Original Article

Contributing Factors in the Decision to Study Korean Medicine and Satisfaction with the College Experience: A Quantitative Nationwide Study

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ABSTRACT

Background: The practice of Korean medicine (KM) taught at KM colleges has equal legal rights and responsibilities as Western medicine in South Korea. To date, no research has been conducted on the factors which influence college students in their choice to study KM and satisfaction with the course.
Methods: Content validity and face validity tests were conducted while developing the questionnaires. Research was conducted amongst all KM colleges in South Korea and of the 744 premedical KM 2nd year students, 420 participated. Analysis was performed on how much the mean values changed between the items and sub-items. Factors were also correlated with the students' satisfaction and willingness to re-enter KM colleges.
Results: The means of stable incumbency items were the highest of all the items, while items concerning experience of chronic disease had the lowest mean values. For enrollment, the latent value that most questionnaire items were changed positively by was interest in KM. Items related to students' choice or KM doctor status were closely tied to students' current satisfaction with their choice to enroll at a KM college, rather than their college entrance examination scores.
Conclusion: Identifying which factors are considered before entering KM college and during the course can help students to be more satisfied with their academic progress. To satisfy the KM students, educators should focus on providing both qualified clinical training and guidance to enter diverse career fields. This study highlights factors that can be applied to college curriculum or subject teaching.

Keywords: Korean traditional medicine, premedical education, satisfaction

Introduction

When examining the medical school experience, a student's perception of their major, has been reported to affect satisfaction with the curriculum, and satisfaction during enrollment onto the course and academic adjustment [1]. Other factors such as students' individual characteristics, values, and needs can also affect their medical school experience. Previous studies have reported that the factors affecting medical students' choices of majors or further careers in medicine are becoming increasingly complex [2-4]. Therefore, identifying relevant college entrance factors, that are the reasons why students choose to study medicine, is important, as these factors reflect the students' perspectives on their compatibility with certain fields of healthcare and flexibility of various jobs [4]. Previous studies have also reported various medical school entrance factors affected the students' decision to choose a medical career [5-7]. Factors contributing to medical school entrance are becoming more complex, and there are distinctive healthcare systems in individual countries. Therefore, it is essential to consider each country's traditional medicine medical school system when examining students' college entrance factors.

Korean medicine (KM), also known as traditional Korean medicine, is distinct from Western medicine, but has equal practitioner legal rights and responsibilities in South Korea's healthcare system. KM is based on traditional Chinese medicine, but it encompasses unique practices such as four-constitution medicine and Saam acupuncture [8]. KM considers humans holistically and employs both a modern medical diagnosis system and a unique pattern diagnosis

theory [9].

There have been studies that explored KM students' satisfaction, academic burnout, and perceptions on their learning environment [10-12]. However, to the best of our knowledge, there have been no studies that explored the KM students' entrance factors and their satisfaction related to these factors. Identifying relevant KM college entrance factors is important for ascertaining KM healthcare provisions because these factors reflect students' perspectives on their compatibility with certain fields of KM and the flexibility of various KM jobs. Furthermore, revealing the factors influencing KM college students' primary career plans is important in determining the degree to which college education presents diverse career opportunities. Also, some factors that are significantly related to students' satisfaction with KM college life can be used to establish a constructive KM educational environment.

In this study, a content validity test and a face validity test were conducted to determine the questionnaire items that measure the KM students' college entrance factors. A nationwide survey was performed on premedical 2nd year KM students.

Materials and Methods

1. Content validity test

Content validity determines whether the developed questionnaire items properly reflect the content [13]. In this study, the item-level content validity index (I-CVI) was measured, which involves the representativeness of individual questionnaire items [14]. The content experts measured the representativeness of individual items with a 4-point Likert scale. Afterwards, the researchers divided the number of experts who rated each item as relevant (a score of three or four out of four) by the total number of experts. Items with an average I-CVI score of 0.8 or higher were regarded as content valid. There were three content experts selected who conduct research in the field: A KM college professor who teaches basic science, a KM college professor who teaches clinical medicine, and a professor who has had extensive experience in survey research. Furthermore, three consultants were selected as content experts for college entrance.

After acquiring consent, the method and implications of the content validity measurement were explained. Experts were given a panel link created by Google Forms (Google, Mountain View, CA, USA), an online survey platform. The representativeness, clarity, and relativeness of each item consisting of each latent variable were measured by evaluating items with a score range of one to four. To acquire meaningful responses from experts, qualitative data regarding each latent variable or each item were collected.

