

Original Article
Medicine General & Policy



Analysis on Students' Career Preparation in One Korean Medical School: Based on the Relationship and Trend Between Career Maturity and Specialty Indecision

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OPEN ACCESS

Received: Mar 24, 2022

Accepted: Jul 27, 2022

Published online: Sep 13, 2022

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ABSTRACT

Background: For medical school students, specialty choice after graduation significantly impacts their future doctor life. Several Korean medical schools have made efforts to prepare career development programs. However, career support programs based on the systematic analysis of medical school students' first to the final year are still lacking. Therefore, this study aims to analyze the students' career preparation of one medical school in Korea using the Career Maturity Inventory (CMI) and Specialty Indecision Scale (SIS) and to explore the relationship between CMI and SIS variables.

Methods: From December 2020 to July 2021, we conducted an online survey of 600 students in years 1 to 4 at Seoul National University College of Medicine. We analyzed the differences between the years of the students through one-way analysis of variance of the CMI and SIS and the relationship between the two instruments by correlation analysis and multiple regression analysis.

Results: A total of 198 students completed the survey. The average scores of the CMI variables tended to increase as the year of study went up, and the confidence score of the 1st year students was significantly lower than that of the 2nd and 4th year students. Although there was almost no consistent decrease by year in the SIS variables, 3rd and 4th year students showed significantly lower readiness scores than 1st year students. Additionally, we found that the CMI variables mostly had a negative effect on the SIS variables.

Conclusion: There is an increasing tendency for career maturity by year of study in Korean medical school students. However, looking at the SIS results, the career concerns vary among the students. Therefore, medical schools can effectively use the SIS to identify the career concerns of students.

Keywords: Medical Students; Career Choice; Vocational Guidance; Career Maturity Inventory; Specialty Indecision Scale

Disclosure

The authors have no potential conflicts of interest to disclose.

Author Contributions

Conceptualization: Lee SY, Lee SH. Data curation: Lee SY. Formal analysis: Lee MJ. Investigation: Lee SY, Lee SH. Methodology: Lee SY, Lee SH. Software: Lee MJ. Validation: Lee SY. Visualization: Lee MJ. Writing - original draft: Lee SY, Lee MJ. Writing - review & editing: Lee SH

INTRODUCTION

Although many medical schools inside and outside Korea recognize the need for career guidance for future doctors, Korean medical schools lack support to prepare them for their career choice. Choosing a lifelong career path as a doctor is a necessary career development process, but many regards the decision-making process as a personal matter of the student.¹⁻³

In particular, the career guidance of medical schools is essential because it is closely related to improving the national public health. In this context, the current trend for concentrations in popular specialties in Korea and a shortage of residents in unpopular specialties is becoming a social issue. This phenomenon suggests that medical students focus on economic factors and employability when making career choices.^{4,5} Therefore, in addition to external factors, there is an urgent need for a systematic career guidance program that can deal with aspects of the identity of medical students, such as individual aptitude, interest, and competency.

Precedent studies on Korean medical school students' career paths covered needs assessment,^{1,6} career education program development,⁷ post-program effectiveness verification,^{3,8,9} analysis of motivation, value, career adaptability, career indecision factor affecting career decision making.¹⁰⁻¹³ All in common, these studies highlighted that systematic career guidance should identify and approach medical students' career preparation and concerns. In succession, this study analyzes the students' career preparation and the current state of one medical school using verified tools, CMI and SIS. This study offers some critical insights into career preparation analysis using objective tools, CMI and SIS, exploring the current overall trend going beyond existing studies on gender,⁹ admission type,¹⁴ or students in a particular year of study.^{10,12}

Specialty indecision refers to a state in which a person lacks certainty in his or her chosen specialty or has not decided which specialty to choose after graduation.^{15,16} Measuring Specialty Indecision aims to identify problems individuals face when making career decisions,¹⁷ which can help students understand their career concerns and make effective career decisions.¹⁸ A study in Korea revealed the significant relationship between SIS and career adaptability in medical students. The students with higher or lower career adaptability showed qualitative differences in SIS. However, both groups demanded more career information.¹²

Career maturity refers to how students are prepared based on an integrated understanding of themselves and their tasks for professional development to be accomplished at the individual developmental stages.^{19,20} Crites reconstructed the career maturity model first presented by Super.²¹ Savickas and Porfeli²² developed the theory of Super and Crites and established the sub-scales of career maturity as Confidence, Curiosity, Concern, and Consultation.

