

Situation of empathy among preclinical medical student in Faculty of Medicine, Yamagata University- A longitudinal study

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(Accepted November 9, 2020)*

ABSTRACT

Empathy education is being addressed as an important part of medical education. However, many researchers have suggested decline in empathy during the course of medical school. Therefore, we examine situation in empathy level among preclinical medical students in Faculty of Medicine, Yamagata University in Japan.

A longitudinal study was carried out. Empathy level in the first year and again on their fourth year was measured by the Japanese version of the Jefferson Scale of Physician Empathy consisting of total 20 questions. Each question composes of a 5-point Likert scale. Statistical analysis was performed with Mann-Whitney U test and multivariate analysis.

No significant decrease in mean empathy scores was shown between first-year (scores: 66.4, n=105) and fourth-year students (scores: 68.4, n=62). 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."

Decline in empathy was not revealed. However, an inverse weak correlation between cognitive empathy and emotional empathy was revealed among preclinical medical students. This may imply the necessity for emotional empathy education before clinical practice.

Keywords: preclinical students, Jefferson scale of physician empathy, situation of empathy

Introduction

Empathy, which is defined as the ability to think, feel, and act from the perspective of the other's framework of cognition, is crucial in enhancing the relationship and communication between a doctor and a patient¹⁾. Importantly, doctors' empathy can even lead to better treatment outcomes. When doctors are more empathic, their patients show greater treatment adherence²⁾. On the other hand, when doctors lose empathy, they are more prone to making medical errors³⁾. The role of empathy

in medical performance is already observable during medical school, where more empathic medical students have been rated as more clinically competent and perform better at exams^{4), 5)}. Even medical students themselves are aware of the importance of empathy: first-year students have reported that empathy is the second most desirable quality of future doctors⁶⁾.

As empathy seems to be one of the determinants of doctors' success, it would be expected that it be a fundamental component of education for medical students. However, not only is there is a lack of teaching of empathy in medical schools, but some

studies have suggested that an erosion of empathy occurs during the course of medical school⁷⁾⁻¹¹⁾ and during internships¹²⁾. Several cross-sectional studies in the U.S., Iran, and India have found that first-year medical students have the highest levels of empathy, while those in the final fourth year have the lowest levels^{7), 9), 10), 11)}. A longitudinal study in the U.S. found the same decline and discovered that it began in the third year of medical school⁸⁾. However, in 2010, a meta-analysis of studies that measured empathy in medical students was published and it noted that the observed decline, although statistically significant, was so weak that it did not have a clinical value¹³⁾. Several studies have also found that a decline in empathy did not occur¹⁴⁾⁻¹⁷⁾. These studies were conducted in the UK, Korea, China, and Japan. When juxtaposed alongside those that have found a decline in empathy among medical students, it suggests that there are cross-cultural differences at play.

The current state of research on empathy in medical students is inconclusive, with several gaps that need to be addressed. First, the majority of the findings are based on cross-sectional research designs. Thus, these differences could have been influenced by the baseline differences among students in different years of medical school. Therefore, it is necessary to conduct more longitudinal studies because they provide stronger conclusions than cross-sectional studies. This will eventually enable a more rigorous meta-analysis comprising longitudinal studies only to be conducted. Second, previous studies have shown that empathy has many components¹⁸⁾. This phenomenon has been well described in the literature¹⁹⁾⁻²¹⁾. But some studies have suggested that social and personal factors may contribute to changes in empathy, similar to the model of reasons reported by Neumann 2011²²⁾.

Cognitive empathy is considered to be a central component of medical education. For example, empathy requirements have been included in Chinese residency programs since 1999²³⁾, and the calm and unemotional style of Japanese physicians has been a frequent subject of studies in recent years²⁴⁾. Yamagata University Faculty of Medicine teaches effective communication for building relationships

of trust with patients. A total of 3.6 hours of the curriculum is related to medical mediation. This medical mediation is intended to foster effective empathetic communication in the context of patient safety and quality²⁵⁾. That is, empathy is considered to be an essential part of a doctor's foundational training. Emotional empathy is also important for doctors to rebuild or maintain relationships of trust with patients who harbor negative feelings toward doctors, as well as in adverse situations^{25), 26)}. Unfortunately, personal and social factors, hidden agendas, and student stress may become barriers to learning empathy^{27), 28)}.

This longitudinal study focused on the status in empathy levels from the first to the fourth year of Faculty of Medicine, Yamagata University using the Japanese version of the Jefferson Scale of Physician Empathy.

