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Personal Qualities of First-Year Medical Students and Academic Performance: A 6-year Follow-up Survey

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Abstract Although it is very important to determine if medical students possess the personal qualities to be competent physicians, no reliable method of doing so has been established. In this study, we evaluated first-year students to determine if they had the personal qualities—the non-cognitive abilities—required of physicians. In addition, we examined the relationship between these personal qualities and students' academic record at Yamaguchi University School of Medicine.

Regarding the method of evaluation, students were requested to write a report on an opinion column published in the Asahi Newspaper in 2002. Assessment of three non-cognitive personal qualities was based on their responses in this report. Then, the assessments of students' personal qualities were compared with their grades in the Introduction to Medicine II course, taught in the first year, and with their subsequent advancement status (i.e., whether they repeated an academic year) and their result on the National Board Examination.

The assessments for "amenability or modesty" and "motivation" were significantly correlated with the course grade. The students' advancement status and their result on the National Board Examination were not correlated with the assessments of any of the three personal qualities, but both were well correlated with their grades for the Introduction to Medicine II course.

In summary, student reports on the opinion column from the Asahi Newspaper were useful in assessing first-year students' personal qualities, particularly motivation and amenability or modesty.

Key words: personal qualities, motivations, responsibility, amenability, early-exposure practical training

Introduction

A physician is responsible for caring for the lives of patients and for addressing the distress related to their illness. In other words, physicians need to have the will to make every effort to help patients. Physicians are expected to be individuals of character, and must develop certain personal qualities. Because society increasingly expects certain attitudes and habits among physicians, evaluation of the non-cognitive personal qualities of first-year medical students is necessary if teachers are to promote the personal development of students during their medical education. However, there is currently no instrument to assess the personal qualities that are required to be competent physicians.[1)2)]

Therefore, as a method of assessing personal qualities, we evaluated the non-cognitive personal qualities of first-year students, including motivation to become a physician,

spirit of self-sacrifice or sense of responsibility, and amenability or modesty, using an opinion column from a 2002 issue of the Asahi Newspaper entitled, "Questions to you who have chosen medicine as your field of study." At the same time, an early-exposure training course in year 1, named "Introduction to Medicine II", was offered to motivate first-year students to become physicians. We then investigated the relationships between the assessments of students' personal qualities, based on their responses to the column, and the students' grades in the Introduction to Medicine II course, their advancement status in the school year (presence of a repeated year or not), and their score on the National Board Examination. During this process, we determined whether the non-cognitive personal qualities of first-year students could be assessed by using their reports on the column, and whether such assessments were useful for teachers hoping to develop the personal characteristics of individual medical students.

The newspaper column is now widely used as a class activity for high-school applicants to medical schools and at preparatory schools.

Methods

Assessment of the personal qualities of first-year medical students

This study took place in the class Introduction to Medicine II (9 units in total), which is part of the first-year curriculum of Yamaguchi University School of Medicine. At the end of this course, to evaluate students' personal qualities, we gave each student an opinion column from the April 16, 2002 issue of the Asahi Newspaper entitled, "Questions to you who have chosen medicine as your field of study" (written by Kazuo Kawasaki, former director of Kanazawa University Hospital). We then asked the students to answer the questions posed in the column:

(A) "Which subjects did you like in high school?"

(B) "In public, can you clearly explain why you have chosen medicine?"

(C) "Do you have a spirit of service and self-sacrifice?"

Then, we asked students to offer their opinions regarding the author's view: "only study hard and study harder" in medical school because "doctors who lack knowledge cause the death of patients". Next, we asked students to write a phrase from the column that impressed them. Finally, students were requested to write a report of 800-1,000 characters. The text of Dr. Kawasaki's column and the report tasks are shown in Table 1. In this column, the author asks medical students about their views and reasons for becoming a physician. By reading the students' reports in the context of the above questions, we were able to evaluate the personal qualities of students, such as "motivation", "self-sacrifice or responsibility", and "amenability or modesty".