Career maturity and Specialty Indecision showed a statistically significant negative association.²⁰ Many formal studies have considered that Career maturity is highly affected by time,¹⁹ year of study, educational system, and higher academic achievement.²³⁻²⁷ On the other hand, according to the SIS guideline of the Association of American Medical Colleges (AAMC),²⁸ first- and second-year medical students had significantly higher specialty indecision scores than third- and fourth-year medical students on all subscales except for Barriers.

CMI and SIS are different questionnaires, addressing different targets, attitudes, and concerns. However, these two instruments intimately link to the career development

process.²⁹ Career maturity deals with competencies to make career decisions, while specialty indecision is about obstacles faced in career development.³⁰ Additionally, a study on the personalities and careers of general college students found that career indecision and career maturity are negatively correlated.²⁹ It was shown that CMI subscales, including Confidence, Curiosity, and Independence, are associated with the career indecision of general college students in Korea.³¹ Despite the studies on college students, there are few papers on understanding the relationship between CMI and SIS in medical schools.

By using CMI and SIS, widely used examination instruments for career education, the purpose of this study was to analyze the career preparation and current status of Korean medical school students by year of study. In addition, we explored the relationship between CMI and SIS variables.

We proposed two research questions shown below:

- 1) Do the scores of each the CMI and SIS variable change from the first to the final year of study in medical students?
- 2) What is the relationship between the variables that make up CMI and SIS?

METHODS

Study design

An online survey-based cross-sectional study was conducted among the undergraduate medical students of Seoul National University College of Medicine using the Career Maturity Inventory (CMI) and Specialty Indecision Scale (SIS).

Participants

The study from December 2020 to July 2021 surveyed first-year to last-year medical students at Seoul National University College of Medicine who participated in an online survey. Of the total 600 students at Seoul National University College of Medicine, 181 (30.2%) students gave informed consent to participate in the study and responded to the online survey.

Survey instruments

CMI is an instrument to measure the competencies and attitude in vocational development³² first developed by John Crites in 1973. The CMI underwent several revisions for better applicability in 1978 and 1995, reducing the number of items and simplifying its sub-scales. This study used the CMI Counseling Form-C, revised by Savickas and Porfeli²² and translated into the Korean version by Bang,³³ to measure the career maturity of the participants. Cronbach's α coefficients of the overall variable in Korean version was 0.686 for Korean high school students.³³ CMI Counseling Form-C is a usable form based on the career construction theory of Savickas that measures the ability of an individual to handle current career development tasks in multiple dimensions in a short time.²²

The CMI consists of 24 items, with 6 items each for Concern, Curiosity, Confidence, and Consultation. This study collected CMI responses using a 5-point Likert scale for each item with 5 points for 'strongly agree' and 1 point for 'strongly disagree.' However, following precedent studies, all items except items 8, 12, 20, and 24 are reverse-coded (Table 1).^{22,33} Thus, higher scores in the CMI indicate a higher career maturity of the participants.

The SIS is an instrument to measure the concerns of medical students when deciding their specialty in medicine. The SIS is a questionnaire developed by Savickas that includes a taxonomy of career decision-making difficulties.¹⁷ Currently, the AAMC provides an online survey through the Career Category website of the AAMC to help medical students discover their concerns when deciding on a specialty.²⁸ The questionnaire consists of 35 items, 5 each in the sub-categories of Readiness, Information, Identity, Barriers, Indecisiveness, Self-doubts. Cronbach's α coefficients of the AAMC online questionnaire was 0.90 for the total items and ranged from 0.65 to 0.84 for each variable in US medical students.²⁸ The Korean version is not published yet; the Korean translation version of Koh³⁴ was published in a previous study by Park,²⁹ which was used for general college students in several studies.^{35,36} However, the questionnaire used in that study was the Career Decision Scale with different compositions in the detailed items. This study made its own Korean translation version to measure the career concerns of the participants in their specialty choices. The SIS response was measured on a 5-point Likert scale for each item with 5 points for 'strongly agree' and 1 point for 'strongly disagree.' A higher SIS score indicates a higher degree of specialty indecision of the participants.