Methods

Ethics approval and consent to participate

This study was approved by the ethical review board of the Yamagata University Faculty of Medicine, and written informed consent was obtained from the students after they were told that their participation in the survey and their answers would not affect their grades or other assessments. In addition, their data were anonymized, further ensuring that participants' identities would not be revealed. Students who agreed to participate were requested to fill out the survey using their own judgment.

Participants

The survey was administered to 126 first-year medical students at the Faculty of Medicine, Yamagata University School of Medicine, in June 2010 and again three years later, in 2013, to 108 students.

Outline of medical education program (Figure S1)

Supplementary Figure S1 shows the program.

The medical students start their training after high school, with a strong focus on their general education first, shifting to medical education over the years. Although they have communication training from the start of training, they only begin

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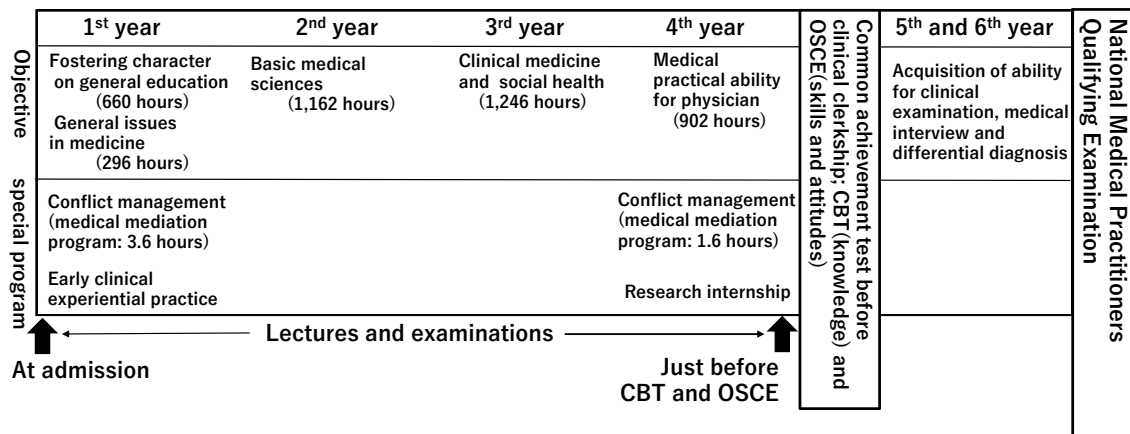


Figure S1. Outline of medical education program
CBT: Computed Based Testing, OSCE: Objective Structured Clinical Examination. Each arrow indicates evaluation of empathy scores performed.

approaching patients in their fourth year.

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 outcomes, for example, in litigation cases, in which the issues are narrowly defined and the need for sincere emotional responses is ignored. Students participating in these sessions learn about the concept through lectures, role-plays, and group discussions^{25), 29)}. 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 the patients and their families.

Instruments

Empathy was investigated using the Japanese version of the Jefferson Scale of Physician Empathy (JSPE)³⁰⁾. The Japanese instrument consists of a 20-item, self-administered questionnaire, which is answered according to a 5-point Likert scale that ranges from 1 - "Don't agree at all" to 5 - "Completely agree." The total scores ranged from 20 to 100. The validity and reliability of the instrument were verified earlier by Abe et al.³⁰⁾. Participants were additionally asked to report their gender, age, school year, and presence/absence of experience as a patient (outpatient and inpatient treatment). The final two items related

to experience as a patient were newly added as they were considered as possible factors relating to understanding patients' emotions.

Statistical analysis

The mean total scores of empathies were shown as mean \pm standard deviation, 95% confidence intervals [CI] of the means because the descriptive statistics of the samples were shown as mean values for the purpose of comparison with previous studies. However, the distribution of the scores of the two grades in this study was non-normal (tested with the Shapiro-Wilk test) so that parametric tests with means and variances were not appropriate. In addition, the data sets of the first- and fourth-year students were not paired. Therefore, the median of them was statistically tested using the non-parametric Mann-Whitney U test. We conducted a factor analysis of the scores of all the respondents by generalized least squares, rotating the axes by the direct oblivion method. The numbers of factors were decided in accordance with the scree plot criterion (eigenvalues: 1 or higher). Next, a logistic regression analysis was performed for factors 1 through 4 derived from the factor analysis. We did not employ a multiple regression analysis because all of the factor scores were not normally distributed. The dependent variable was set to (1) if the factor score for each factor was positive and (0) if it was negative. The four independent variables were gender, age, school year, and experience as

Table 1. Participants' characteristics by school year (n = 167).