In the analysis of the reports, the criteria for assessing the report were as follows. For "motivation", those who stated that they could explain their reason for choosing medicine were classified as "sufficient", those who admitted that they could not express their reasons were classified as "poor", and those who did not answer clearly were classified as "unknown". For "self-sacrifice or responsibility", those who responded that they had a spirit of service or self-sacrifice for patients were classified as "sufficient", those who admitted that they were not sure if they had such a spirit were classified as "poor", and those who did not answer clearly were classified as "unknown". For "amenability or modesty", those who agreed with the author's view "only study hard and study harder" were classified as "sufficient", those who consistently did not accept this view were classified as "poor", and those who did not answer clearly were classified as "unknown".

Assessment of students' grades in the Introduction to Medicine II course

The activities of the Introduction to Medicine II course included visiting a human anatomy exercise, practice in medical communication, a tour of the departments of the university hospital, and visits to elderly-care facilities, as shown in Table 2.

Course grading was based on student essays describing their impressions of each class and on their attitudes during the course

Table 1 An opinion column from the Asashi newspaper and the report tasks

My point of view (Opinion: News Project) - April 16, 2002
"Questions to you who have chosen medicine as your field of study" (Kazuo Kawasaki, former director of the Kanazawa University Hospital)

First, I have questions for you who are going to be a doctor. Which subjects did you like in your high school days (A)? You may have been fascinated by physics. You may have been good at English. However, medicine could never have been your favorite, because there is no high school providing medical education in Japan.

If you loved physics (or English) in high school, why didn't you enter the Department of Physics of a Faculty of Science (or Faculty of Literature)? If you were attracted to physics, you must be interested in lectures at the Department of Physics.

Aside from whether or not you like medicine, you must accept the fact that you have chosen medicine as your field of study. In short, you are not allowed to skip a class even if you feel that it is boring. It is your responsibility that you have chosen medicine for some reason even though you may have had no idea whether medicine would be interesting for you.

Then, I ask you another question. In public, can you explicitly explain the reason you have chosen medicine (B)? If you cannot recall any real motive other than "a profession that appears to be privileged economically and socially", you must read through Dante's "Divina Commedia". If this is impossible, you should immediately change your major.

I further question you. Do you have the spirit of service and self-sacrifice (C)? A doctor's jobs are not as cool as in a TV drama. Consecutive overnight duties to treat severely-ill patients, as well as the unexpected cancellation of a holiday plan due to an emergency case, always happen. Can you connect with the mind of a patient stricken with a life-threatening illness?

I strongly appeal to you (D). It is unacceptable for a doctor to lack knowledge. If you become a doctor without sufficient knowledge, you may cause the death of innocent patients. It is impossible to diagnose patients if you do not know the disease. You cannot provide treatment you are not familiar with. Some doctors are not ashamed of saying, "I'm sorry, but we did everything we could", without feeling guilty.

If you don't want to be such a doctor, you cannot "study hard and have a full social life". Medical students must prepare themselves only to "study hard and study harder".

There are unsuccessful applicants for the national examination for medical practitioners in every medical school. The reason that 10 to 20% of applicants fail the exam, which, naturally, could be passed by all applicants, is the lack of their recognition of the heavy responsibility a doctor should bear. Can you entrust your own life or that of your beloved to a doctor short of study when in a critical state? Doctors cannot excuse their lack of knowledge. To become a doctor is such a responsibility that you cannot help but shudder.

Finally, I ask you. There are two types of satisfaction a doctor can feel. One is the satisfaction of patients regaining their health as a result of the doctor's treatment. The other is satisfaction from making a medical discovery useful for society and people. (Sentences omitted)

The first type of satisfaction represents a natural position as a doctor. I wish you not to be content with this, but to develop a strong intention to experience the other type of satisfaction. What brings you the true peace of mind is not wealth, fame, nor a position, but when you feel that you have done something useful for people and society.

Tasks: Read the column from the Asahi Newspaper, and answer the questions (A), (B), and (C) from the author to medical students. Also, freely describe your opinion on his view expressed following the sentence (D). (E) If you find any phrase or sentence that impressed you in this column, write it down.

