

# Stability of empathy scores between first- and fourth-year medical students: A longitudinal study at a Japanese medical school

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## Research article

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## Abstract

**Background:** In medical practice, a relationship of trust between doctors and patients is essential. An important part of building and maintaining this relationship is empathy. Prior studies have suggested that empathy in medical students declined around the fourth year. The purpose of this study is to verify the decrease of empathy and gain further insights into empathy factors. **Methods:** This longitudinal study of undergraduate medical students was conducted through a self-administered, 20-item survey, using a 5-point Likert scale. First (n=105) and fourth (n=62) year students at Yamagata University Faculty of Medicine, School of Medicine in Japan were assessed for empathy using the Japanese version of the Jefferson Scale of Physician Empathy (JSPE). Total empathy scores were calculated, and multivariate analysis of variance (MANOVA) was used to reveal the underlying factors of the Japanese version of JSPE. Finally, logistic regression analysis was used to investigate the presence of any relationships between attributes such as gender-related differences, age, school year, and experience as a patient. **Results:** In total, 234 participants were contacted, of whom 167 responded (71.3%). No decrease of mean empathy scores was shown between first-year (66.4) and fourth-year students (68.4). Factor analysis identified four factors: "building good patient-doctor relationship," "importance of empathetic care," "understanding patients' view," and "compassionate care." A weak correlation ( $r = -0.271$ ) was observed between "understanding patients' view" and "importance of empathetic care." The odds ratio of females in "understanding patients' view" and "compassionate care" was significantly higher ( $p < 0.05$ ) than in males. For "compassionate care," statistically significant differences were noted for gender ( $p < 0.05$ ) and age ( $p < 0.05$ ) and the effect of gender being larger than age. **Conclusions:** This longitudinal cohort study in one medical school in Japan showed that empathy scores of first- and fourth-year students did not decrease, and the contribution of "compassionate care" was lowest of the four factors. The results imply the necessity to provide a program that enables preclinical medical students to understand the significance of emotional empathy and express it before they appear for computer-based testing (CBT) and objective structured clinical examination (OBCE) in their fourth year.

## Background

A relationship of trust between doctors and patients is essential in medical practice [1]. Empathy, which is defined as the ability to think, feel and act from one's frame of cognition, is important to maintain a relationship of mutual trust. Therefore, empathy is a fundamental issue in education for medical students. They are aware of this point. This is shown by Hurwitz *et al.*, [2] who surveyed first-year students regarding the desirable qualities of future doctors and reported that empathy received the second-highest score. Meanwhile, some previous studies have indicated a decline of students' empathy during undergraduate medical education [3-7]. However, other studies have demonstrated that there is no tendency of decline [8-12]. Almost all these findings are based on a cross-sectional study design. Therefore, these differences could be influenced by the baseline differences among students in different years of medical school. To confirm the tendency, it is desirable to conduct a longitudinal study design and follow a cohort during the entirety of their medical education.

Next, these studies show that empathy has many components [13]. Therefore, when dealing with empathy in medical education, it is desirable to establish the standard. The aim of empathy in medical education is to build clinical empathy that involves the abilities to: (a) understand a patient's perspective, (b) communicate that one has understood, (c) act on that understanding, and (d) share the patients' intrinsic feelings [14]. *Cognitive* empathy (a) is considered to be a central component of medical education. However, it is also an essential part of a doctor's foundation training to learn the *emotional* dimension of empathetic ability, outlined in points (b), (c), and (d). Emotional empathy is important for doctors to rebuild or maintain relationships of trust with patients who harbor negative feelings toward doctors, and in adverse situations [15,16]. Thus, emotional empathy is also crucial. These proficiencies are considered to be the objective of empathy education and are assimilated into each medical student during the provision of education, in a way that they appear as natural behavior during their medical practice. However, hidden curricula or student distress may become barriers to learning empathy [17,18]. In addition, there is very little data on empathy situations of lower grade medical students in Japan [8].