Variables	School Year			
	1 st		4 th	
	n	%	n	%
Sex				
Male	55	52.4	45	72.6
Female	45	47.6	17	27.4
Total	105	100.0	62	100.0
Age (years)				
Mean	19.8		23.6	
SD	2.6		4.5	
Experience as patients				
outpatient treatment				
Yes	68	64.8	40	64.5
No	37	35.2	22	35.3
Total	105	100.0	62	100.0
inpatient treatment				
Yes	30	28.6	22	35.5
No	75	71.4	40	64.5
Total	105	100.0	62	100.0

Table 2. Mean total-scores of Physician Empathy Scale by school year and sex.

School year	Sex	n	Ave.	SD	95% CI	Mdn	p
1 st	Male	55	65.0	10.2	62.3 - 67.8	66.0	0.144
	Female	50	68.0	10.2	65.1 - 70.9	70.5	
	Total	105	66.4	10.3	64.5 - 68.4	67.0	
4 th	Male	45	68.8	6.2	67.0 - 70.7	69.0	0.797
	Female	17	68.8	6.2	65.6 - 72.0	68.0	
	Total	62	68.8	6.1	67.3 - 70.4	69.0	
Total	Male	100	66.8	8.8	65.0 - 68.5	68.0	0.527
	Female	67	68.2	9.3	65.9 - 70.5	69.0	
	Total	167	67.3	9.0	66.0 - 68.7	68.0	

Ave.: Average

SD: Standard Deviation

CI: Confidential Interval

Mdn: Median

a patient (outpatient and inpatient treatment). The level of statistical significance was set at $p < 0.05$.

Results

Participants and mean empathy score

There were 105 out of 126 respondent participants in the first-year students and 62 out of 108 respondent participants in the fourth-year students. The participant characteristics are shown in Table 1. The participants were, on average, 19.8 years old for the first-year students and 23.6 for fourth. In the first-year student, 52.4% were male and in the fourth, 72.6%. Most of them had experience as outpatients, but not as inpatients (in the first-year students, 64.7%, 31.1% respectively). The

mean and median empathy scores by school year and gender are shown in Table 2. There was no significant difference in gender scores between school years.

Factor analysis and correlations among factors

The Kaiser-Gattman 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 in Table 3. Factor 1 was composed of nine 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 relationships." Factor 2 comprised four items (16,

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Table 3. Factor Analysis of Physician Empathy Scale.

	Factor 1	Factor 2	Factor 3	Factor 4
	(Building good patient- doctor relationships)	(Importance of emphatic care)	(Understanding patients' views)	(Compassionate care)
Asking after what is happening in the patient's life is as important as asking about physical complaints. (10)	0.813	-0.024	0.05	-0.048
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	0.18
For more effective treatment, a doctor must pay careful attention to individual patients' experience. (7)	0.617	0.051	0.02	-0.023
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	0.051
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	0.499
Trying to imagine oneself in the position of the other person contributes to the quality of care. (18)	0.49	0.077	-0.228	0.041
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	0.139
Understanding body language is as important as verbal communication in the doctor-patient relationship. (9)	0.413	0.106	-0.088	0.279
It is basically impossible for a doctor to see things from the patient's perspective when people are so different. (4)	0.23	-0.103	-0.162	0.096
Empathy is a therapeutic skill without which the success of the doctor will be limited. (16)	0.037	0.786	0.175	0.358
Empathy is an important therapeutic practice in the medical field. (11)	0.285	0.406	-0.176	0.06
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	-0.054
When the emotional scene taking place between the patient and his/her family is viewed, even the physicians may be emotionally moved, which is a good thing. (17)	-0.034	0.332	-0.009	-0.043
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	0.323
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	0.13
Emotional matters have nothing to do with the patient's medical treatment. (6)	-0.001	0.116	-0.089	0.633
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	0.55
Reading books and enjoying art can improve the doctor's ability to provide better care. (14)	0.097	-0.036	0.043	0.55
The doctor's humor can contribute to a better treatment outcome. (3)	-0.1	0.011	-0.087	0.519
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	-0.26	0.434

Extraction Method: Generalized Least Squares.

Rotation Method: Oblimin with Kaiser Normalization.

Rotation converged in 18 iterations.

Reversed items were (4), (6) and (19)

Table 4. Factor correlation of physician empathy.

Factor	1	2	3	4
1 (Building good patient-doctor relationships)	1.000			
2 (Importance of emphatic care)	0.256	1.000		
3 (Understanding patients' views)	-0.500	-0.271	1.000	
4 (Compassionate care)	0.595	0.244	-0.378	1.000

Extraction Method: Generalized Least Squares.

Rotation Method: Oblimin with Kaiser Normalization.