Table 2 Course schedule of "Introduction to Medicine II" (early-exposure practical training)

Class No.	Class theme	Details of early-exposure practical training
1)	Orientation	Course orientation is provided. In small groups, students extract issues they recall about "medicine and healthcare" according to the KJ method, list them on drawing paper, and make presentations to provoke a discussion.
2)	Hospital visit	In small groups, students visit the departments of the university hospital (each group is assigned to two departments). They participate in ward rounds, observe an operation, and visit laboratories, while receiving explanations from the doctor in charge about what clinicians do in the hospital.
3)	Observation of a human anatomy exercise	Students observe and participate in two human anatomy exercises a year. They receive an explanation of the meaning of body donation, as well as the dignity of humans, and exchange their impressions.
4)	Workshop	In small groups, students discuss the ideal images of a physician. With reports of emergency cases, terminally-ill cases, cancer patients, and patients with lifestyle-related diseases as reference material, they summarize their ideas on how a physician should behave, and make presentations.
5)	Role-playing	Practicing a medical interview. In pairs, students perform a role-play as a doctor or patient based on a simple scenario. Students acting as a doctor review their explanation of the patient's condition, as well as their understanding of the patient. Students acting as a patient review their ways of communicating their conditions and anxieties to the doctor.
6-7)	Practice at elderly-care facilities	In small groups, students visit elderly-care facilities, and experience the site of nursing-care and welfare through volunteer activities such as helping the residents take a meal/bath and talking with them. This class is conducted for two days, each at different facilities.
8)	Field work	In small groups, students visit public facilities to assess whether public life environments are designed for people with disabilities, while developing a barrier-free map.
9)	General overview	Students review the entire course. Again, in small groups, they extract issues they recall about "medicine and healthcare" according to the KJ method, list them on drawing paper, and make presentations. By comparing their work to presentations in the initial class, students identify and share what they learned in this course.

(9 classes in total). For each class, the essays were graded by one of the three instructors in charge of practice for that class. They were scored from three viewpoints, according to a method of qualitative evaluation[3]: 1) a mere description of the contents of the practice, 2) the student's opinions or impressions triggered by their experience in practice, and 3) a description of the student's behavioral modification due to their experience in the practice. Their attitude in class was scored based on their performance, by adding or subtracting points from the basic number of points.

Relationship between the assessments of first-year students' personal qualities and their grades for the Introduction to Medicine II course

After using the reports to estimate the personal qualities of students, the three-level assessment for each of the three personal qualities of the students, i.e., "sufficient", "poor", and "unknown", were compared with their grade for the Introduction to Medicine II course. For the statistical analysis, one-way analysis of variance was performed to determine whether there was a significant difference in the grade for the course among the three assessment groups. Multiple comparison (Scheffe's F-test) was used to determine whether there was a significant difference between groups.

Relationship between the assessment of students' personal qualities and their grade in the Introduction to Medicine II, and both their advancement status and their result on the board examination

Among 85 first-year students who entered the university in 2002, the assessments of their personal qualities and their grade in the Introduction to Medicine II course were examined for any relationships with their advancement status (presence of a repeated year or not) during the 6 years of their education and with their result on the board examination in 2008.

First, the percentage of those who had repeated at least one year or failed the board examination was compared among the three assessment groups for each of the three personal qualities, using the chi-square test. Then, Student's t-test was used to evaluate the difference in the mean grade for the Introduction to Medicine II course between those who passed the board exam without repeating a year and those who had failed the exam or repeated a year. Overall, there were 64 students who had passed the board examination without repeating a year during the 6 years, and 21 students who had failed the board examination or repeated at least one year. Values of $P<0.05$ were considered significant.

The study was performed annually for each first-year class from 2002 through 2007. The numbers of students analyzed were 85 in 2002, 82 in 2003, 86 in 2004, 85 in 2005, 85 in 2006, and 85 in 2007.

Informed consent was obtained in advance from all students, after explaining that the report on the column would be assessed and opened by instructors but could not be used to identify individuals.

