Motivational State of Japanese Medical Students at the Time of Admission and Factors Influencing Intrinsic Motivation: a Cross-sectional Study

Asuka Kikuchi (✉ kikuchi.asuka.xo@ehime-u.ac.jp)

Ehime University Hospital

Ryuichi Kawamoto

Ehime University Graduate School of Medicine

Taichi Akase

Ehime University Graduate School of Medicine

Daisuke Ninomiya

Ehime University Graduate School of Medicine

Yoshio Tokumoto

Ehime University Graduate School of Medicine

Teru Kumagi

Ehime University Hospital Post Graduate Medical Education Center

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Abstract

Background

Medical schools should select students with clear intentions to become doctors because motivated students are better pupils and become better doctors. However, there are no studies directly asking medical students whether they intend to become doctors at the time of medical school admission. The aim of this study was to explore the motivational aspirations of medical students and the factors impacting motivation upon entering medical school.

Methods

We conducted a cross-sectional study at a Japanese national medical school from April 2019 to March 2021. We used a questionnaire asking medical students whether they had clear intentions to become doctors when applying to medical school. Students who answered affirmatively were classified as “intrinsically motivated,” whereas those without this intention were classified as “extrinsically motivated.” We compared these two groups and analyzed the factors influencing intrinsic motivation with multinomial logistic regression analysis.

Results

Out of 531 medical students who completed the questionnaire, 378 (71.2%) had clear intentions to become doctors at the time of admission (intrinsically motivated), and the remaining students did not (extrinsically motivated). Factors influencing intrinsically motivated students were doctors in the students’ family other than their parents (OR = 1.645, $P = 0.041$), doctors as role models (OR = 2.836, $P < 0.001$), and having the personality characteristic of empathy (OR = 1.940, $P = 0.008$). Parental (OR = 0.391, $P < 0.001$) and peer (OR = 0.284, $P = 0.008$) influences on their career choice had negative effects on intrinsic motivation.

Conclusions

This study revealed that not all medical students intended to become doctors upon entering medical school, and their motivational status and reasons for being motivated varied. In conducting motivational research on medical students, it may be necessary to keep in mind that the target students who aspire to become doctors are not necessarily a homogenous group. These findings may lay the groundwork for additional medical student motivational research. Additional research on motivation after admission through prospective surveys and developing curricula based on motivation should also be studied in the future.

Background

It is important for medical schools to select students who have clear intentions to become doctors because medical students who are motivated will take appropriate actions to achieve this goal. In

educational psychology, being motivated is a state where people are engaged in achieving their goals. A person's actions are based on the interpersonal, socio-cultural, and physical factors that they consider valuable [1]. The Organismic Integration Theory is a sub-theory of the Self-Determination Theory, which is an established theory that approaches motivation from the aspect of desire [2]. This theory advocates that humans have an innate tendency toward growth and integration. This theory also posits that motivation is largely divided into extrinsic and intrinsic types. With extrinsic motivation, on the one hand, people act for reward (external adjustment) or for approval from themselves or others (introjection). When people find value in their goal, and the goal is what they hope to achieve (identification or integration), extrinsic motivation is similar to intrinsic motivation. However, this scenario is still considered extrinsic since there is a lack of satisfaction in the goal itself. On the other hand, intrinsic motivation is based on autonomous decision making and is affected by factors such as interest, pleasure, and satisfaction [2, 3]. Extrinsic and intrinsic motivation are concepts on the same spectrum [2, 3], and both types of motivation can be the driving force for a person's actions simultaneously [1, 4, 5]. Regarding motivation in medical students whose goal is to become doctors, "intrinsically motivated" can be described as follows: students who have a clear intention to become doctors based on their life experiences and who continue taking actions to achieve their goals [3, 6].

