

The Relation of Knowledge, Attitude, and Perceived Seriousness for Korean Nursing Student

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Abstract

This study is a descriptive correlation research for understanding the relation between knowledge and attitude toward tuberculosis targeting Korean university students. The data collection was performed for a month from April 1st 2020. The data collected from total 166 subjects was analyzed by using the SPSS 23.0 Program. The mean age of subjects was 20. According to the general characteristics, the knowledge of tuberculosis did not show significant differences. In the attitude toward tuberculosis according to the general characteristics, the students who lived with their family showed the higher score than the students who lived in dormitory ($F=0.513$, $p=0.035$). In the rate of correct answers to tuberculosis, the question <If examine sputum of tuberculosis patients, Mycobacterium tuberculosis is always seen.> showed the lowest rate of correct answers. And in the score of attitude, the subjects had no interest in tuberculosis. Regarding the correlations of knowledge, attitude, and perceived seriousness of tuberculosis, the attitude and perceived seriousness of tuberculosis ($r=0.196$, $p=.013$), and the knowledge and perceived seriousness of tuberculosis ($r=0.211$, $p=.007$) showed positive correlations. This study could understand the actual status of tuberculosis targeting the nursing students, and the results of this study verified the necessity of education that could improve their knowledge and attitude.

Keywords: Tuberculosis. Knowledge. Attitude. Student. Seriousness, COVID-19

1. Introduction

Tuberculosis is a respiratory infectious disease caused by tuberculosis germs. Out of 36 member countries of Organization for Economic Cooperation and Development (OECD), Korea is ranked as the first place for the incidence rate of tuberculosis, and the second place for the death rate caused by it. In 2019, tuberculosis takes up the second-most reported number of patients following chickenpox among infectious diseases, and the most number of deaths [1]. Tuberculosis is regarded as one of the most serious infectious diseases worldwide despite the improvement of the medical environment with the development of modern medicine [2].

Tuberculosis, once caught, requires long-term treatment and management for 6-24 months or longer, but it poses a threat to public health due to discontinuation of treatment and drug-resistant tuberculosis [2]. The number of new tuberculosis patients in 2020 was 19,933 ($N=38.8/100,000$), which was decreased by 16.3% than the previous year ($N=23,821$). Since the operation of the national tuberculosis monitoring system in 2000, the number of new patients entered the range of 10,000s for the first time [3]. This decrease must be influenced by the effects of tuberculosis preventive control policy and delayed visit to medical institutions & delayed diagnosis of tuberculosis patients caused by

the COVID-19 pandemic[4].

The World Health Organization(WHO) and Stop TB Partnership predicted the increase in the number of tuberculosis patients and deaths in the future even through the tuberculosis patients could be temporarily decreased by the influence of the COVID-19 pandemic. And they recommended to maintain the essential tuberculosis management system on top of responses to the COVID-19, in order to achieve the goal of eradicating tuberculosis in the whole world by 2030[4], [5].

Viewing the number of new tuberculosis patients from 2018to 2020, when the age was higher, the rate of new tuberculosis patients was also high. However, when changing from the 10s to the 20s, the incidence rate was rapidly increased from a single digit to double digits compared to other age groups[5]. The period of university student after going through the adolescence, is an important period of establishing the basic health for healthy life in adulthood, by experiencing various stresses in new social environment. College students in early adulthood are at the peak of physical growth and intellectual development, and have the lowest mortality and morbidity rates in their life cycle. However, Korean college student culture contains various harmful factors that threaten the physical and mental health of students [6].College students are active and curious, so they are not afraid of risky behaviors or have overconfidence in their health.

In addition, there are many cases of independence from home, which leads to nutritional imbalance and lack of exercise, and increases the risk of having an unrestricted lifestyle [7].As a result, the body's immunity is weakened, and there is a high possibility of infection with tuberculosis, and there is a high possibility of infection with tuberculosis in the situation of using a closed school bus or living in an unventilated classroom.The communal living in university, independent life while living in dormitory or apart from family, and academic/employment stresses could threaten the physical and psychological health of university students[6]. This vulnerability could raise the university students' chance to be exposed to the tuberculosis infection, and especially, as preservice hospital employees, the nursing students have the higher probability to be exposed to infectious diseases like tuberculosis through hospital practice compared to other people in their 20s[7].