Table 1. Variables and its items extracted from CMI and SIS

Variables	Item No.	Item
CMI		
Confidence (C1)	3	I have so many interests that it is hard to choose just one occupation.
	15	I often daydream about what I want to be, but I really have not chosen an occupation yet.
	11	I keep changing my occupational choice.
Curiosity (C2)	18	I don't know whether my occupational plans are realistic.
	10	I am having difficulty in preparing myself for the work that I want to do.
Concern (C3)	6	I don't know how to go about getting into the kind of work I want to do.
	13	I'm not going to worry about choosing an occupation until I am out of school.
	5	I can't seem to become very concerned about my future occupation.
Consultation (C4)	9	I seldom think about the job that I want to enter.
	8	If you have doubts about what you want to do, ask your parents or friends for advice.
	24	In making career choices, one should pay attention to the thoughts and feelings of family members.
	20	It is important to consult close friends and get their ideas before making an occupational choice.
	12	When it comes to choosing a career, I will ask other people to help me.
SIS		
Identity (S1)	27	Before exploring specialties, I need to know more about my own interests and goals.
	36	I need a clearer sense of who I am.
Indecisiveness (S2)	7	I'm interested in several specialties, but haven't found the perfect one.
	23	I've identified some good specialty choices, but can't decide among them.
Information (S3)	24	I don't know how or where to find information about specialties.
	16	I don't know who can help me make a decision.
	22	I don't know where I can get guidance for choosing a specialty.
	17	I don't know what kind of information I need to help me decide.
	33	I don't have reliable information about my interests, abilities, and goals.
Self-doubt (S4)	11	I can't find adequate and reliable information about the specialties I'm interested in.
	8	I'm unsure about my ability to succeed in different specialties.
Readiness (S5)	26	Making important decisions is always difficult for me.
	4	I haven't spent much time thinking about choosing a specialty.
	13	I don't know much about the specialty I'm interested in.
Barriers (S6)	14	I don't know how the specialties differ from each other.
	10	The specialty I'm interested in doesn't pay well enough.
	15	Someone important to me doesn't like the specialty I've chosen.

CMI = Career Maturity Inventory, C = CMI variable, SIS = Specialty Indecision Scale, S = SIS variable.

Statistical analysis

All statistical analyses were performed using SPSS (version 25.0 KoreaPlus Statistics for Medical Service; IBM Corp., Armonk, NY, USA). The analyses were on the demographics of the study participants, factor extraction from the CMI and SIS survey data, correlations analysis among the CMI and SIS variables, and one-way analysis of variance (ANOVA) with post hoc analysis according to the year of study of the students. The values for Cronbach's α in all the CMI and SIS variables were acceptable. Mean scores of each factor were calculated and used as variables for the correlation, multiple regression, and ANOVA analysis.

Ethics statement

The present study protocol was reviewed and approved by the Institutional Review Board (IRB) of Seoul National University College of Medicine (approval No. IRB 2007-042-1140). Informed consent was submitted by all subjects when they enrolled.

RESULTS

Demographics

Among 600 eligible medical students, 198 completed the survey. The demographic characteristics of the participants are presented in **Table 2**.

Factor extraction

This study eliminated a few items through a scale purification procedure to set the variables. To validate the scale, we conducted exploratory factor extraction. We adopted principle component analysis to extract composing factors and varimax to simplify the factor loading. The extracted factors and their items of the CMI and SIS are presented in **Table 1**. The number of factors extracted from the 2 different surveys was the same as in previous studies.