In medical educational research, educators have explored methods to select the best students and have identified factors that predict students' performance [7–13], effective learning methods [14–22], and evaluation scales of medical students [23–26]. In addition, empathy and altruism in medical students have been under investigation because these characteristics are critical for doctor–patient communication and are said to positively affect patients' health [27–32]. The relationship between medical students' motivation and their performance or empathy have also been a subject of intense study [5, 33]. In most studies, researchers have aimed to develop better curricula to help medical students become excellent doctors and seem to take it for granted that most medical students or medical school applicants have the desire to become doctors. So do all students really have a strong intention to become doctors? Are they motivated intrinsically to become medical professionals? Although this is a major assumption, no studies have answered this question to date. There are a few reports that focused on background factors and other factors that are career determinants [34, 35]. These, however, do not mention motivational status in detail or the relationship between motivation and its regulatory factors. Therefore, we conducted this study to examine whether medical students have a clear intention to become doctors and what factors impacted their motivational status at the time of medical school admission.

Methods

Participants

We conducted this observational cross-sectional study from April 2019 to March 2021 at Ehime University Faculty of Medicine, a national university in Japan. The study subjects were medical students attending Ehime University. We asked the students to complete a questionnaire during a class or at a

community practice session. Students who were not obligated to attend these sessions were asked to complete the survey by e-mail, and they answered the questionnaire online.

Medical schools in Japan do not require applicants to have undergraduate degrees. To apply to a national university, students must take the National Center Test for University Admission. Students who earn scores over a certain level are then able to take original examinations that each national university provides and attend interviews. Some students enter national medical school with recommendations from designated high schools without paper examinations. Once students enter university, they cannot change their major. To do that, students need to drop out and take another entrance examination the following year. Therefore, students have no other choice than to take entrance examinations several times or give up on their career choice. Some people believe that dropping out of university several times is related to personal problems. Therefore, most applicants begin to prepare for medical school admission in their early education.

Questionnaire

We developed a questionnaire based on the Organismic Integration Theory [2, 3]. We defined intrinsically motivated students as students who had a clear intention to become doctors at the time of admission. By contrast, we defined extrinsically motivated students as students who entered medical school without this intention. These two motivational states were used as dependent variables. We chose the following factors as independent variables: background factors (gender, age, grade, the location, and population of the student's hometown, type of high school (public, private, and national), having graduated from a combined junior and senior high school, having taken entrance examinations twice or more, experience in a different career, having changed majors from another to medicine, use of a scholarship, having a recommendation from a designated high school, the presence of doctors in the students' family, and doctors as role models), the most influential career determining factors at the time of admission (advice from parents, siblings, or high school classmates; work experience programs; medical dramas, comics, or novels; and an experience of illness in themselves or in someone close), and personality factors (sociable, self-sacrificing, sensible, empathetic, and indecisive). Since there have been no previous studies conducted to detect motivation at the time of admission, we decided on each variable by referring to previous studies on medical school applicants or medical students [8, 34, 36–42].

Statistical analyses

Statistical analysis was performed with SPSS statistics v.27 (IBM Japan Digital Services Company). All questionnaires containing missing data were excluded, and only those with complete data were used. First, we conducted an X^2 test to determine the dependent variables that showed differences between intrinsically and extrinsically motivated students, and then we performed stepwise multinomial logistic regression analysis to identify the dependent variables that are related to intrinsic motivation. A P -value < 0.05 was considered statistically significant.

Informed consent and ethical considerations

The purpose of the survey was noted at the beginning of the questionnaire, and it was clearly explained that answering the questionnaire would constitute consent to participate in the study. We obtained the approval from the Institutional Review Board at Ehime University Hospital.

Results

Of 697 students, 531 completed the questionnaire. The collection rate was 76.2%, and none of the respondents withdrew from the study.

Motivation of medical school students at the time of admission

A total of 378 students (194 males and 184 females) entered medical school with a clear intention to become doctors, which made up 71.2% of the total (Figure 1). The remaining 153 students explained their reasons for choosing medical school as follows: "Considered other medical careers and medical school was not mandatory" (54.0%), "Recommended by parents" (20.3%), "Recommended by a cram school" (0.6%), "Had a good result on the National Center Test for University Admission" (4%), and other reasons (21.1%). Other reasons included "Pure academic interest," "Interpreted parents' expectations (parents never mentioned their desire that their children become doctors, but I sensed what they wanted)," "For the reputation and career stability," "I chose what most of my classmates chose for their career," "I just had good grades, so I chose to attend medical school," and "For qualifications that will last a lifetime."