If the perception of tuberculosis is insufficient, the risk to be exposed to tuberculosis would be increasing. In relation to tuberculosis, there were domestic preceding researches targeting high school students[9],[10], university students related to health science[7], [11], and nursing students[8], [12], [13], [14]. Especially, the researches on nursing students that perform clinical practice and would become medical personnel in the future should be continued. However, compared to the continuous occurrence of tuberculosis, it is lacking in the researches on it.

Due to the complexity and diversification of the living environment, new infectious diseases such as MERS and Corona are occurring, and the number of deaths due to these is increasing. Corona vaccination is also implemented in each country, but the risk of infectious diseases continues due to various mutated viruses.

Under the current COVID-19pandemic, it has been reported that a tuberculosis patient who was also infected with the COVID-19simultaneously is highly possible to have bad results of treatment. In

case when infected with a new infectious disease and tuberculosis together, it could be more dangerous, so the interest in tuberculosis should be continued[4].

This study was performed to understand the nursing students' knowledge and attitude toward tuberculosis, and also to establish the basic data for tuberculosis preventive education.

2. Study Methods

2.1. Study Design

This study design is a descriptive correlation research for understanding the knowledge, attitude, and perceived seriousness targeting Korean university students. Through the convenience sampling method, the nursing students of universities in Gyeonggi-do, Chungcheongnam-do, and Chungcheongbuk-do were selected as the subjects of this study.

Using the G-Power 3.1.2 Program, the minimum sample size required for the regression analysis was calculated. This study targeted the students enrolled in two universities in Daejeon Metropolitan City, one university in Chungcheongnam-do, and one university in Gyeonggi-di. In order to obey the research ethics, the researcher sufficiently explained the purpose of this study and the contents of questionnaire to subjects, and then let the subjects who agreed on the participation in this study participate in this study.

The sample size was calculated by using the G Power 3.1.9.2 program. Based on the significance level($\alpha=.05$), test power($1-\beta=.95$), effect size(f^2) 0.15), and 15 predictive factors, the minimum number of sample required for this study was 132. Considering the drop-out rate, total 170 people participated in this study. After excluding four questionnaires with insufficient contents, total 166 questionnaires were used for the analysis. The data was collected from April 1st to April 30th 2020. Before data collection, the ethical aspect of subjects was considered.

2.2. Study Tools

This study is composed of six questions about general characteristics, 30 questions about knowledge of tuberculosis, 15 questions about attitude toward tuberculosis, and one question about perceived seriousness, and the concrete contents are as follows. Regarding the instrument of this study, the researcher developed, modified, and complemented it based on preceding researches, and two professors of nursing science reviewed the content validity. The general characteristics were composed of gender, age, school year, type of residence, and matter of tuberculosis test. The concrete contents of knowledge, attitude, and perceived seriousness are as follows.

2.2.1. Knowledge on Tuberculosis

In order to measure the Knowledge on tuberculosis by nursing students, this study used the 'Knowledge on tuberculosis' developed by Cha[20]. Meaning the individual's level of knowledge about epidemiology & infection route, treatment method, symptoms, and preventive examination of tuberculosis, the knowledge of tuberculosis had total 30 questions including 14 questions about epidemiology & infection, five questions about prevention examination, five questions about importance

of treatment, three questions about cognition of contact examination & latent tuberculosis, and three questions about symptom.

Each question could be responded as 'Yes' for 1point, 'No' for 0point, and 'I don't know'. The correct answer receives 1point while the wrong or unknown answer receives 0point(Scope of score: 0-30points). The higher total score means the higher degree of knowledge about tuberculosis. In the research[8] by Cha. the reliability of instrument was cronbach' α ='.87, and in this study, it was cronbach' α ='.96.

2.2.2. Attitude on Tuberculosis

In order to measure the Attitude on tuberculosis by nursing students, this study used the 'Attitude on tuberculosis' developed by Cha [20]. Attitude toward tuberculosis refers to tuberculosis prevention education, the importance of treatment, and awareness of tuberculosis. There were 15 items in total, and each item was measured on a Likert scale ranging from 1 point 'Not at all' to 4 points 'strongly agree' (score range 15-60 points). The higher the score, the more positive the attitude toward tuberculosis. In Cha's study [8], the reliability of instrument was cronbach' α ='.83, and in this study, it was cronbach' α ='.94.