This study uses a longitudinal design and focuses on the estimation of decline in empathy levels as the course progresses in years. It discovers grounds for the provision of empathetic education before students appear for the computer-based test (CBT) and the objective structured clinical examination (OSCE).

## Methods

### Participants

The survey was administered to 126 first-year students at Yamagata University Faculty of Medicine, School of Medicine in June 2010, and again three years later in 2013 to 108 students from the same sample in their fourth year, before the CBT and the OSCE. Eighteen students could not progress from the first-year to fourth-year, and were not included in the second survey.

### Outline of medical education program

New medical students enter directly to Yamagata University Faculty of Medicine (Japan) after graduating high school at the age of 18. The duration of the program is six years. The objective of Yamagata's medical program is as follows: (1) First year: Fostering character; (2) Second year: Learning basic medical science; (3) Third year: Learning clinical medicine and social health; (4) Fourth year: Learning practical abilities for physicians, and performing common achievement tests (CBT and OSCE); and (5) Fifth and six years: Acquiring abilities for clinical examinations, medical interviews, and differential diagnoses. The course starts in April. First, effective communication for building relationships of trust with patients is taught in 3.6 hours of the curriculum related to medical mediation. This medical mediation is intended to foster effective empathetic communication in the context of patient safety and quality [15]. After that, the students experience early medical exposure that includes on-site training in emergency medicine by riding in an ambulance. Of the 956 hours of education provided to first-year students, 660 are allocated to general education. The rest of the time is assigned to the study of basic medical sciences. Second-year students receive 1,162 hours of education, which only includes specialized medical sciences. Third-year students receive 1,246 hours of education in specialized medical sciences. Fourth-year students receive 902 hours of education in specialized medical sciences before the common

achievement tests, CBT and OSCE, which are conducted September onward. Prior to the tests, students in this school year receive a second round of medical mediation program of 1.6 hours.

The medical mediation program mentioned above teaches a conflict management method for dispute resolution. It attempts to minimize emotionally hostile conflicts and improve less-satisfactory resolutions, for example, in litigations in which issues are narrowly limited and the important need for sincere emotional responses are ignored. Students participating in these sessions learn the concept through lectures, role-plays, and group discussions [15,19]. The program consists of behavioral and recognition skills, acceptance of negative feelings, disclosure of information with expressions of the doctor's sincere attitude, and sharing of information between the doctor and patients and their families.

#### Instruments

Empathy was investigated using the Japanese version (Abe) of the Jefferson Scale of Physician Empathy (JSPE). The Japanese instrument consists of a 20-item self-administered questionnaire answered on a 5-point Likert scale that ranges from 1 - "Don't agree at all," to 5 - "Completely agree," and total scores were 20 to 100. The validity and reliability of the instrument was verified earlier by Abe, K et al. [20]. Respondent attributes surveyed were gender, age, school year and presence/absence of experience as a patient (outpatient and inpatient treatment). The final item, experience as a patient, was newly added to the attribute items as it was considered a possible factor related to understanding patient emotion.

#### Statistical analysis

The mean total scores of empathies were shown as mean  $\pm$  standard deviation, 95% confidence intervals [CI] of the means. The median total empathy scores of the two grades were statistically tested using Mann-Whitney U-test. The following static examinations were analyzed on an ordinal scale. We conducted a factor analysis of the scores of all the respondents by generalized least squares, rotating axes by the direct oblivion method. The numbers of factors were decided in accordance with the scree plot criterion (eigenvalues: 1 or higher). Next, logistic regression analysis was performed for factors 1 through 4 derived from the factor analysis. The four dependent variables were gender, age, school year, and experience as a patient (outpatient and inpatient treatment). The analysis was done with the dependent variable set to (1) if the factor score for each factor was positive and (0) if it was negative. The level of statistical significance was set at  $p < 0.05$ .