Comparison of intrinsically and extrinsically motivated students

Medical students who entered medical school with a clear intention to become doctors were defined as the intrinsically motivated group, whereas those without this intention were defined as the extrinsically motivated group. We performed χ^2 tests to examine whether there were differences between the groups in terms of background factors (Table 1), factors that had the greatest impact on the students' career choice decision (Table 2), and personality traits (Table 3). Factors that were significantly different between the two groups were as follows: "The presence of doctors in the student's family except for their parents" (intrinsically motivated, 31.0% vs. extrinsically motivated, 22.2%) and "The presence of doctor role models" (48.7% vs. 22.9%) among the background factors, and "The influence of one's parents" (34.9% vs. 51.6%), "The influence of one's peers" (2.4% vs. 7.8%), "The influence of medical TV shows" (10.1% vs. 4.6%), and "The experience of illness in someone close" (24.1% vs. 13.1%) among the career determinant factors. (Table 1,2,) Differences in personality predisposition between the two groups were apparent in "sociability" (65.1% vs. 54.2%), "self-sacrificing" (71.2% vs. 58.8%), and "empathetic" (85.2% vs. 71.9%). (Table 3) In the stepwise multinomial logistic regression analysis (Table 4), "The presence of doctors in the student's family except for their parents," "The presence of doctor role models," "The influence of one's parents," "The influence of one's peers," and "Empathetic" were identified as factors differentiating intrinsically motivated medical students at the time of admission. (Table 4)

Table 1

Comparison of the background factors influencing intrinsically and extrinsically motivated students

Background Factor	Motivation at Admission		
	Intrinsically Motivated	Extrinsically Motivated	P-value
	N (%)	N (%)	
Sex	Female = 184 (48.7%)	Female = 70 (45.8%)	0.541
Age (SD), years	21.8 (3.01)	21.8 (2.49)	0.968
Hometown is in the same prefecture where the medical school is located	180 (47.6%)	69 (45.1%)	0.598
Type of high school	Public 183 (48.4%) Private 174 (46.0%) National (5.6%)	Public 66 (43.1%) Private 76 (49.7%) National 10 (6.5%) Others 1 (0.1%)	0.308
Combined junior and senior high school	209 (55.3%)	86 (56.2%)	0.847
Took entrance exams twice or more	161 (42.6%)	52 (34.0%)	0.067
Experience in a different career	15 (4.0%)	6 (3.9%)	0.980
Changed majors to medicine	32 (8.5%)	8 (5.2%)	0.201
Received a scholarship	123 (32.5%)	48 (31.4%)	0.794
Recommendation by a designated school	117 (31.0%)	51 (33.3%)	0.593
Presence of doctors in students' family; parents	107 (28.3%)	39 (25.5%)	0.510
Presence of doctors in students' family other than parents	117 (31.0%)	34 (22.2%)	0.043*
Presence of doctor role models	184 (48.7%)	35 (22.9%)	<0.001*
Significant values ($P < 0.05$) are presented with (*).			

Table 2

Differences in factors having the greatest impact on students' career choice decision between the groups

Motivation at Admission			
Factor	Intrinsically Motivated N (%)	Extrinsically Motivated N (%)	P-value
The influence of one's parents	132 (34.9%)	79 (51.6%)	<0.001*
The influence of one's siblings	8 (2.1%)	8 (5.2%)	0.057
The influence of one's peers	9 (2.4%)	12 (7.8%)	0.003*
A workplace experience	20 (5.3%)	10 (5.3%)	0.574
The experience of illness in someone close	91 (24.1%)	20 (13.1%)	0.005*
The experience of illness in myself	63 (16.7%)	16 (10.5%)	0.069
The influence of medical TV shows	38 (10.1%)	7 (4.6%)	0.040*
The influence of medical comics	10 (2.6%)	6 (3.9%)	0.436
The influence of medical novels	9 (2.4%)	1 (0.7%)	0.404
Significant values ($P < 0.05$) are presented with (*).			