Confidence (C1), Curiosity (C2), Concern (C3) and Consultation (C4) factors were extracted from the CMI which explained 59.8% of the total variance. Between the 24 CMI items, 11 items were removed because of the inadequacy of the theoretical structure, and 13 items were used in the variable calculation.

Identity (S1), Indecisiveness (S2), Information (S3), Self-doubt (S4), Readiness (S5) and Barriers (S6) factors were extracted from the SIS which explained 73.0% of the total variance. Between the 35 SIS items, 18 items were removed because of the inadequacy of the theoretical structure, and 17 items were used in the variable calculation.

Table 2. Demographics of study participants

Characteristics	1st Grade	2nd Grade	3rd Grade	4th Grade	Total
Gender					
Woman	31 (45.6)	30 (46.9)	8 (33.3)	11 (44.0)	80 (44.2)
Man	37 (54.4)	34 (53.1)	16 (66.7)	14 (56.0)	101 (55.8)
Admission type					
Premedical course	66 (97.1)	42 (65.6)	18 (75.0)	19 (76.0)	145 (80.1)
Transfer admission	2 (2.9)	17 (26.6)	5 (20.8)	3 (12.0)	27 (14.9)
Commissioned education	0 (0)	5 (7.8)	1 (4.2)	3 (12.0)	9 (5.0)
Total	68 (37.6)	64 (35.4)	24 (13.3)	25 (13.8)	181 (100.0)

Values are presented as number (%).

Trend in career maturity and specialty indecision by year of study

The mean scores in the CMI variables tended to increase as the student's year of study went up, except for Curiosity (C2) (Fig. 1A, Table 3). The 4th year students showed the highest mean score, and the 1st year student showed the lowest mean score in three CMI variables, except for Curiosity (C2). As a result of the post-hoc analysis, the Fisher's LSD test revealed a significant ($P = 0.035$) decrease of the Confidence (C1) score in 1st-year medical students compared to the 2nd- and 4th-year medical students.

The mean scores of most of the SIS variables had no pronounced tendency as the student's year of study went up (Fig. 1B, Table 3). Only the Self-doubt (S4) score increased, and the Readiness (S5) score decreased as the year of study rose. Looking at the average scores of the SIS variables, the years of study with the highest or lowest average scores varied over variables. For example, only the mean scores of Identity (S1) and Readiness (S5) were the lowest for 4th-year medical students. Indecisiveness (S2), Information (S3), and Barriers (S6) scores were highest for the 3rd-year medical students. Conversely, the Self-doubt (S4) score tended to increase over the years of study. From the results of the post hoc analysis, the Dunnett T3 test revealed that the Readiness (S5) score was significantly higher for the 1st-year medical students than for the 3rd-year ($P = 0.007$) and 4th-year ($P = 0.001$) medical students.

Relationship between career maturity and specialty indecision

The means, standard deviations, and intercorrelations of the variables are shown in Table 4. Additionally, this study analyzed the correlations between the variables to verify how the CMI contributes to SIS. The CMI variables indicating career maturity and the SIS variables indicating the degree of career indecision demonstrated generally negative associations; however, there were some exceptional areas.

The correlations analysis results showed that Confidence (C1) and Curiosity (C2) have correlated variables in the SIS. Curiosity (C2) had a marked degree of negative correlation with Information (S3), Self-doubt (S4), and Readiness (S5). Confidence (C1) had a marked negative correlation with Indecisiveness (S2). Moreover, several variables from the CMI showed low degree correlations to those of the SIS.

Multiple linear regressions demonstrated that four CMI variables correlate significantly to one or more SIS variables (Fig. 2). The two most influential CMI variables were Concern (C3) and Consultation (C4). Concern (C3) demonstrated a significant association with three different SIS variables, Indecisiveness (S2) ($P = 0.011$), Self-doubt (S4) ($P < 0.001$), and Readiness (S5) ($P < 0.001$). Additionally, Consultation (C4) had a significant association with Self-doubt (S4) ($P < 0.001$), Readiness (S5) ($P = 0.002$), and Barriers (S6) ($P < 0.01$). Next, Curiosity (C2), which contributes to two SIS variables, had a significant effect on Information (S3) ($P < 0.001$) and Self-doubt (S4) ($P = 0.014$). Lastly, Confidence (C1) had a significant ($P < 0.001$) effect on Indecisiveness (S2). As a result, the four CMI variables generally had a negative effect on the SIS variables. As an exception, a positive effect was observed between Concern (C3) and Self-doubt (S4) and between Consultation (C4) and Barriers (S6).