## Results

#### Participants and mean empathy score

Of a total of 234 students, 167 participated in the survey. Respondent attributes are shown in Table 1. The mean empathy score by school year and gender is shown in Table 2. Mean empathy scores increased from 66.4 in the first year to 68.8 in the fourth year (not significant), and mean empathy scores of females were higher than that of males. Median empathy scores increased from 67.0 to 69.0 (not significant).

#### Factor analysis and correlation among factors)

The Kaiser–Guttman and scree plot criteria were shown to be valid. The Kaiser–Meyer–Olkin measure of sampling adequacy was 0.914 and Bartlett's test was  $p < 0.01$ , confirming the validity of this factor analysis. Four factors were identified (Table 3). Factor 1 was composed of eight items (10, 13, 7, 15, 8, 18, 20, 9 and 4) and, because it was related to interpersonal relations between doctors and patients, it was called "building good patient-doctor relationship." Factor 2 comprised four items (16, 11, 12, and 17) and, because responding to patients' emotional needs is also an important aspect of medicine, it was called "emphasizing empathy therapeutically." Factor 3 was composed of two items (1 and 5) and, because it was related to disregarding patients' point of view in practicing medical therapy, it was called "not emphasizing patients' view therapeutically." Empathetic patient understanding was called "understanding patients' view." Factor 4 was composed of five items (6, 19, 14, 3, and 2) and, because responding to patients' emotional needs is also an important aspect of medicine, it was called "compassionate care." The cumulative contribution ratio was 38.58% for factor 1, 42.74% for factor 2, 45.87% for factor 3, and 49.22% for factor 4.

An inverse weak relationship of correlation between factors 2 and 3 was revealed (Table 4).

#### Logistic regression analysis

Table 5 shows the results of logistic regression analysis for each factor with gender, age, school year and experience as a patient. Odds ratio of females is significantly higher than males in factor 2, "importance of empathic care" ( $p < 0.05$ ). For factor 4, "compassionate care," statistically significant differences were noted for gender ( $p < 0.05$ ) and age ( $p < 0.05$ ), and the effect of gender differences was larger compared to age.

## Discussion

Previous studies conducted in the United States of America and other countries have suggested that empathy scores may reduce during the span of the educational course at medical schools [3-7]. However, no decrease in students' empathy scores between first- and fourth-years medical students was shown, and the mean empathy score increased slightly in fourth-year students (Table 2). This tendency was also reported by some researchers [8-12]. Kataoka et al. reported that the mean empathy score of first-year students was 98.5 and that of fourth-year students was 102.8 (rated on a 7-point Likert scale) [8].

Other researchers reported different results, witnessing that empathy scores declined in third- or fourth-years students whose curriculum was shifting toward patient-care activities [3-7]. In particular, the empathy score of Chein's study (rated on 7-point Likert scale) [3] was 115.5 in the incoming class, which corresponded to third-year students in Japan, and 118.2 in second-year students, which matched fourth-year scholars in Japan. In this viewpoint, no decrease

of empathy scores was found in these grades. This means that when comparing changes in empathic scores, it is necessary to consider differences in educational courses. To confirm the tendency of decreasing empathy scores in Japan, further longitudinal studies of fifth- and sixth-year students are needed.

Possible explanations of stability of empathy scores are as follows. First, fourth-year medical students do not opt for such subjects as technology-oriented specialties or people-oriented specialties [3,4]. Second, medical students might not be losing empathy during the course of their medical education. It might be that they receive insufficient empathic training, and the instrument estimates empathic thinking of medical students in clinical empathy. It has been seen that the intervention of empathic education increases cognitive empathy [21-24]. Compared to these previous studies, which does not specify their stage of education, the approximately 5 hours curriculum of medical mediation in our study might be very short to defend the decline of empathy. The contents are, however, somewhat meaningful. This program focuses on conflict resolution of negative feelings toward doctors, whereas they intend to enhance empathetic competence of students. The third explanation is the differences in admission processes, curricula, and cultural factors. Further study is needed to identify which program may foster the growth of cognitive empathy in medical students.