Table 3

Differences in personality predisposition between the groups

Motivation at Admission			
Personality Trait	Intrinsically Motivated N (%)	Extrinsically Motivated N (%)	P-value
Sociable	246 (65.1%)	83 (54.2%)	0.020*
Self-sacrificing	269 (71.2%)	90 (58.8%)	0.006*
Sensible	282 (74.6%)	102 (66.7%)	0.064
Empathetic	322 (85.2%)	110 (71.9%)	<0.001*
Indecisive	283 (74.9%)	124 (81.0%)	0.128
Significant values ($P < 0.05$) are presented with (*).			

Table 4

Stepwise forced entry multinomial logistic regression analysis of differences between intrinsically and extrinsically motivated students

Variables	Stepwise Regression		Forced Entry Regression	
	Odds Ratio (95% CI)	P-value	Odds Ratio (95% CI)	P-value
The presence of doctors in the student's family except for their parents	1.645 (1.021–2.652)	0.041*	1.770 (1.902–2.870)	0.021*
The presence of doctor role models	2.836 (1.811–4.440)	<0.001*	2.795 (1.765–4.426)	<0.001*
The influence of one's parents on career decision	0.391 (0.258–0.594)	<0.001*	0.508 (0.320–0.806)	0.004*
The influence of one's peers on career decision	0.284 (0.113–0.718)	0.008*	0.386 (0.149–1.002)	0.051
The experience of illness in someone close	–	–	1.651 (0.906–3.010)	0.102
The influence of medical TV shows	–	–	2.426 (0.988–5.956)	0.053
Sociability	–	–	1.071 (0.693–1.655)	0.756
Self-sacrifice	–	–	1.245 (0.793–1.953)	0.341
Empathy	1.940 (1.193–3.153)	0.008*	1.732 (1.207–2.923)	0.040*
Indecisiveness	–	–	0.691 (0.417–1.145)	0.152
Significant values ($P < 0.05$) are presented with (*). (–) did not remain in the final model by stepwise multinomial logistic regression analysis.				

Discussion

This survey was conducted at a Japanese national medical school to elucidate the motivational state of medical students at the time of admission to medical school. We found that not all students entered medical school with a strong desire to become a doctor and that a certain number of students entered medical school with non-autonomous extrinsic motivation.

About half of the students who filled out the survey responded that their motivation was to become a medical professional without specifically becoming a doctor. The other half made introjected decisions such as “being explicitly or implicitly influenced by their parents to go to medical school,” “having made their choice with the evaluation of others on their mind,” “I was in tune with the people around me,” and “I got good grades.” There are no previous reports that evaluate students’ motivational state at the time of admission. However, there are studies that examined the medical career orientation of early education students [34, 35]. According to these studies, important factors included the opportunity to receive a basic education enabling them to apply to medical school, sufficient family income to be able to afford medical education, and parental income [34]. In addition, “being aware that one’s grades are considerably above average compared to one’s peers” and “socioeconomic status” were elementary and junior high school factors that impacted students’ interest in medical professions [35]. The factors associated with extrinsically motivated students in this study are similar to those reported in previous studies in terms of giving careful consideration to their parents’ educational policies, good grades, and social status. This might reflect these students’ immaturity in making a career choice. Although both intrinsic and extrinsic motivation affect one’s behavior [5], intrinsic motivation is associated with higher performance [43]. Student life in medical school is busy and stressful. Overcoming these difficulties and passing the National Board Examination require patience. Considering this point, students may drop out or burn out, unless they have motivation that is self-determined and intrinsic to a certain extent [42]. To support medical students, we believe it is important to assess data on medical students’ motivation at the time of admission and to understand their motivation and mental state through their student life.