Results

Relationship between the assessment of first-year students' personal qualities and their grade for the Introduction to Medicine II course

With respect to "motivation" as a personal quality of first-year students, the mean grade for the Introduction to Medicine II course was compared among the three assessment groups: "sufficient", "poor", and "unknown". As shown in Table 3, the mean grade was higher in the "sufficient" group than in the "poor" or "unknown" groups for every year during the 6 years studied. The difference was significant in 2004, 2005, and 2007, which suggests that there was a correlation between the assessment of "motivation" and the grade for the course.

Regarding "self-sacrifice or responsibility", the mean grade for the Introduction to Medicine II did not significantly differ among the three assessment groups, as shown in Table 3. The mean grade was significantly higher in the "sufficient" group than in the "unknown" group in 2006 only, but did not significantly differ in the other years, which suggests that the relationship between the assessment of

"self-sacrifice or responsibility" and the score in the course was unclear.

For "amenability or modesty", the mean grade for Introduction to Medicine II was compared among the three assessment groups. As shown in Table 3, the mean grade was higher in the "sufficient" group than in the "poor" or "unknown" group for every year during the 6 years. The mean grade of the "sufficient" group was significantly higher than that of the "poor" group for every year during the 6 years, and significantly higher than that of the "unknown" group in 2004 and 2007, which suggests that there was a clear correlation between the assessment of "amenability or modesty" and the course grade.

Relationships between the assessments of medical students' personal qualities and grade in the Introduction to Medicine II course, and their advancement status and the result of the board examination

The assessments of "motivation", "self-sacrifice or responsibility", and "amenability or modesty" of the 2002 first-year students were examined for any correlations with their advancement status and the result of the board examination of 2008. That is, the percentage of those who had repeated at least one year or failed the examination was compared among the three assessment groups for each of the three personal qualities. As shown in Table 4, there was no significant difference among the three assessment groups for any of the three personal qualities.

Then, the grade for the Introduction to Medicine II of 2002 was examined for any relationships with advancement status and the result on the board examination in 2008. As shown in Table 5, the mean course grade was significantly higher for students who passed the board exam without repeating a year, as compared to those who had repeated at least one year or failed the board exam.

Discussion

The personal qualities of first-year medical students were studied by using an opinion column from the Asahi Newspaper. Assessments of "amenability or modesty" and "motivation" were significantly correlated with grades for an Introduction to Medicine II

Table 3 Comparison of the assessments of medical students' personal qualities and the mean grade in "Introduction to Medicine II" (out of 100 points)

"Motivation" and score	total		①Sufficient		②Poor		③Unknown		P-value for variation between subgroups	Items with a significant difference
	n	mean±SD	n	mean±SD	n	mean±SD	n	mean±SD		
(Year)										
2002	85	82.6 ± 6.7	71	83.1 ± 6.9	3	79.0 ± 5.3	11	80.5 5.7	0.32	–
2003	82	81.2 ± 4.3	70	81.5 ± 4.4	9	79.2 ± 3.0	3	80.0 ± 4.0	0.28	–
2004	86	81.7 ± 5.4	79	82.6 ± 4.2	5	73.0 ± 6.6	2	67.5 ± 9.2	<0.01	① vs ②,③
2005	85	75.0 ± 11.3	76	76.6 ± 9.8	7	62.7 ± 15.8	2	58.5 ± 12.0	<0.01	① vs ②,③
2006	85	81.8 ± 7.1	71	82.3 ± 7.2	11	80.5 ± 2.4	3	75.0 ± 14.8	0.17	–
2007	85	79.5 ± 5.5	72	80.1 ± 5.3	10	75.3 ± 6.1	3	78.3 ± 2.5	0.03	① vs ②,③

"Self-sacrifice or responsibility" and score	total		①Sufficient		②Poor		③Unknown		P-value for variation between subgroups	Items with a significant difference
	n	mean±SD	n	mean±SD	n	mean±SD	n	mean±SD		
(Year)										
2002	85	82.6 ± 6.7	42	82.5 ± 5.6	22	83.5 ± 9.2	21	81.9 ± 5.9	0.71	–
2003	82	81.2 ± 4.3	58	81.1 ± 4.6	8	83.3 ± 2.8	16	80.6 ± 3.5	0.34	–
2004	86	81.7 ± 5.4	65	81.5 ± 5.5	11	84.0 ± 5.7	10	80.5 ± 3.7	0.28	–
2005	85	75.0 ± 11.3	71	75.8 ± 10.8	10	71.4 ± 13.3	4	69.3 ± 14.2	0.29	–
2006	85	81.8 ± 7.1	68	82.6 ± 6.1	7	82.1 ± 6.7	10	76.2 ± 11.3	0.02	① vs ③
2007	85	79.5 ± 5.5	70	79.7 ± 5.8	6	79.0 ± 3.8	8	77.1 ± 3.9	0.44	–