DISCUSSION

The CMI and SIS questionnaires were given to first- to last-year medical school students in this study. To test the two research questions, we checked the difference in the scores of the

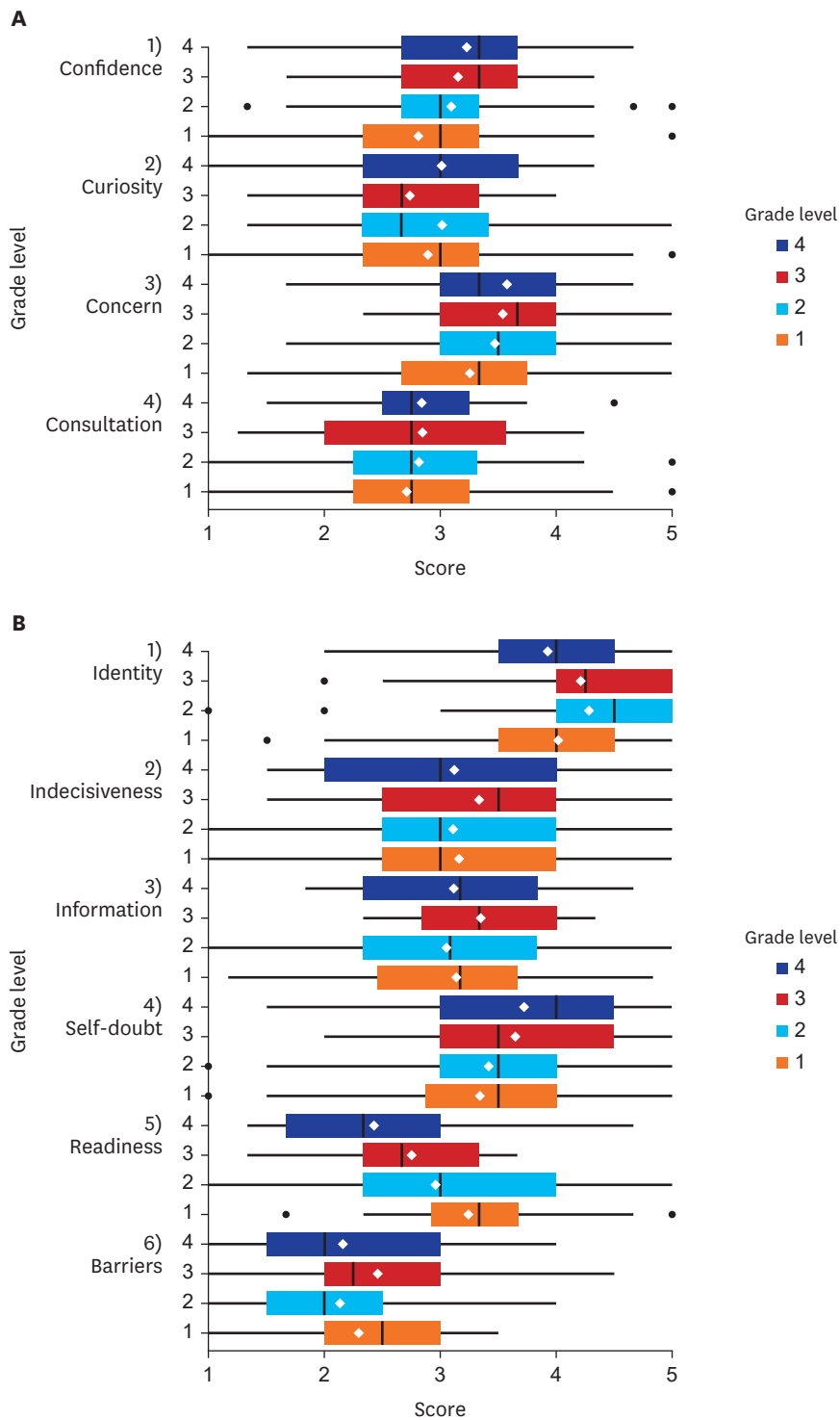


Fig. 1. Boxplots of career variable differences by Korean medical students' grade levels. **(A)** Career Maturity Inventory variables by medical students' grade levels. **(B)** Specialty Indecision Scale variables by medical students' grade levels. The colored rectangle indicates the interquartile range. The bold line in the middle is the median values. White diamond-shaped dots in the middle of rectangles are mean values. The horizontal lines are whiskers, showing minimum or maximum values. The small black dots are outliers.

Table 3. One-way analysis of variance of the differences between CMI, SIS and students' grade levels

Variables	G1 (n = 68)	G2 (n = 64)	G3 (n = 24)	G4 (n = 25)	F	Post hoc analysis
CMI						
1) Confidence	2.81 ± 0.75	3.09 ± 0.76	3.15 ± 0.72	3.22 ± 0.82	2.74*	G1 < G2, G4 (Fisher's LSD)
2) Curiosity	2.89 ± 0.82	3.02 ± 0.94	2.74 ± 0.85	3.01 ± 0.87	0.72	
3) Concern	3.25 ± 0.80	3.47 ± 0.77	3.54 ± 0.69	3.57 ± 0.68	1.71	
4) Consultation	2.71 ± 0.71	2.81 ± 0.78	2.84 ± 0.93	2.84 ± 0.64	0.34	
SIS						
1) Identity	4.01 ± 0.77	4.28 ± 0.74	4.21 ± 0.86	3.92 ± 0.80	1.99	G1 > G3, G4 (Dunnett T3)