2.2.3. Perceived Seriousness on Tuberculosis

In order to measure the Perceived seriousness on tuberculosis by nursing students, researcher developed it based on preceding researches, and two professors of nursing science reviewed the content validity. Perceived seriousness on tuberculosis is one question. This question is two professors of nursing science reviewed the content validity.

The Perceived seriousness on tuberculosis was composed of one item on the basis of 10-point Likert Scale (1: Not at all, 10: Very Seriousness).

2.3. Data Collection and Ethical Considerations

The Data collection and ethical considerations are as follows. In this study, the data was collected through self-reported structured questionnaire. The data collection was performed for a month of April. The survey was conducted before starting the class after explaining the significance and purpose of this survey and then getting permission of the survey.

Before starting the survey, the researcher and a trained research assistant fully explained the purpose and significance of this study, voluntary will to participate, reward for participation in this study, no disadvantages in case when not participating in this study, guarantee of anonymity by anonymously handling personal information.

In case when agreeing on the participation in this study, they were asked to sign on the written consent to research participation, and then to respond to the questionnaire. To prevent the leakage of personal information and survey contents, the researcher immediately collected the questionnaires and then input the data. The written consent forms and questionnaires were kept in the researcher's private

research office with a locking device, so no one could access it except for the researcher. All the collected data was discarded after the research ended.

2.4. Data Analysis

The collected data was analyzed by using the IBM PASW Statistics (SPSS) 23.0 program. The general characteristics of research subjects were analyzed through frequency and percentage. To examine differences in knowledge and attitude toward tuberculosis according to the general characteristics, the t-test and ANOVA were conducted.

As the post-test, the Scheffe' test was used. The correct answer rate of knowledge and score of attitude toward tuberculosis were analyzed through frequency, percentage, mean, and standard deviation. The correlation was analyzed through the Pearson correlation.

3. Results

3.1. General Characteristics

The general characteristics are as follows[Table 1].The mean age of subjects was 20. In gender, the male (51.8%) showed the higher percentage. In school year, the second year(55.4%) was the most. In the type of residence, the dormitory(36.1%) was the most. Regarding the matter of cohabitation, the percentage of living together with friend(32.5%) or family(39.2%) was higher than living alone(20.5%). There were more subjects with no experiences in tuberculosis test(53.0%) than the experienced subjects. The score of knowledge about tuberculosis was 16.84 of 30 while the score of attitude toward tuberculosis was 45.44 of 60. The score of perceived seriousness was 3.72 of 5.

Table I. General characteristics

N=166

Characteristics	Categories	n(%)or M±SD
Age		20.00±3.73
Gender	Male	86(51.8)
	Female	80(48.2)
Grade	Freshman	46(27.7)
	Sophomore	92(55.4)
	Junior	8(4.8)
	Senior	20(12.0)
Type of housing	Dormitory	60(36.1)
	boarding house	47(28.3)

	House Living alone	59(35.5)
Living type	Living alone	34(20.5)
	Living with a friend	54(32.5)
	Living with parents	65(39.2)
	other	13(7.8)
TB Test	Yes	78(47.0)
	No	88(53.0)
KT	Range(0-30)	16.84±5.51
AT	Range(15-60)	45.44±8.91
PST	Range(0-5)	3.72±0.96

KT: Knowledge about TB; AT: Attitude about TB; PST: Perceived seriousness about TB

3.2. Knowledge, Attitude and Perceived Seriousness Related to General Characteristics

The Knowledge, attitude, and perceived seriousness related to the general characteristics are as follows[Table 2].There were no significant differences in the knowledge of tuberculosis related to the general characteristics. In the attitude toward tuberculosis, the students living with their family showed the higher score of attitude than the students living in dormitory. There were no significant differences in the perceived seriousness of tuberculosis according to the general characteristics.

