analysis was performed using the IBM SPSS Statistics Ver. 21 program, and the detailed analysis method is as follows

1) The demographic characteristics of the research subjects were examined by descriptive statistics.
2) To examine the relation between variables, a Pearson's correlation analysis was performed.
3) The procedure of Baron and Kenny (1986) was used to test the mediating effect between each variable[7].
2.4 Ethical Consideration

This research was conducted with the IRB approval of Y University (Approval number: YSUIRB-201509-HR-02). Questionnaires translated into Chinese and English were used so that the research subjects could understand the purpose and intent of this study. For written consent, subjects were made to write down their names and departments in their own handwriting; and for the questionnaire, an anonymous survey was conducted separately from the written consent procedure.

3 Results

3.1 Characteristics of the Participants

With regard to the gender of the participants, 60.5% were males (135 persons) and 39.5% were females (88 persons). The average age was 23.07±2.096. The average Korea residence period was 24.53±17.307 months, and a 1~2 years residence period accounted for 32% of the total, which was the most common.

3.2 The characteristics of participants

For the experience of tuberculosis-related education 59.6% of the participants had received education. 37.9% of the responded that they had gained information about tuberculosis through the internet.

With regard to the tuberculosis infection experience, 94.5% of the participants responded they did not have an infection experience, but 5.5% (12 subjects) responded they had a tuberculosis infection experience. 10 participants (83.3%) responded they had received treatment for Tuberculosis, and two of them responded they had not received treatment but that the disease was cured.

3.3 Knowledge, attitude and preventive behavioral score towards tuberculosis of participants

Table 1 shows the knowledge, attitude, and preventive behavior level toward tuberculosis of participants.

Table 1. Knowledge about Tb, attitude and preventive behavior score towards tuberculosis of participants
<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total score of knowledge of tuberculosis</td>
<td>195</td>
<td>0.00</td>
<td>25.00</td>
<td>13.54</td>
<td>5.399</td>
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<tr>
<td>Epidemiology and route of infection</td>
<td>204</td>
<td>0.00</td>
<td>12.00</td>
<td>5.44</td>
<td>2.334</td>
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<tr>
<td>Screening for tuberculosis prevention</td>
<td>218</td>
<td>0.00</td>
<td>5.00</td>
<td>3.18</td>
<td>1.327</td>
</tr>
<tr>
<td>The importance of treatment</td>
<td>220</td>
<td>0.00</td>
<td>5.00</td>
<td>2.40</td>
<td>1.506</td>
</tr>
<tr>
<td>Awareness of latent tuberculosis and contact investigation</td>
<td>225</td>
<td>0.00</td>
<td>10.00</td>
<td>1.54</td>
<td>1.369</td>
</tr>
<tr>
<td>Symptoms of tuberculosis</td>
<td>223</td>
<td>0.00</td>
<td>3.00</td>
<td>0.96</td>
<td>1.114</td>
</tr>
<tr>
<td>Attitude score about tuberculosis</td>
<td>211</td>
<td>43.00</td>
<td>75.00</td>
<td>56.99</td>
<td>6.933</td>
</tr>
<tr>
<td>Preventive behavioral score towards tuberculosis</td>
<td>218</td>
<td>44.00</td>
<td>75.00</td>
<td>59.61</td>
<td>7.634</td>
</tr>
</tbody>
</table>

### 3.4 Correlation among Preventive Behavior, Attitude towards Tb, and Knowledge about Tb

To test the mediating effect of the attitude toward tuberculosis of the participants, a correlation analysis was performed for knowledge, preventive behavior, and attitude toward tuberculosis, and the results are summarized in Table 2.

**Table 2. Correlation among preventive behavior, attitude and knowledge**

```
<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<tbody>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Screening for tuberculosis prevention</td>
<td>0.495***</td>
<td>1</td>
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<td></td>
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<tr>
<td>The importance of treatment</td>
<td>0.376***</td>
<td>0.510**</td>
<td>1</td>
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</tr>
<tr>
<td>Awareness of latent tuberculosis and contact investigation</td>
<td>0.368***</td>
<td>0.481**</td>
<td>0.390**</td>
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<td></td>
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<tr>
<td>Symptoms of tuberculosis</td>
<td>0.334***</td>
<td>0.344**</td>
<td>0.358**</td>
<td>0.503**</td>
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<tr>
<td>Total score of knowledge of tuberculosis</td>
<td>0.792***</td>
<td>0.771**</td>
<td>0.700**</td>
<td>0.710**</td>
<td>0.618**</td>
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</table>
```
Preventive behaviors towards tuberculosis

M 5.21 3.18 2.40 1.47 0.96 13.64 56.99 59.61
S.D 2.223 1.327 1.506 1.146 1.114 5.402 6.933 7.634

3.5 Effect of Knowledge about Tb on Preventive Behavior through the Mediation of Attitude toward Tb

To verify the mediating effect of attitude toward tuberculosis on the relation between knowledge and tuberculosis prevention behavior, a three-step regression analysis was performed. Thus, attitude toward tuberculosis had a positive comprehensive mediating effect on the relation between knowledge about tuberculosis and tuberculosis prevention behavior (Table 3, figure 1).

Table. 3. Mediated effect of attitude on relation between knowledge and preventive behavior towards Tb

<table>
<thead>
<tr>
<th>step</th>
<th>Variables</th>
<th>Unstandardized coefficient</th>
<th>Standardized coefficient</th>
<th>t (p)</th>
<th>Collinearity statistics</th>
<th>F (p)</th>
<th>R2</th>
<th>ΔR2</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Knowledge of tuberculosis-&gt; Tuberculosis prevention behavior</td>
<td>.256 .102 .183 * .2512 (.013)</td>
<td>1.83</td>
<td>1.00</td>
<td>1.00</td>
<td>6.312* (.013)</td>
<td>.34</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Knowledge of tuberculosis-&gt; Attitude about tuberculosis</td>
<td>.300 .096 .230 * .3122 (.002)</td>
<td>2.30</td>
<td>1.00</td>
<td>1.00</td>
<td>9.747** (.002)</td>
<td>.053</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Knowledge of tuberculosis-&gt; Tuberculosis prevention behavior</td>
<td>.029 .098 .020 .294 (.769) .942</td>
<td>1.06</td>
<td>2</td>
<td>26.829*** (.000)</td>
<td>.240 .206</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attitude about tuberculosis-&gt; Tuberculosis prevention behavior</td>
<td>.526 .075 .485 * 7.033*** (.000)</td>
<td>1.06</td>
<td>2</td>
<td>26.829*** (.000)</td>
<td>.240 .206</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4 Conclusions

Based on the results of this study, it was found that the current risk status of tuberculosis infection among foreign students is at quite serious level, and health-related policies for foreign students and the resultant health education are ineffective. Therefore, accurate knowledge and information about tuberculosis needs to be provided, and a health education program that can change perceptions and attitudes toward tuberculosis needs to be developed. Thus, universities need to become more and aware and interested in the health care of foreign students, and also need to prepare relevant plans.

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