There were 16 items identified for revision which were edited first, and the content validity experts were asked to check whether the edited items represented their content accurately. The representativeness, clarity, and relativeness of the new questionnaire items were then measured with a 4-point Likert scale. Therefore, a total of 24 questionnaire items were created.

2. Face validity and pretest

Measuring face validity involves asking people who are related to a subject group whether the questions appear to be valid and gathering the respondents' opinions about the questionnaire orally [15]. Measurement for assessing face validity can include a cognitive interview process (a way for a participant to verbalize their thoughts and feelings to reveal their perceptions) [16]. First and 2nd year medical students were selected as participants for the face validity tests. One group of seven 1st year medical students and another group of six 2nd year medical students participated in focus group interviews. The coding criteria of the interviews examined the appropriate implementation of the researchers' intentions [17]. Therefore, the researcher introduced the intention of each questionnaire item to the groups and let them freely discuss their feelings. The process of face validity includes identifying and editing questionnaire items that the participants have difficulty understanding and checking whether they understand the edited questionnaire items. Through this process, the examples written in the survey were edited for better understanding.

3. Designing questionnaire items

To design the questionnaire items for KM students, we followed the questionnaire design guidelines from the international Association for Medical Education in Europe [18]. Based on the previous studies [5,10,19], discussions between the authors of this study, and the content validity and face validity tests, seven latent variables were defined as follows: (1) Status and security: social status, stable incumbency, expecting higher earning; (2) Career: research, clinical activities, social activities; (3) Patient care and working with people: interactions with people; (4) Requiring personal and clinical skills: manual skills, psychological skills; (5) Interest in KM: interest in the theory of KM, interest in KM treatment methods based on modern science, interest in the treatment methods different from Western medicine, KM's potential for future development; (6) Personal experience or atmosphere: positive experience receiving KM treatment, military duty, examination scores, belief that KM is students' calling, chronic disease associated with the student or their family member; and (7) Influencing person or method: family and relatives,

acquaintances, mass media, and independent choice.

To conduct a general investigation of the students' satisfaction levels, two questionnaire items were created: "I am satisfied with my current enrollment in the college/graduate school of Korean medicine (current satisfaction)" and "if I were to restart my postsecondary education, I would choose the college/graduate school of Korean medicine again ('re-entrance')." The study intended to identify the KM college students' satisfaction levels, both at the point they decided to matriculate and at the present time. Thus, a sub-questionnaire item stating "my experience attending this school is satisfactory for the same reason as above" was included.

The twenty-two questionnaire items described above were constructed with a 5-point Likert scale. However, because some participants were female or had already finished their military service, the questionnaire item related to "military duty" included an additional "not applicable" answer. We constructed questionnaires to obtain the demographic information of participants. Examples of the questionnaire items are included to provide a better understanding of the participants' answers. Before the survey, a pretest was conducted with premedical 2nd year students. The final online survey questionnaire can be found in Supplementary 1.

4. Subjects and survey procedure

As there are several curriculum differences between each KM college, research was conducted among all the KM colleges in South Korea, with a total of 744 premedical 2nd year students. The survey was conducted over ten days, from April 8 to April 17, 2019. The online survey link was distributed via a message to the student group leaders of each KM college's premedical 2nd year students. Potential participants were informed of the following before participating in the study: Background and aim of the research, type of participants, methods, dates of the study, benefits from participating in the research, lack of direct side-effects, rewards or costs, privacy of personal information, voluntary participation and how to end their participation, and contact details. Only participants who read this information and gave their informed consent online could participate in the study.

5. IRB approval and informed consent

This study was conducted after receiving approval from the Public Institutional Bioethics Committee designated by the MOHW (no.: P01-201903-22-003). Personal information acquired by the study was protected using methods provided by the online survey platform SurveyMonkey (SurveyMonkey, LLC; Palo Alto, CA, USA) and IRB institution. The personal information collected consisted only of a cellular phone number that was used to provide participants

with a $1 reward. Participants were informed about the collection of this information before they took the survey. Those who wanted to stop participating were free to do so at any time. To this end, the online survey provided two researchers' phone numbers and email addresses. After the survey was conducted and rewards were distributed, the personal information of the students was destroyed.