2) Indecisiveness	3.16 ± 0.92	3.11 ± 0.98	3.33 ± 1.01	3.12 ± 1.23	0.31	
3) Information	3.13 ± 0.85	3.05 ± 0.95	3.34 ± 0.64	3.11 ± 0.82	0.69	
4) Self-doubt	3.34 ± 0.94	3.41 ± 1.06	3.65 ± 0.96	3.72 ± 0.87	1.28	
5) Readiness	3.23 ± 0.70	3.01 ± 1.03	2.85 ± 0.60	2.54 ± 0.90	6.66***	
6) Barriers	2.29 ± 0.73	2.13 ± 0.77	2.46 ± 0.91	2.16 ± 0.85	1.21	

Data are presented as mean ± standard deviation.

CMI = Career Maturity Inventory, SIS = Specialty Indecision Scale, G = grade.

*P < 0.05; ***P < 0.001.

Table 4. The correlations between variables

Variables	1	2	3	4	5	6	7	8	9	10
1. Confidence	1.000									
2. Curiosity	0.396**	1.000								
3. Concern	-0.039	-0.133	1.000							
4. Consultation	0.276**	0.199**	0.056	1.000						
5. Identity	-0.190*	-0.227**	-0.159*	-0.151*	1.000					
6. Indecisiveness	-0.475**	-0.217**	-0.071	-0.225**	0.102	1.000				
7. Information	-0.355**	-0.622**	0.034	-0.142	0.253**	0.233**	1.000			
8. Self-doubt	-0.362**	-0.446**	-0.318**	-0.341**	0.298**	0.389**	0.478**	1.000		
9. Readiness	-0.324**	-0.402**	-0.273**	-0.268**	0.198**	0.209**	0.537**	0.271**	1.000	
10. Barriers	-0.142	-0.186**	-0.012	0.137	0.031	0.055	0.222**	0.148**	0.145	1.000
Mean ± SD	3.01 ± 0.77	2.93 ± 0.87	3.41 ± 0.77	2.78 ± 0.75	4.12 ± 0.78	3.16 ± 0.99	3.13 ± 0.86	3.46 ± 0.98	2.96 ± 0.85	2.24 ± 0.79

SD = standard deviation.