"Amenability or modesty" and score	total		①Sufficient		②Poor		③Unknown		P-value for variation between subgroups	Items with a significant difference
	n	mean±SD	n	mean±SD	n	mean±SD	n	mean±SD		
(Year)										
2002	85	82.6 ± 6.7	37	84.8 ± 6.3	30	80.2 ± 7.7	18	82.1 ± 3.9	0.02	① vs ②
2003	82	81.2 ± 4.3	51	82.4 ± 3.7	13	78.7 ± 5.1	18	79.9 ± 4.4	<0.01	① vs ②
2004	86	81.7 ± 5.4	37	84.1 ± 4.2	18	78.7 ± 6.1	31	80.6 ± 5.2	<0.01	① vs ②,③
2005	85	75.0 ± 11.3	49	77.7 ± 11.4	12	68.5 ± 8.1	24	72.8 ± 11.0	0.02	① vs ②
2006	85	81.8 ± 7.1	51	83.7 ± 7.4	16	78.5 ± 4.3	18	79.4 ± 7.0	<0.01	① vs ②
2007	85	79.5 ± 5.5	31	83.2 ± 4.9	16	76.6 ± 3.8	38	77.7 ± 5.2	<0.01	① vs ②,③

Table 4 Comparison of the assessments of personal qualities of 2002 first-year students and the percentage of those who repeated at least one year or failed the National Board Examination

"Motivation"	①Sufficient	② Poor	③ Unknown	P-value
The rate of students who repeated year(s) or failed exam	0.24	0	0.36	0.4
Students who passed the exam without repeating a year	54	3	7	
Students who repeated at least one year or failed the exam	17	0	4	
(Total number)	(71)	(3)	(11)	

"Self-sacrifice or responsibility"	①Sufficient	② Poor	③ Unknown	P-value
The rate of students who repeated year(s) or a failed exam	0.21	0.27	0.29	0.78
Students who passed the exam without repeating a year	33	16	15	
Students who repeated at least one year or failed the exam	9	6	6	
(Total number)	(42)	(22)	(21)	

"Amenability or modesty"	①Sufficient	② Poor	③ Unknown	P-value
The rate of students who repeated year(s) or a failed exam	0.26	0.31	0.21	0.72
Students who passed the exam without repeating a year	23	11	30	
Students who repeated at least one year or failed the exam	8	5	8	
(Total number)	(31)	(16)	(38)	

Table 5 Comparison of the grade for "Introduction to Medicine II" (Out of 100 points) among the 2002 freshman, and their advancement status and result on the National Board Examination in 2008

Academic status and board exam result	Students who passed board exam without repeating a year		Students who repeated at least one year or failed board exam		P-value
	n	mean±SD	n	mean±SD	
Grade in "Introduction to Medicine II" (points)	64	83.6±6.3	21	79.7±8.4	<0.02

course.

Early-exposure training, such as that offered in the Introduction to Medicine II course for first-year students, has been reported by other institutions to be useful in cultivating students' non-cognitive personal qualities, including motivation to become a physician and compassion/morality as a physician.[4-7] In other words, students who received a superior grade in the Introduction to Medicine II course are likely to have acquired non-cognitive personal qualities, which is the objective of early-exposure training.

Because those students who were judged to be "amenable or modest", based on their report on the opinion column, received higher grades than other students for the Introduction to Medicine II, assessment of medical students' "amenability or modesty" using this type of report appears to be feasible. In the column, Dr. Kawasaki asked the question, "In the case of a critical illness, would you entrust your life or that of a loved one to an insufficiently educated doctor?" to show first-year students why they should "only study hard and study harder", thereby advancing a sound argument that cannot be contested by young medical students. Although it is understandable that first-year students feel a little uncomfortable with this question, this column appears useful in assessing "amenability or modesty" as a personal quality of medical students.