6. Data analysis and statistical analysis

Responses from 420 students who participated in the survey were analyzed. The frequency, mean, and standard deviation (SD) of the questionnaire items were analyzed on a 5-point Likert scale. The linear-to-linear analysis between questionnaire items and sub-questionnaire items was conducted using RStudio software, package "vcd" The Pearson's correlation test was conducted between the questionnaire item "I am satisfied with my current enrollment in the college/graduate school of Korean medicine" and the questionnaire items of the seven latent variables, as well as the item "If I were to restart my postsecondary education, I would choose the college/graduate school of Korean medicine again" and the questionnaire items of the seven latent variables. Excel 2013 (Microsoft, Redmond, WA, USA), IBM SPSS Statistics 25 (SPSS Inc., Chicago, IL, USA), RStudio (PBC, Boston) and Graphpad Prism 7 (GraphPadSoftware Inc., San Diego, California, USA) were used for statistical analysis.

Results

1. Revised items via content validity and face validity tests

At first, KM professors rated questionnaire items regarding "clinical skills" and "psychological skills" relatively low. They pointed out that "manual skills" is an inappropriate questionnaire item that required respondents to include detailed examples. Therefore, the questionnaire items "perform manual skills as a Korean medicine doctor" and "perform psychological skills" were modified to "learn to perform clinical skills (including acupuncture, moxibustion, and herbal medicine) myself" and "perform psychological treatments." After the modification, the I-CVI was calculated as 1.0 (Table 1).

In particular, two questionnaire items were developed based on qualitative data from experts, one of which stated "I entered the college/graduate school of Korean medicine because I think Korean medicine has potential for future development," and was categorized as a latent variable "interest in Korean medicine." The other stated "I entered the college/graduate school of Korean medicine because I would like to make policies and perform social activities related

Table 1. I−CVI Score of New Items and Edited Questionnaire Items.

Number and title of modified questionnaire items
(b) I entered the college/graduate school of Korean medicine because I think Korean medicine doctors are professionals with a stable incumbency.
(c) I entered the college/graduate school of Korean medicine because I expect higher earnings as a doctor of Korean medicine than other professions after graduation.
(f) I entered the college/graduate school of Korean medicine because I am interested in treatment methods found in Korean medicine different from Western medicine.
(i) I entered the college/graduate school of Korean medicine because I would like to carry out research related to Korean medicine.
(j) I entered the college/graduate school of Korean medicine because I would like to perform clinical activities (including working at a hospital or a Korean medicine clinic).
(l) I entered the college/graduate school of Korean medicine because Korean medicine requires interaction with people who need examinations and treatments to be done by Korean medicine doctors.
(o) I entered the college/graduate school of Korean medicine because I can fulfill my military duty (as a public health doctor or an army doctor) easier than other occupational groups.
(p) I entered the college/graduate school of Korean medicine because college entrance examination scores (college scholastic ability test, high school records) were important factors at the time of college application.
(q) I entered the college/graduate school of Korean medicine because I think Korean medicine doctors and the related occupational scope of practice are closely related to my calling.
(r) I entered the college/graduate school of Korean medicine because I or one of my family members have/has a chronic disease.
(s) My family and relatives influenced my decision to attend the college/graduate school of Korean medicine.
(u) Mass media (including TV programs, the Internet, Korean medicine doctors as role models in the media) influenced my decision to attend the college/graduate school of Korean medicine.
(w) I am satisfied with my current enrollment in the college/graduate school of Korean medicine.

Title of newly added questionnaire items	Experts						I-CVI
	I	II	III	IV	V	VI	
(h) I entered the college/graduate school of Korean medicine because I think Korean medicine has potential for future development.	4	4	3	4	4	4	1.0
(k) I entered the college/graduate school of Korean medicine because I would like to make policies and perform social activities related to Korean medicine.	4	4	3	4	4	4	1.0
(m) I entered the college/graduate school of Korean medicine because I can learn to perform clinical skills (including acupuncture, moxibustion, and herbal medicine) myself as a Korean medicine doctor.	4	4	3	4	4	4	1.0
(n) I entered the college/graduate school of Korean medicine because I can perform psychological treatments, including counseling, as a Korean medicine doctor.	4	4	3	4	4	4	1.0

I-CVI = item-level content validity index.
I, II, III: professors majored in Korean Medicine.
IV, V, VI: consultants for college entrance.

to Korean medicine, and was categorized into the latent variable "career." The average I-CVI of the two items was 1.0 (Table 1). Twelve questionnaire items that had a score of 0.8 or higher I-CVI, but required modifications according to qualitative data from experts, were modified. After the revision, it was determined whether the questionnaire items were adequate by showing both unmodified and modified questionnaire items to the experts. Taken together, questionnaire items that ask the future development possibilities of the academic discipline and more diverse career paths when planning to examine the entrance factors of medical students should be considered.