*P < 0.05; **P < 0.01.

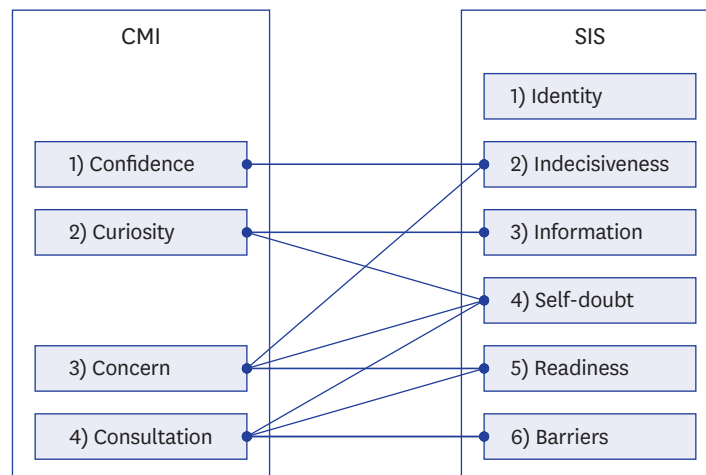


Fig. 2. Effect between CMI and SIS variables. The lines between CMI and SIS boxes indicates associations between CMI and SIS variables. Four variables in CMI influence five out of seven variables in SIS, as a result of multiple linear regression analysis.

CMI = Career Maturity Inventory, SIS = Specialty Indecision Scale.

CMI and SIS according to the year of study of the medical school students through one-way ANOVA analysis and the association between the CMI and SIS variables through descriptive statistics, correlations, and multiple regression analysis.

According to Crites's theory and previous studies on career maturity, CMI scores increase with the student's year of study.^{19,23,37} For medical students in Korea, the average score for all four variables was the highest in the 4th year of study. However, the post hoc analysis result showed that only for Confidence, the 2nd, 3rd, and 4th year of study had increased scores compared to the 1st year of study, and there was no significant difference between year of study in the other variables. Although in the theory of Super's career development, career development tasks follow the life cycle in a longitudinal aspect, also these tasks exist in small stages from a microscopic viewpoint.³⁸ The medical school curriculum in Korea consists of lecture-based pre-clinical training in the first and second years of study and team-based, field-based clinical training rounding several medical specialties at hospitals in the third and final years of study. Precedent studies found that classes with small groups and debates were more effective than large classroom lectures regarding students' career motivation and maturity.¹⁰ Moreover, students transitioning from classroom to field undergo educational, social, and developmental distress and struggles because of their learning environment and role changes.³⁹ Therefore, students in the third year of study may face a new phase in career development influenced by this curriculum transition, which in turn affects students' career decisions and maturity.

In the case of the SIS, it is more suitable for choosing a specific specialty, so many medical education organizations have been using it for the career guidance of medical students who have determined career paths as a doctor.³⁸ According to the AMEE statistics on US medical students, scores decreased according to the year of study in all variables except for Barriers.²⁸ However, there was almost no consistent decreasing trend when considering the average SIS scores of Korean medical students by year of study. Some variables showed the highest average scores in the 3rd year of study. Only the Readiness score was significantly lower in the 4th year of study than the 1st year of study, and the Self-doubt score was lower in the 4th year of study than in the 2nd year of study confirmed through the post hoc test. These trends in SIS variables measured from one medical school in Korea are different from the precedent studies showing a consistent decrease following the students' year of study. Therefore, further studies in Korea could determine why medical school students came up with the result.

Many career theories infer that it is appropriate for the CMI to have a negative effect on the SIS.²⁰ When surveying Korean medical school students, four CMI variables contributed to five SIS variables in this study. Most of them had a negative effect, and only Consultation among the CMI variables had a positive effect on Barriers among the SIS variables. The relationship between these variables can help identify the career problems of medical students and resolve their problems using an appropriate career guidance program.