Previous studies revealed that the empathy scores of females were higher than that of males [3,5,7,8,10,25]. Our results (Table 2) supported these reports. The higher empathy scores are explained by evolutionary-biological gender characteristics, gender in role expectations, and stronger sensitivity of caring for offspring [3,5,7,8,10,25,26].

In the factor analysis, factor 3 was identified negatively (not emphasizing patients' view therapeutically) and showed weak negative correlation with factor 2. If students fully understand the meaning of empathy, which contains not only an emotional aspect but also a cognitive one, factor 3 should be identified positively and show moderate or strong correlation with factor 2. Therefore, this result implies that many of the students confuse empathy with sympathy.

As the results in Table 3 show, in the opinion of medical students, factor 1, with regard to empathy, is "building good patient-doctor relationship," which means the factor of "perspective taking" (factor 3). However, what was chosen as factor 4 (compassionate care) in this study was placed in second position (factor 2) in other studies [5,8,12] that were conducted on first- to sixth-year medical students. This difference may indicate that there is little recognition of the importance of emotional empathy in fourth-year students before starting clinical clerkship. They do not understand that "compassionate care" is an important, necessary communication skill for doctors. Therefore, between the time students are in their first and fourth years, it is necessary to create an awareness of empathetic emotion, and strengthen the understanding that others' individual emotional perspectives are equally important [21].

For the independent variables, gender and age of factor 2 (importance of empathetic care) and factor 4 (compassionate care) displayed significant difference of odds ratios (Table 5). Female medical students were shown to have higher recognition of emotional sympathy than male students. This result is consistent with previous findings [6,8]. The variable of age showed weaker affect compared to gender in "compassionate care." This implies that gender was the main variable in emotional empathy in this study. An awareness that one's own empathetic emotion is as necessary as another's particular emotional perspective should be strengthened between first- and fourth-year students.

The presence of a relationship between experience as a patient (outpatient and inpatient treatment) and empathy found no significant correlations with any factor (Table 4). These experiences may not influence empathy scores of lower-grade medical students. To confirm this, further study is necessary.

Our longitudinal study has limitations. First, because of the small sample size and first- and fourth-year students from only one Japanese medical school, it is difficult to apply our results to students in other medical schools in Japan and other countries. Second, our study does not reveal a reason for the lack of decline of empathy score. It implies some possibility, which may be a program of conflict management resolution for first- and fourth-year students and the lowest position of the factor, "compassionate care." Further longitudinal design studies are needed within medical schools in Japan and other countries to confirm these facts.

## Conclusion

The decrease of empathy scores between first- and fourth-year students was not shown at a medical school in Japan. The analysis of factors extracted that factor 1 was "building good patient-doctor relationship" and there were weak correlations between factor 2 (importance of empathic care) and factor 3 (understanding patients' view). Gender differences significantly affected factor 2 and factor 4 (compassionate care). These results demonstrate that there was confusion of empathy with sympathy, and little awareness of the importance of the emotional dimension of empathy. They imply the necessity of an educational program to illuminate the importance of clinical empathy before the CBT and the OSCE in Japan.

## List Of Abbreviations

JSPE, Jefferson Scale of Physician Empathy

MANOVA, Multivariate analysis of variance

CBT, computer-based test

OSCE, objective structured clinical examination

CI, confidence interval

## Declarations

Ethics approval and consent to participate

This study was approved by the ethical review board of the Yamagata University Faculty of Medicine. The students were told that their participation in the survey and/or their answers would not affect their grades or other assessment, and data were de-identified, further ensuring that participant identities would not be revealed. Students who agreed to participate were requested to fill out the survey using their own judgment.

#### Consent for publication

Not applicable.

#### Availability of data and material

All data generated or analyzed during this study are included in this published article.

#### Competing interests

The authors declare that they have no competing interests.

#### Funding

This study was not funded.