Table 2. Knowledge, Attitude and Perceived Seriousness regarding General Characteristics
N=166

Character istics	Categories	KT		AT		PST	
		M±SD	t or F (p)	M±SD	t or F (p)	M±SD	t or F (p)
Gender	Female	16.73±5.87	-0.268 (.789)	44.33±9. 68	.685 (.494)	3.71±1.02	-0.211 (.833)
	Male	16.96±5.14		46.61±7. 90		3.74±0.89	
Grade	Freshman	16.37±5.16	0.570	44.59±7. 67	.847	3.89±1.03	2.552

	Sophomore	16.84±5.34	(.636)	45.89±7.67	(.470)	3.64±0.90	(.058)
	Junior	19.12±9.10		50.20±6.61		4.38±0.74	
	Senior	17.10±5.56		44.05±9.32		3.45±0.99	
Type of housing	Dormitory	17.16±5.85	0.410 (.664)	43.06±11.83	3.430 (.035)	3.75±1.03	0.031 (.969)
	boarding house	16.23±5.58		47.04±5.53		3.70±0.97	
	House Living alone	17.00±5.15		46.63±6.92		3.71±0.89	
Living type	Living alone	16.32±5.98	0.461 (.710)	47.26±6.44	.529 (.663)	3.71±1.08	-0.116 (.951)
	Living with a friend	16.66±5.70		44.86±10.32		3.67±0.97	
	Living with parents	16.95±4.96		44.71±9.24		3.77±0.92	
	Other	18.38±6.58		47.00±5.35		3.77±0.13	
TB Test	Yes	16.87±5.02	1.043 (.354)	46.06±8.68	0.840 (.402)	3.79±0.95	0.888 (.376)
	No	16.81±3.33		44.88±9.12		3.66±0.95	

KT: Knowledge about TB; AT: Attitude about TB; PST: Perceived seriousness about TB

3.3. Knowledge of Tuberculosis

The rate of correct answers to the knowledge of tuberculosis is as follows [Table 3]. The question showing the highest correct answer rate was ‘Tuberculosis can be transferred through patient’s cough and sneeze.’ while the question showing the lowest correct answer rate was ‘If examine sputum of tuberculosis patients, Mycobacterium tuberculosis is always seen’.

Table 3. Knowledge of Tuberculosis
N=166

	Question	Correct answer (%)
Epidemiology & Infection	Tuberculosis is reportable infectious diseases	68.7
	Tuberculosis can break out in anywhere of human body	30.1
	Tuberculosis can be transferred through patient's cough and sneeze	77.7
	Tuberculosis may be transmitted by physical contact such as shaking hands or hug	27.1
	Blanket or goods used tuberculosis patient is sterilized by the sub dry because tuberculosis germs is been extirpated in direct ray of light	27.1
	All 100% is taken ill if is infected to Mycobacterium tuberculosis..	44.0
	If tuberculosis infected once, immunity is formed for whole life.	33.1
	Tuberculosis is not transmitted through that towel, plate, bowl, and so on used by patients	50.6
	If take antituberculosis drug 2 weeks in the beginning, tuberculosis is not transferred to another person	21.7
	Tuberculosis can be taken ill when immunity was weak.	61.4
	Tuberculosis is to be more and more smokers..	28.3
	Tuberculosis is inherited to children from parents.	33.1
	Tubercular bacillus exist in the air.	41.6
	B.C.G is vaccination medicine prevented from tuberculosis	39.8

	Immunity will last a lifetime through the BCG vaccination once.	27.7
Cognition of Contact examination & latent tuberculosis	It should be isolated if is infected to Mycobacterium tuberculosis.	31.0
	Latent tuberculosis curer should be isolated	54.0
	Among family or friend, if there is tuberculosis patient, I should examined fortuberculosis	70.5
Prevention examination	If examine sputum of tuberculosis patients, Mycobacterium tuberculosis isalways seen	18.7
	It should examine if prolonged cough and sputum for more than 2 weeks	65.7
	Chest X-ray is one of way that can diagnose tuberculosis	65.7
	Even if there is no special symptoms of coughing, sputum, I should get tuberculosis medical examination if I have weight loss, fatigue and so on	39.5
	PPD test is diagnostic methods about whether tuberculosis infected or not.	52.4
Importance of treatment	If take antituberculosis drug 2 weeks in the beginning, tuberculosis is nottransferred to another person.	65.7
	Tuberculosis may not treat if there is no special symptoms	36.1
	Tuberculosis is treated though take medicine everyday more than at least 6months	36.1
	Can be better if get tuberculosis medical treatment well, but if not, death from tuberculosis can be	51.8
	Treatment is difficult for drug resistance, if do not eat well	39.8

	antituberculosisdrug regularly	
Symptom	If is infected in tuberculosis, slight fever occurs in the afternoon.	21.1
	There is no special symptoms in tuberculosis infection early.	33.1
	Until tuberculosis show early symptoms, there is 4-12 week's latent period	44.6