Through the face validity test, the example written in the survey was edited for better understanding. Questionnaire items regarding "examination scores" were also edited from "because of the examination scores" to "because examination scores were important factors."

2. Basic characteristics of respondents

In the KM curriculum, students are separated into premedical and medical. Premedical 2nd year is a sophomore year in which students learn basic KM theory, basic medical science, and liberal arts. Considering recall bias, the survey did not target upper grades. As premedical 1st year students are freshmen, the researchers assumed that they did not have enough KM college experience. Therefore, premedical 2nd year students were selected as

Table 2. Basic Characteristics of Respondents (*N* = 420).

Characteristics	Frequency (%)
Male	209 (49.76)
Female	207 (49.29)
No reply	4 (0.095)
Age (y)	
18-23	370 (88.1)
24-28	33 (7.9)
29-32	13 (3.1)
33 or more	3 (0.7)
No reply	1 (0.2)
Having a doctor, a dentist, or a Korean medicine doctor in their family (multiple choices)	
Doctor	28 (6.7)
Dentist	19 (4.4)
Korean medicine doctor	46 (10.7)
None	337 (78.2)
No reply	0 (0.0)
High school track choice	
Natural sciences (natural sciences)	307 (73.10)
Arts and humanities (liberal arts)	109 (25.95)
Not applicable (including not taking the CSAT test)	4 (0.095)

College	No. respondents (A, *N* = 420)	Total enrollment (B, *N* = 744)	Response rate Per school (A/B) (%)	Frequency (%)
I	12	25	48.0	2.9
II	36	119	30.3	8.6
III	68	118	57.6	16.2
IV	58	94	61.7	13.8
V	44	77	57.1	10.5
VI	34	45	75.6	8.1
VII	24	48	50.0	5.7
VIII	14	22	63.6	3.3
IX	41	46	89.1	9.8
X	21	44	47.7	5.0
XI	13	55	23.6	3.1
XII	55	110	50.0	13.1
Overall	420	744	56.5	

CSAT = College Scholastic Ability Test.

potential research participants. Of the 744 students, 420 participated. The response rate was 56.5% (Table 2).

3. Overall survey results

The highest mean for the questionnaire items regarding entrance factors were related to stable incumbency, examination scores, clinical activities, and military duty (mean ± SD: 4.08 ± 0.745, 4.03 ± 0.938, 4.00 ± 0.984, 3.96 ± 1.1; Fig. 1A). The lowest mean for questionnaire items regarding entrance factors was related to chronic diseases associated with students or their family members, followed by mass media, the construction of policies and performance of social activities, and KM based on modern science (mean ± SD: 2.18 ± 1.07, 2.30 ± 1.02, 2.60 ± 1, 2.65 ± 1; Fig. 1A). The highest mean for questionnaire items regarding students' satisfaction was related to military duty followed by stable incumbency (mean ± SD: 3.90 ± 1.07, 3.85 ± 0.795), and the
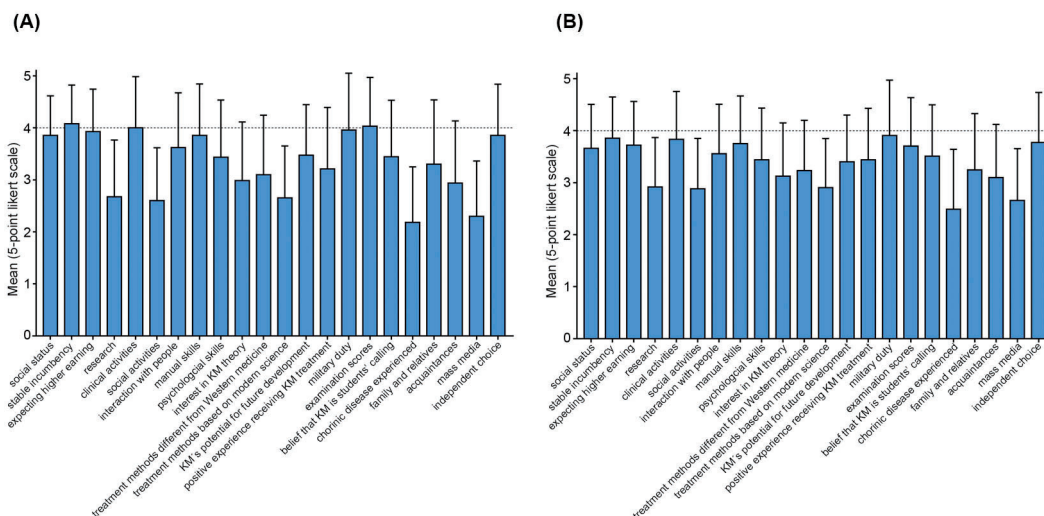
Fig. 1. Overall survey results of entrance factors and satisfaction with the college experience among Korean medicine students: (A) scores of each questionnaire item; and (B) scores of each sub-questionnaire item.
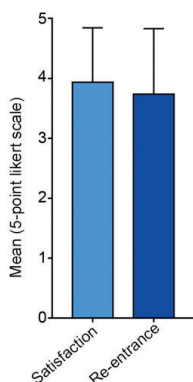Error bars are SD.