#### Authors' contributions

TN was involved in conception and design, data acquisition, data interpretation and drafting the article and revised the manuscript. HI was involved in statistical analysis and evaluation of the data. All authors were involved in the writing of the manuscript and have approved the final version.

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## Tables

**Table 1** Characteristics of Respondents

Variables	n	%
Gender		
Male	100	59.9
Female	67	40.1
Total	167	100.0
Age (years)		
Mean	21.1	
SD	3.9	
School year		
1st	105	62.9
4th	62	37.1
Total	167	100.0
Experience as a patient		
Outpatient treatment		
Yes	59	35.3
No	108	64.7
Total	167	100.0
Inpatient treatment		
Yes	115	68.9
No	52	31.1
Total	167	100.0

**Table 2** Mean total scores of physician empathy items by school year and sex

School year	Gender	n	Mean	SD	95% CI
<b>1st</b>	Male	55	65.0	10.2	62.3 - 67.8
	Female	50	68.0	10.2	65.1 - 70.9
	Total	105	66.4	10.3	64.5 - 68.4
<b>4th</b>	Male	45	68.8	6.2	67.0 - 70.7
	Female	17	68.8	6.2	65.6 - 72.0
	Total	62	68.8	6.1	67.3 - 70.4
<b>Total</b>	Male	100	66.8	8.8	65.0 - 68.5
	Female	67	68.2	9.3	65.9 - 70.5
	Total	167	67.3	9.0	66.0 - 68.7

SD: Standard deviation; CI: Confidence Interval

**Table 3** Factor Analysis of Physician Empathy Scalea

	Factor 1 Building good patient-doctor relationship	Factor 2 Importance of empathic care	Factor 3 Understanding patients' view
Asking after what is happening in the patient's life is as important as asking about physical complaints. (10)	0.813	-0.024	0.050
The patient who feels that the doctor has understood his or her feelings is left with a good impression. (13)	0.622	-0.044	-0.066
For more effective treatment, a doctor must pay careful attention to individual patients' experience. (7)	0.617	0.051	0.020
Conveying that the doctor has understood the patient's feelings is an important factor in conducting a medical interview and taking down the patient's medical history. (15)	0.608	0.126	-0.247
A patient who feels that someone else has made an effort to understand him or her can have enhanced self-efficacy and can heal on his or her own. (8)	0.507	-0.061	0.207
Trying to imagine oneself in the position of the other person contributes to the quality of care. (18)	0.490	0.077	-0.228
One important factor in the success of the doctor-patient relationship is the doctor's ability to understand the patient's feelings as well as those of the family. (20)	0.449	0.012	-0.357
Understanding body language is as important as verbal communication in the doctor-patient relationship. (9)	0.413	0.106	-0.088
It is basically impossible for a doctor to see things from the patient's perspective when people are so different. (4)	0.230	-0.103	-0.162
Empathy is a therapeutic skill without which the success of the doctor will be limited. (16)	0.037	0.786	0.175
Empathy is an important therapeutic practice in the medical field. (11)	0.285	0.406	-0.176
The best method for caring for the patient is something that should be considered from the patient's point of view. (12)	0.287	0.332	-0.295
When the emotional scene taking place between the patient and his/her family is viewed, even the physician may be emotionally moved, which is a good thing. (17)	-0.034	0.332	-0.009
A doctor who can consider things from the viewpoint of the other person is able to provide better medical care. (1)	0.068	-0.016	-0.702
The ability of a doctor to understand the feelings of the patient and the patient's family is a positive treatment factor. (5)	0.213	0.192	-0.361
Emotional matters have nothing to do with the patient's medical treatment. (6)	-0.001	0.116	-0.089
Medical treatment alone has the ability to cure the patient's condition. Even when the doctor makes an effort to forge a good relationship with the patient, this does not have an important role in the curing of the illness. (19)	0.146	0.069	-0.006
Reading books and enjoying art can improve the doctor's ability to provide better care. (14)	0.097	-0.036	0.043
The doctor's humor can contribute to a better treatment outcome. (3)	-0.100	0.011	-0.087
A doctor needs to carefully observe what is going on in the mind of the patient, which is expressed through non-verbal messages like facial expressions and body language. (2)	0.196	0.046	-0.260
% of explained variance	38.58	4.17	3.11

Extraction Method: Generalized Least Squares; Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 18 iterations.

b. Scores of PES 4, 6 and 19 were reversed for negative items.