In this study, factors impacting intrinsically and extrinsically motivated students at different rates included having a family member who was a doctor other than their parents, having doctors as role models, parental influence on career choice, and being empathetic. Having parents who were doctors was not significantly different between these two groups. It has been reported that career aspiration is influenced by expectations from parents, but there are no reports on influence by siblings and relatives [42]. Based on our study, this factor may influence intrinsic motivation among students, but we did not assess differences in perception about this factor between the groups. To clarify whether influence by siblings and non-parental relatives also affects extrinsically motivated students, we need to investigate how medical students think about it in detail. On the other hand, there are many reports showing that having doctors as role models has a positive influence on motivation among medical students and residents [5, 33, 44]. Empathy is also reported to affect motivation positively [33]. Therefore, it is likely that these factors impact intrinsic motivation at the time of admission.

Finally, our survey revealed that intrinsically motivated students tended to be less influenced by their parents and peers in terms of their career choice. This result suggests that the decision making of

intrinsically motivated students is autonomous rather than being influenced by the intentions of someone close to them. This is consistent with the Organismic Integration Theory, in which the choices of intrinsically motivated people are self-determined and autonomous, while extrinsically motivated people lack these features [2, 3]. Indecisiveness in students' career decision making is categorized as chronic indecision, and these types of students exhibit low self-efficacy and autonomy, especially when they perceive high control from parents and friends [44, 45]. Education that supports the autonomy of medical students is believed to lead more humane care, and in the interest of patients, intrinsically motivated and autonomous students are preferred as medical students [46]. Considering the results of this study and the findings of previous studies, medical education curricula should be more tailored to different types of students. Educators must construct curricula that maintain intrinsic motivation and encourage those who are extrinsically motivated to become more intrinsically driven.

This study has several limitations. First, our survey was conducted at a national medical university in Japan. Unlike those in other countries, the Japanese medical school admission system does not require undergraduate graduation. Moreover, Japanese medical school applicants are younger than those in other countries, suggesting that they may be less mature [47]. Cultural differences in career maturity are also expected [48]. Considering these factors, it is unclear whether the results of this study can be applied to medical students in other countries. Second, we used a questionnaire survey based on recollection. For students in clinical clerkship, the survey was taken many years after admission, and they may have been influenced by interpersonal and environmental factors after admission. Finally, motivation is influenced by various factors and changes year by year. The implications of motivation at the time of admission on differences during clinical practice, national examinations, internship, and residency remain to be determined. Once these factors are investigated, how educators support students based on their motivational status might change. Further research and accumulation of data through prospective surveys are required.

Conclusions

This study revealed that not all medical students had a clear intention to become a doctor upon entering medical school, and their motivational status varied. Factors that differed the most between intrinsically and extrinsically motivated students and were most impactful on the students' career choice were whether there was a doctor among the student's siblings or close relatives, the presence of a doctor as a role model, and whether the student was influenced by their parents or classmates. In conducting motivational research on medical students, it may be necessary to keep in mind that the target students are not necessarily a homogenous group who aspire to become doctors. These findings may lay the groundwork for medical student motivational research. Additional studies on motivation after admission through prospective surveys and developing curricula for students with various motivation levels should be carried out in the future.

List Of Abbreviations

Declarations

Ethics approval and consent to participate

The purpose of the survey was listed at the beginning of the questionnaire, and it was clearly explained that answering the questionnaire would constitute consent to participate in the study. We obtained the approval of Institutional Review Board, Ehime University Hospital, for this study (date: July 27, 2015; reference number: 15007004).

Consent for publication

This article does not contain any individual personal data in any form.

Availability of data and materials

The datasets analyzed in this study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests

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Authors' contributions

A.K., R.K., and T.K. conceived of the idea, and A.K. and R.K. planned the study and created the questionnaire to evaluate medical students' motivation. A.K., R.K., T.A.D.N., and Y. T. collected data. A.K. performed statistical analysis and took the lead in writing the manuscript with support from all authors.

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Figures

Figure 1

Motivation of medical school students at the time of admission. *Others included “pure academic interest,” “interpreted parents’ expectations (parents never mentioned their desire that their children become doctors verbally, but I sensed what they wanted),” “for the reputation and career stability,” “I chose what most of my classmates chose for their career,” “I just had good grades, so I chose to attend medical school,” and “for qualifications that will last a lifetime.”