3.4. Attitude of Tuberculosis

The score of attitude toward tuberculosis is as follows[Table 4].The question showing the highest score(3.31(±0.85)) was <I will encourage them to get treatment If there is tuberculosis patient all around me.> while the question showing the lowest score(2.16(±0.88)) was <Am I interested in tuberculosis?>.

Table 4 Attitude of Tuberculosis
N=166

Categories	Question	Mean±SD
To prevention education and activity	Am I interested in tuberculosis	2.16±0.88
	An education about tuberculosis should be needed?	2.96±0.84
	If I am diagnosed of tuberculosis, I will take antituberculosis drug steadily for at least 6 months to doctor's direction	3.18±0.89
	If friend discontinues taking an antituberculosis medication, I will persuade friend to take antituberculosis medication continuously	3.18±0.90
	I think that it is helped in prevention of tubeculosis that I get tuberculosis medical examination regularly every year.	3.18±0.01
	think that should get tuberculosis medical examination if there is tuberculosis patient among family or friend	3.21±0.82
	I think that tuberculosis is disease that can cure	3.09±0.79

	completely if detected and treated early	
Contact check-up and latent TB treatment	If I am diagnosed to latent tuberculosis in PPD test, I will undergo medicine treatment.	3.21±0.83
	I will encourage them to get treatment If there is tuberculosis patient all around me	3.31±0.85
Preception of TB	I think that friend or a surrounding person may know about my tuberculosis infection	3.01±0.81
	I think that I can do together everyday life such as meal in case of workfellow as caught in tuberculosis.	2.24±0.91
Importance of treatment	If I get tuberculosis diagnostic, I may inform immediately in the University	3.09±0.81
	I think that tuberculosis is disease that can be infected without even realizing it	3.27±0.73
	I think that if I get tuberculosis, it will have a big impact on myself as well as my family and school life.	3.20±0.80
	I think that tuberculosis is very serious disease	2.93±0.79

3.5. Correlation between Knowledge, Attitudes and Perceived Severity of Tuberculosis

The correlations of knowledge, attitude, and perceived seriousness of tuberculosis are as follows[Table5].The attitude and perceived seriousness of tuberculosis showed a positive correlation($r=.196, p=.013$), and the knowledge and perceived seriousness of tuberculosis showed a positive correlation($r=.211, p=.007$).

**Table 5 Correlation between Knowledge, Attitude and Perceived severity of Tuberculosis
N=166**

Variables	KT	AT	PST
KT	1		
AT	$r=.124$ $(P=.116)$	1	

PST	r=.211 (P=.007)	r=.196 (P=.013)	1
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KT: Knowledge about TB; AT: Attitude about TB; PST: Perceived seriousness about TB

4. Discussion

The purpose of this study was to understand the knowledge, attitude, and perceived seriousness of tuberculosis targeting nursing students. This study was also performed to make the basic data for the development of educational programs for the prevention of tuberculosis infection of preservice nurses.

First, examining the general characteristics, the most subjects of this study were the subjects in their 20s, women, and second-year students. There were more subjects with no experiences in tuberculosis test than the experienced subjects. There were more cases of living together with friend(32.5%) or family(39.2%) than living alone(20.5%). In case when there was a tuberculosis patient, the infection could happen through close contact in this environment. According to a research[15] related to the mass outbreak of tuberculosis in high school, in the results of monitoring the contacts of a second-grader of high school with tuberculosis symptoms, there were total 30 additional tuberculosis patients and 74 people with latent tuberculosis infection.