**Table 4** Factor correlation of physician empathy

Factor	1	2	3	4
1	1.000			
2	.256	1.000		
3	-.500	-.271	1.000	-.378
4	.595	.244	-.378	1.000

Extraction Method: Generalized Least Squares

Rotation Method: Oblimin with Kaiser Normalization

Factor 1: Building good patient-doctor relationship

Factor 2: Importance of empathic care

Factor 3: Understanding patients' view

Factor 4: Compassionate care

**Table 5** Logistic regression analysis of physician empathy factors

	Factor 1 (building good patient-doctor relationship)			Factor 2 (importance of empathic care)			Factor 3 (understanding patients' view)			Factor 4 (compassionate care)		
	OR	95% CI	<i>p</i>	OR	95% CI	<i>p</i>	OR	95% CI	<i>p</i>	OR	95% CI	<i>p</i>
<b>Gender</b>												
Male	1.00	Reference		1.00	Reference		1.00	Reference		1	Reference	
Female	1.83	(0.93 - 3.59)	0.081	2.11	(0.59 - 2.21)	0.032	0.53	(0.26 - 1.07)	0.078	2.58	(1.26 - 5.27)	0.008
<b>Age (by year)</b>												
1-10	1.05	(0.94 - 1.17)	0.369	1.03	(0.93 - 1.13)	0.611	0.99	(0.89 - 1.09)	0.811	1.04	(0.93 - 1.16)	0.500
<b>School year</b>												
1st	1.00	Reference		1.00	Reference		1.00	Reference		1	Reference	
4th	1.35	(0.64 - 2.84)	0.433	1.59	(0.75 - 3.34)	0.226	0.74	(0.35 - 1.61)	0.456	1.68	(0.76 - 3.69)	0.150
<b>Experience as a patient</b>												
<b>Outpatient treatment</b>												
Yes	1.34	(0.66 - 2.72)	0.422	1.22	(0.60 - 2.50)	0.575	0.82	(0.40 - 1.71)	0.604	1.81	(0.87 - 3.77)	0.100
No	1.00	Reference		1.00	Reference		1.00	Reference		1.00	Reference	
<b>Inpatient treatment</b>												
Yes	1.25	(0.62 - 2.67)	0.504	1.49	(0.71 - 3.12)	0.290	0.73	(0.34 - 1.57)	0.419	1.34	(0.62 - 2.89)	0.150
No	1.00	Reference		1.00	Reference		1.00	Reference		1.00	Reference	

OR: odds ratio; CI: confidence interval

## Figures

	1 <sup>st</sup> year	2 <sup>nd</sup> year	3 <sup>rd</sup> year	4 <sup>th</sup> year	5 <sup>th</sup> and 6 <sup>th</sup> year
Objective Medical practice	Fostering character General education (660 hours) General issues in medicine (296 hours)	Basic medical sciences (1162 hours)	Clinical medicine and social health (1246 hours)	Practical ability for physician (902 hours)	Acquisition of ability for clinical examination, medical interview and differential diagnosis
	Conflict management (medical mediation program: 1.6 hours)  Early clinical experiential practice			Conflict management (medical mediation program: 1.6 hours)  Medical research	

Common achievement test before clinical clerkship: CBT (knowledge) and OSCE (skills and attitudes)

Figure 1

Outline of Medical Education Program. CBT: Computed Based Testing, OSCE: Objective Structured Clinical Examination