Fig. 2. Mean scores of questionnaire items regarding current satisfaction with the college experience or willingness of Korean medicine students to make the same initial choice to study Korean medicine.
Error bars are SD.

lowest mean for questionnaire items regarding students' satisfaction was related to chronic diseases associated with students or their family members, followed by mass media (mean ± SD: 2.49 ± 1.15, 2.66 ± 0.997; Fig. 1B). Taken together, the highest influencing factor for both entrance and satisfaction was the stable incumbency of the KM doctor, whilst experience of chronic disease, and mass media had the least influence.

Two questionnaire items asking about current satisfaction and willingness of "re-entrance" both gained assumed relevance with a response score between three and four (mean ± SD: left, 3.94 ± 0.908; right, 3.74 ± 1.09; Fig. 2). The response scores of every questionnaire item are described in Supplementary 2 .

4. Magnitude of change between questionnaire and sub-questionnaire items

The magnitude of change in the mean between the questionnaire items and sub-questionnaire items implies a high influence of specific factors that contribute to the students' college entrance choices and their current satisfaction with the school they attend. Eleven items had positive changes: research (0.090), social activities (0.1072), psychological skills (0.0005), interest in KM theory (0.046), treatment methods which were different from Western medicine (0.0429), treatment methods based on modern science (0.095), positive experience receiving KM treatment (0.0704), calling (0.0195), experience of chronic disease (0.1406), influence from acquaintances (0.0551), and influence from mass media (0.1552; Fig. 3). Of the four questions belonging to the "interest in KM" latent value, the mean of three questions was changed in a positive direction. Therefore, it can be assumed that perception of KM evokes the most satisfaction through education.