In the results of an epidemiologic investigation by the Korea Centers for Disease Control & Prevention in 2018, two out of ten family members living together with a tuberculosis patient were infected with tuberculosis germs[16]. Like this, tuberculosis could be collectively transferred from a single patient, so its prevention is important. The score of perceived seriousness of tuberculosis was 3.72 of 5(74.4 when converted to 100). Even though it was difficult to accurately compare as there were no similar research instruments, the score of perceived seriousness was higher than the mean, so the nursing students were perceiving the seriousness of tuberculosis.

In the results of this study, the score of knowledge about tuberculosis was 56.6 of 100. Examining the preceding researches that measured the knowledge by using the same instrument, in the results of a research[9] targeting high school students, the score was 45.5. The score of knowledge about tuberculosis was shown as 50.9 in a research[10], 56.6 in a research[7] targeting the university students related to health studies, 59.5 in another research[11], 64.8 in a research[8] targeting nursing students, 65 in a research[12], 61.1 in another research[13], and 64.4 in a research[14].

In this study, the score of knowledge of university students was higher than high school students, showing the same score as the university students related to health studies, and lower than the knowledge level of nursing students in a preceding research. In this study, 83% of subjects were the first & second-year students. And they probably did not have much opportunity to acquire knowledge because the face-to-face class or relevant club activities were absent due to the influences of the COVID-19, and most of them did not experience the clinical practice yet. In addition, as the knowledge level of tuberculosis is not high, it is necessary to supplement it with practical contents on prevention and management of tuberculosis. If nursing students, who are prospective nurses, do not know exactly the

infection route and symptoms, the risk of tuberculosis infection as a student nurse who is vulnerable to infection will increase [13].

In case when receiving the education of tuberculosis from university, the level of knowledge and preventive behaviors were high, so the universities should continuously provide the relevant education[8]. Especially, the results of a preceding research[8] reporting that there should be the measures for educating tuberculosis from the first-year curriculum of nursing department, were supported by the score of knowledge in this study. The Korea National Tuberculosis Association is performing the online tuberculosis education every year[17]. The recipients of this education are doctors, army surgeons, or nursing officers, and it would be necessary to nationally expand this education to the future medical personnel such as nursing students or medical students.

The two questions showing the high correct answer rate higher than 70% among the questions about knowledge, were 'Tuberculosis can be transferred through patient's cough and sneeze.' and 'Among family or friend, if there is tuberculosis patient, I should be examined for tuberculosis.'. The seven questions showing the low correct answer rate less than 30% were 'If examine sputum of tuberculosis patients, Mycobacterium tuberculosis is always seen', 'If infected with tuberculosis, slight fever occurs in the afternoon.', 'Tuberculosis may be transmitted by physical contact such as shaking hands or hug.', 'Blanket or goods used by tuberculosis patient is sterilized by the sun dry because tuberculosis germs have been extirpated in direct ray of light.' 'If take antituberculosis drug 2 weeks in the beginning, tuberculosis is not transferred to another person.', 'Immunity will last a lifetime through the BCG vaccination once.', and 'Tuberculosis is to be more and more smokers.'.

If the nursing students with high risk to be exposed to infection during clinical practice do not know much about symptoms and prevention of tuberculosis, the possibility of tuberculosis infection could be increasing[8], so the practical education of tuberculosis infection should be provided before clinical practice.

In this study, the score of attitude toward tuberculosis was 75.7 of 100 and 3.0 of 4. Reviewing the preceding researches measuring it by using the same instrument, the score of attitude was shown as 3.2 in a research[8] targeting high school students, 2.9 in a research[9], 3.1 in another research[10], 3.1 in a research[11], 3.1 in another research[13], and 3.2 in a research[14]. The score of attitude in this study was similar to the results of preceding researches. There were no huge differences between high school students and university students. In the level of each sub-area, it was shown in the order of contact check-up & latent TB treatment for 3.26, importance of treatment for 3.15, negative perception of tuberculosis for 2.95, and prevention education & activity for 2.93. In the preceding researches [8], [9], [11], & [12], the perception of tuberculosis was all negative. In the preceding research[8], the level of preventive behavior was 3.0, which was similar to the results of this study. Thus, it showed the low score of negative perception of tuberculosis and prevention education & activity.