Given the correlation observed between the

assessment of "motivation" and the grade for Introduction to Medicine II, it seemed feasible to assess medical students' "motivation" based on their report on the column. In the column, Dr. Kawasaki asks, "In public, can you explicitly explain why you have chosen medicine?" Students who were intimidated by the phrase "in public" might have hesitated to explain their attitudes. Therefore, a revision of this column may result in a more effective assessment of "motivation".

No significant relationship was observed between the assessment of "self-sacrifice or responsibility" of medical students and their grade for the Introduction to Medicine II. In the column, Dr. Kawasaki specifically points out, "Consecutive overnight duties to treat severely-ill patients, as well as the unexpected cancellation of a holiday plan due to an emergency case, are frequently required of a physician". However, first-year students who had not experienced such a demanding clinical situation might have answered negatively, for example, "not yet confident" or "unwilling to do so". That is, the assessment of "self-sacrifice or responsibility" of medical students might be improved if the author's language is made more moderate.

Among the 2002 first-year students, their advancement status during their 6 years of education and their performance on the national board exam were compared to their personal qualities, as assessed in year 1. No significant difference was found among the three assessment groups for any of the three personal qualities, which indicates that there was no correlation between students' personal qualities in year 1 and their advancement status or their performance on the national board exam. Therefore, it seems that personal qualities, as assessed in year 1, change during the subsequent 6 years.

Advancement status and the result on the board exam were compared with the grade for Introduction to Medicine II. The mean course grade was significantly higher in those who passed the board exam without repeating a year, as compared to those who had repeated at least one year or failed the board exam. This seems to confirm the belief, common among instructors, that students who perform poorly in a basic medicine course also perform poorly later in clinical medicine. This result is attributable to individual students' attitudes in class or toward class assessment, which are both associated with factors other than the three personal qualities investigated in this study.

As for the personal qualities to be cultivated in a physician, in 1996 Dr. Shigeaki Hinohara delivered a lecture at the Fuji Institute of Education and Training on the clinical competence of physicians, in a workshop for medical teachers. He explained that for clinicians to attain clinical competence, sensitivity and compassion were essential. In Europe and the United States, the American Board of Internal Medicine presented a practical suggestion on the components of competence required of internists in 1979[8] and, later, the Association of American Medical Colleges highlighted compassion and altruism as non-cognitive abilities that medical students should acquire.[9] In a recommendation for "tomorrow's doctors", published by the British General Medical Council in 2000, the importance of clinical competence, as well as scientific knowledge, was advanced as the core of medical education.[4)10)11]

Although the necessity of developing the non-cognitive abilities of medical students has recently been highlighted, the question of whether their attitudes can be favorably modified by training remains unanswered. The prospects for modification by training appear unpromising because medical students are already adults. However, it has been reported that attitudes can be acquired to some degree, not through temporary measures, but by repeated and continuous implementation of an attitude training program.[12-14] For universities, the importance of employing instructors who can function as role models for students, and of selecting students with suitable affective qualities, by means of the entrance examination to medical school, has been pointed out.[12)15)16]

In 2001, internists' associations in Europe and the United States published the behavioral characteristics that should be inculcated in physicians as medical professionals, in the form of a medical professional charter.[17] Professional education for medical students has already begun in Europe and the United

States.[13)17-19)] At some institutions, students judged to lack professional skills in ward practices are recommended to cease their training. It has also been suggested that irresponsibility and a diminished capacity for self-improvement in medical students may lead to unprofessional behavior when they are physicians.[20)]

The non-cognitive personal qualities of medical students should be assessed after they have entered medical school. The column from the Asahi Newspaper is valuable for this purpose. For potentially problematic students, however, it is feasible to correct their personal qualities in the later years of medical education, because these qualities can be expected to change as students progress through their education. In light of this, evaluation of the personal qualities that are necessary for students to become competent physicians should be undertaken at an early phase of medical education.

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