To investigate the relationship between questionnaire items and their sub-questionnaire items in depth a linear-by-linear test of the relationship was conducted. As the questionnaire item and its' sub-questionnaire items are tightly interconnected, all items showed a positive correlation with their sub-items. Specifically, the item regarding interaction with people ($Z = 16.55$) had the highest z-score, while the item asking about examination scores ($Z = 7.9303$) had the lowest z-score. The response scores of every questionnaire item are described in Supplementary 3.
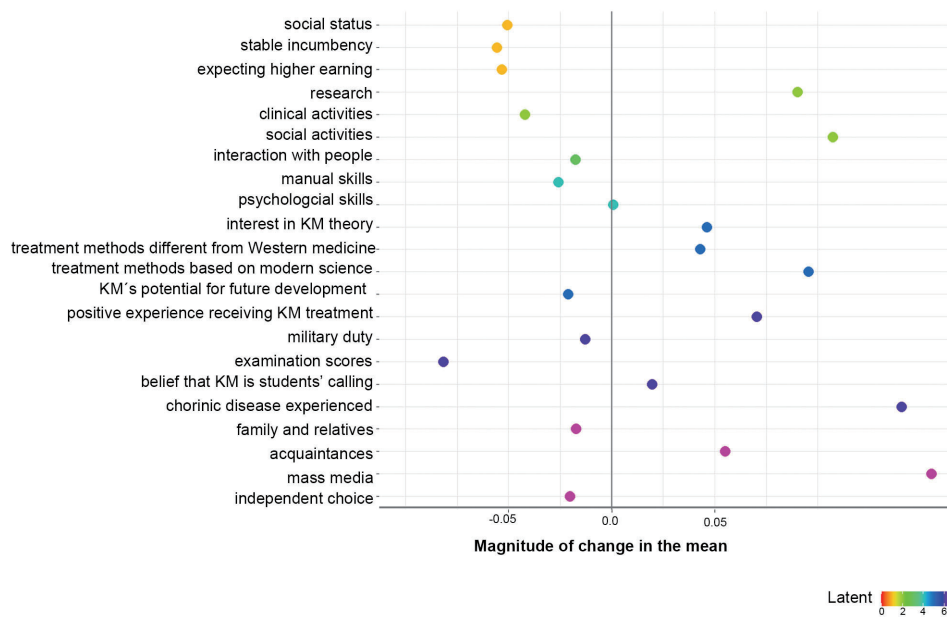
Fig. 3. Magnitude of change during questionnaire development between questionnaire items and sub-questionnaire items regarding entrance factors and satisfaction with the college experience among Korean medicine student.
Each dot represents individual items.
Each color represents the latent variables of each questionnaire items.

5. Pearson's correlation between the participants' satisfaction, willingness to re-enter, and motivation

The questionnaire items or sub-questionnaire items that showed a moderately high correlation with the item asking the students' satisfaction with their choice to enroll onto the KM course were as follows: "Independently chose to attend the college/graduate school of KM" (independent choice; sub-questionnaire item, r = 0.6055), "Korean medicine doctors are professionals with a stable incumbency" (stable incumbency; sub-questionnaire item, r = 0.5622), "Korean medicine doctors are professionals with high social status" (social status; sub-questionnaire item, r = 0.5273), "Korean medicine doctors and the related occupational scope of practice are closely related to my calling" (calling; sub-questionnaire item r = 0.489), and "I would like to perform clinical activities" (clinical activities; sub-questionnaire item, r = 0.4712 ; Fig. 4A).

The questionnaire item or sub-questionnaire item that showed a moderately high correlation with the item asking whether participants were willing to re-enter the KM college were as follows: "Independently chose to attend the college/graduate school of KM" (independent choice; sub-questionnaire item, r = 0.5273), "Korean medicine doctors are professionals with high social status" (social status; sub-questionnaire item, r = 0.4514) and "Korean medicine doctors are professionals with a stable incumbency" (stable incumbency; sub-questionnaire item, r = 0.4873), "Korean
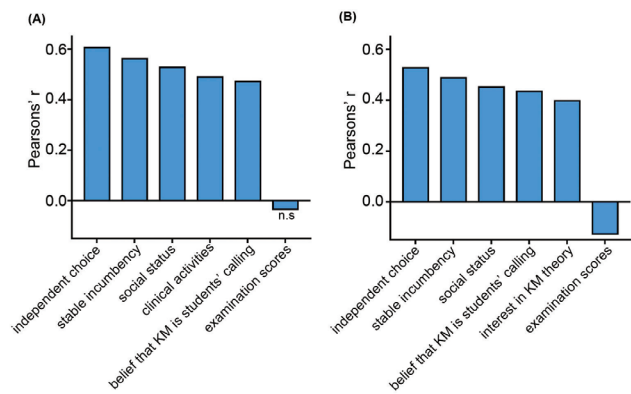

Fig. 4 Correlation coefficients between questionnaire items and satisfaction or re-entrance: (A) Pearson's correlation coefficient of questionnaire items or sub-questionnaire items with the students' current satisfaction in their enrollment onto a KM course: (B) Pearson's correlation coefficient of questionnaire items or sub-questionnaire items with the students' willingness to re-enter Korean medicine.
n. s. = not significant.

medicine doctors and the related occupational scope of practice are closely related to my calling" (calling; sub-questionnaire item, r = 0.434), and "Interested in the theory of KM" (interest in KM theory; sub-questionnaire item, r = 0.3967; Fig. 4B).