In emergency situations, the nurses often have to take care of patients rather than their own health, so it would be necessary to emphasize the importance of self-management by increasing their own immunity in order not to get infected with tuberculosis at ordinary times[8]. This implies the

importance of educating the perception and practice of tuberculosis management from the period of university student before clinical practice.

In the analysis of each question, the question showing the highest score of attitude(3.31) was 'I will encourage them to get treatment If there is tuberculosis patient all around me.', and the question showing the lowest score(2.16) was 'Am I interested in tuberculosis?'. Considering that the question about the interest in tuberculosis showed the lowest score, even though they were nursing students, their interest in tuberculosis was low. In this study, the perceived seriousness of nursing students was higher than the mean while the interest was low in detailed questions of attitude. In this question, the subjects were not much interested in tuberculosis even though they perceived the seriousness of tuberculosis. However, in correlations, there were positive correlations between perceived seriousness and attitude toward tuberculosis, and between perceived seriousness and knowledge of tuberculosis.

This supported the results of previous studies [9] and [13]. In other words, if correct knowledge about tuberculosis is established, it can have a positive effect on attitude, so concrete and effective tuberculosis prevention education should be conducted. As the result of this study that there is a correlation between knowledge and attitude, the establishment of correct knowledge will improve attitude, and attitude will be improved when knowledge improvement and interest in health are raised. Considering these factors, educational efforts to improve the level of knowledge about tuberculosis and education programs to raise interest in infectious diseases should be organized.

In a previous study [12], it was confirmed that nursing students had low knowledge of tuberculosis and that raising awareness of infection control was effective to increase the perceived severity. Therefore, a tuberculosis prevention education program is necessary before clinical practice for nursing students, and it should be emphasized especially in the part to recognize the importance of infection control.

Even though the score of attitude was low, the whole attitude and perceived seriousness showed a positive correlation. And there was no correlation between knowledge and attitude. However, the knowledge enables them to perceive the seriousness of tuberculosis. Also, once the seriousness of tuberculosis is perceived, the attitude toward tuberculosis would be improved. There should be additional researches on the causality of those three variables.

The nursing students meet with various patients through hospital & community practice. During the clinical practice, they closely contact many patients through observation, interview with patients, and basic nursing activities[18],[19]. After graduation, they would experience the hospital infection. If they fully understand and perform the standard knowledge of infection under this circumstance, it would be possible to achieve positive results in the prevention of infectious diseases like tuberculosis[18]. Thus, it would be needed to inform the risk of infectious diseases, especially, tuberculosis to nursing students, and also to provide them with preventive education. For this, the educational contents and programs should be developed[20].

In the results of this study, the nursing students' knowledge and attitude toward tuberculosis were low. And the current infection rate of the COVID-19 is continuously increasing[21],[22],[23]. Thus,

if the tuberculosis patients are exposed to the COVID-19 at the same time, it could be more dangerous, so the knowledge and attitude should be improved for the prevention and management of tuberculosis infection. The educational contents & materials related to tuberculosis released by CDC[24] are very systematic. Like this, Korea also needs to establish the systematic educational data of tuberculosis. And as mentioned earlier, the education should be provided to the future healthcare managers including nursing students. For this, first, it would be needed to designate the infection management course as a major elective course for nursing students.

The significance of this study is to verify the necessity of systematic education and management of tuberculosis[25].

5. Conclusion

The purpose of this study was to understand the knowledge, attitude, and perceived seriousness of tuberculosis targeting nursing students. This study was also performed to make the basic data for the development of educational programs for the prevention of tuberculosis infection of preservice nurses. In the future, it would be necessary to establish the tuberculosis preventive programs for nursing students, and also to plant the perception of its necessity in them. As a limitation of this study, this study was based on randomly-sampled data in a certain area, so it is limited to generalize the results of this study. However, this study aimed to contribute to the provision of basic data for the prevention of tuberculosis by examining the knowledge, attitude, and perceived seriousness of tuberculosis as a legal infectious disease targeting some nursing students in the state when the COVID-19 pandemic was still continued.

Based on such results of this study, this study suggests a research for developing and applying a tuberculosis prevention/management program that could improve the level of knowledge and attitude toward tuberculosis.

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