Four career guidance issues for medical students can be identified through the CMI and SIS by examining the career problems of medical students focused on the relationship between specific variables.

First, the low Concern score in the CMI and the high Readiness score in the SIS imply that students might not have recognized the importance of career planning. We suggest that these students need education to raise their awareness of the importance of career planning. This education can enable them to plan their careers while studying in medical school and help reduce trial and error when making essential career decisions.

Second, according to Super's career development theory, identity of students should be established as the year of study rises from the 1st to the 4th year. Therefore, it means the

Identity score of the SIS should decrease. In this study, however, the Identity score of the 2nd- and 3rd-year medical students was higher than that of the 1st-year medical students. Moreover, the Self-doubt score tended to increase as the student's year of study went up, concurrently having a positive association with the Concern score in the CMI. Because this can be a fundamental problem in the career development task of medical students, it is necessary to identify the specific causes and develop a program to overcome their identity crisis.

Third, the relationship between some variables highlighted that career consultation and detailed coaching programs are necessary. High Curiosity score in the CMI and low Information score in the SIS show that students are highly interested in their career information. This aligns with the idea that students in the group with high career adaptability in Korea needed more information due to their high interest in their career path.¹² In other words, it can be helpful to provide specific and diverse information about the various career paths that doctors can take. The information can satisfy the interests of those students or cultivate curiosity about career paths in general. In addition, career information can help the rational decision-making process by enabling students to acquire the information on their own through various experiences. Likewise, high Consultation score in the CMI with high Barriers score in the SIS may indicate that students are experiencing conflicts with friends or family over their chosen career paths. In particular, these Korean medical students often have a lot of pressure and anxiety over their career. For example, the Barriers score indicates their conflicts with the expectations of their parents on their future as a physician.¹ A previous study in Korea pointed out that students lack self-directed attitudes and are significantly influenced by people around them, such as their parents, in career decision-making.¹² Therefore, we suggest that in-depth counseling is required for these students, especially for their anxiety and barriers. In addition, career counseling personnel or programs need to be prepared in the future, as in the case of several US medical schools.

Fourth, low Confidence score in the CMI with high Indecisiveness score in the SIS can be related to a lack of confidence. Further studies need to be done to verify if these scores are related to the year of study or low self-efficacy of students in medical school.³⁰ Currently, the AAMC guide suggests that medical students need integrated career guidance with life and academics.⁴⁰ Furthermore, studies are needed on career maturity, specialty decision, and self-efficacy after career coaching programs and consultations.

This study is significant as it demonstrates the CMI and SIS score characteristics in medical students according to their year of study. Moreover, it is the first study to examine the association between the CMI and SIS variables in medical students and to analyze students' career preparation from all four years of study in one medical school in Korea. Through these results, we discovered that identifying the career needs and concerns of medical students can be critical. Our results imply that the CMI and SIS can be powerful instruments for understanding the career development levels of medical students and gathering career development information on individual students for personalized career coaching.

The limitations of our study are as follows:

- 1) The medical students who participated in this study were from a single medical school, and the number of participants was small, especially the 3rd- and 4th-year medical students.
- 2) The Korean translation version of the SIS questionnaire did not pass the cross-cultural validity test.

Our suggestions for further studies are as follows:

- 1) A study with a more significant number of Korean medical school students is necessary. In addition, a study developing the CMI and SIS standard scores of Korean medical school students by year of study is imperative.
- 2) The SIS questionnaire is an effective tool for determining the career concerns of medical students and is actively used in the US. However, a systematic translation of the SIS questionnaire into a Korean version is required, and research is necessary on its development and feasibility.
- 3) Research is needed to develop a joint career guidance program that reflects the characteristics of the CMI and SIS by the year of study of medical school students. Furthermore, research using CMI and SIS test results for career counseling is necessary for students in medical school.
- 4) A study on diversified career guidance for Korean medical school students is vital to support the opinions on the CMI and SIS levels and the above career issues.

ACKNOWLEDGMENTS

The authors thank Seoul National University School of Medicine, for supporting the survey data collection for the research.

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