Interestingly, the questionnaire item asking whether college entrance examination scores, such as a college scholastic ability test or high school records, were important

factors at the time the students applied to college was the only item that had negative correlations with the items regarding students' current satisfaction (examination score; questionnaire item, r = -0.0341) and willingness to re-enter (examination score; questionnaire item, r = -0.1269), but had observation has a low correlation (Figs. 4A and 4B). The results show that independent choice, social status, and career are the most important factors contributing to student satisfaction.

Discussion

Students enter Western medicine and KM colleges for numerous reasons. As each country has its unique law of defining the role of medical professionals, it is necessary to consider each country's unique healthcare system when focusing on why a student chooses to study medicine. In Korea both Western medicine and KM doctors have equal legal rights and responsibilities. This study was conducted to understand the choices made by students entering KM colleges from developing a questionnaire to collecting data to reflect the unique healthcare system in Korea.

The score of questionnaire items regarding stable incumbency and high income were high because in South Korea, professionals have relatively high job stability and high income. This is aligned with the results of previous studies which reported that pay is a significant factor for Western medicine and dental students in their career choice [19]. The score of the questionnaire item regarding students' willingness to conduct clinical activities was very high. In contrast, before choosing KM, only few students considered diverse career choices including a professor who conducts research in KM. Almost every KM doctor conducts clinical activities after their graduation. Therefore, performing clinical activities as a KM doctor is a major factor in the choice to study KM.

Nonetheless, the magnitude of change between questionnaire and sub-questionnaire items where the students were asked about students' willingness to perform research in KM, as well as policy making, and performing social activities related to KM increased slightly. Many curricular experiences, including lectures, strongly influence the students' career decisions [11]. Therefore, whilst they attend college, students consider different career paths that are not limited to engaging in clinical activities.

Taken together, a lot of clinical activities or manual skills in the curriculum, as well as career programs that help students access KM doctors working in different fields, are factors that educators can consider when they design educational programs that allow students to perform. As a result of this study, more KM students now appreciate that KM is based on modern science, which will boost their satisfaction with the KM course. In addition, if the educator demonstrates to the student that use of a medical device is feasible and applicable to the clinical field, KM student satisfaction with the course will increase. Furthermore, cultivating career opportunities that help students to experience both clinical and nonclinical activities, or planning the coursework could aid student satisfaction with the course. In other countries, research experience is offered to medical undergraduates [20]. Potentially this could be adopted in Korea and is worth further consideration.

Although there were enough participants in this study for statistical analysis, there is always the possibility of performing a larger study with more participants. The limitations of this study are that the participation rate of students from different schools across the country was not even. This could be overcome, to some extent, by delivering the web survey link in a variety of ways in addition to a message to the student group leaders of each KM college. Although the positive Pearson's correlation coefficient between questionnaires indicated the students' satisfaction with their enrollment onto a KM course, it may also imply the students' rationalization for their choices. Long term research could also be conducted on students who participated in this study to examine changes in the KM students' perceptions over time.

Conclusion

This study attempted to identify factors that contribute to student satisfaction in KM colleges. The results of this study may guide students who are thinking about studying and are suitable for entrance into a KM college. Additionally, some factors may contribute to current student satisfaction with their KM college and course. The identification of college entrance factors that are closely related to the students' motivation to become a Doctor of KM may increase the current academic satisfaction of KM students and decrease the course drop-out rates. Moreover, some college entrance factors that can be applied to college curriculum or subject teaching, such as interest in KM research , should be prioritized in the curriculum in the future to increase the students' overall satisfaction. Lastly, some responses to the questionnaires indicate that KM is perceived as an interesting academic discipline to learn at university.

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Author Contributions

Conceptualization: HSK and HK1. Methodology: HSK, HK1, and JL. Software: HSK. Validation: JL. Formal analysis: HSK, JL, and HK2. Investigation: HSK and HK1. Resources: HK1. Data curation: HSK. Writing – Original Draft: HSK. Writing – Review & Editing: HSK, HK1, JL, and HK2. Visualization: HSK. Supervision: HSK and HK1. Project administration: HK1.

Completes of Interest

The authors have no conflicts of interest to declare.

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Ethics Approval and Consent to Participate

This study has been approved by the Public Institutional Bioethics Committee designated by the MOHW (no.: P01-201903-22-003). All participants could only respond to the online survey if they had read the information about the contents of survey and gave their informed-consent online before taking part in the survey. The completion of survey was taken as implied consent. Informed consent was obtained from all participants.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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