Table 5. Multivariate analysis of Physician empathy scales factor

	Factor 1			Factor 2			Factor 3			Factor 4		
	OR	95% CI	<i>p</i>	OR	95% CI	<i>p</i>	OR	95% CI	<i>p</i>	OR	95% CI	<i>p</i>
Sex: female versus male	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)	0.01
Age	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)	0.048
School year: 4th versus 1st	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)	0.51
Experience as patients												
Outpatient treatment: yes versus no	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)	0.379
Inpatient treatment: yes versus no	1.25	(0.62 - 2.67)	0.504	1.49	(0.71 - 3.12)	0.29	0.73	(0.34 - 1.57)	0.419	1.34	(0.62 - 2.89)	0.159

OR: odds ratio

CI: confidential interval

Factor 1: Building good patient-doctor relationships

Factor 2: Importance of emphatic care

Factor 3: Understanding patients' views

Factor 4: Compassionate care

11, 12, and 17) that were related to responding to patients' emotional needs; thus, factor 2 was called the "importance of emphatic care." Factor 3 was composed of two items (1 and 5) and, because it was related to acknowledging patients' points of view while practicing medical therapy, it was called "understanding patients' views." Factor 4 was composed of five items (6, 19, 14, 3, and 2)³¹⁾ 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 the correlation between factors 2 and 3 was revealed in Table 4.

Logistic regression analysis

Table 5 shows the results of the logistic regression analysis for each factor with gender, age, school year, and experience as a patient. The odds ratio of the female participants was significantly higher

than the male participants 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

This study found that empathy in the preclinical medical students of Faculty of Medicine, Yamagata University does not decrease from the first to the fourth year; instead, the mean empathy score increased slightly in fourth-year students in Table 2. These findings accord with studies that have measured empathy in medical students in the U.K., Korea, China, and Japan¹⁴⁾⁻¹⁷⁾, while studies conducted in the U.S., Iran, and India have found that medical students show greater empathy in the first year of medical school than later on⁷⁾⁻¹¹⁾. This means that when comparing changes in empathy

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scores, it is necessary to consider differences in personal and social factors, as well as differences in the design of medical training in different countries.

Possible explanations for the stability of the empathy scores could be since participants received sufficient empathic training. It has been noted that the intervention of empathic education increases cognitive empathy^{32)–35)}. The curriculum for the medical mediation concept, which emphasizes empathy education in this study, was short (about five hours) and may be insufficient to justify the reasons for the lack of empathy. In such a case, medical mediation may offer impactful content that focuses on the conflict resolution of negative feelings toward doctors by enhancing the empathetic competence of students. Another 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 have revealed that the empathy scores of females were higher than those of males^{7), 9), 11), 14), 15), 36), 37)}. Our results (Table 2) does not support these findings. On the other hand, in Table 5, female influence was significantly seen in the second and fourth factors. This difference is due to be small number of female respondents in the fourth school year being 27.4%.

As the results in Table 3 show, in the opinion of the medical students, factor 1, concerning empathy, is about “building good patient-doctor relationships,” which refers to the factor of “understanding patient’s view” (factor 3). However, what was chosen as factor 4 (compassionate care) in this study was placed in the second position (factor 2) in other studies^{9), 14), 17)} 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 they begin their clinical experience. Although cognitive empathy increases with medical education, from dissection practice in the second year to bedside learning (BSL) in the fourth year, if emotional empathy is the ability to share the emotional state of others while finding it difficult to control one’s own emotions (e.g.,

seeing someone in distress and feeling distressed and wanting to help), it is conceivable that the ability of emotional empathy does not change significantly with medical education through to fourth year in Table 4. It is possible that the use of cognitive empathy has increased and that relative emotional empathy has decreased because it is difficult to make the best decisions and recommend the best treatments if only emotional empathy is felt, and it is difficult to make appropriate decisions and form responses if one does not try to understand the other person’s condition with regard to cognitive empathy. In other words, it has been shown that cognitive empathy is stronger, but emotional empathy is relatively weaker. The students did 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 emotions and strengthen the understanding that others’ individual emotional perspectives are equally important³²⁾.

For the independent variables, gender and age, factor 2 (importance of empathetic care) and factor 4 (compassionate care) displayed significant differences in odds ratios (Table 5). Female medical students were shown to have a higher recognition of emotional empathy than male students, which is consistent with previous findings^{10), 14)}. Age showed a weaker effect compared to gender for “compassionate care.” This implies that gender was the main variable in emotional empathy in this study. There was no significant correlation between experience as a patient (outpatient and inpatient treatment) and any empathy factor in Table 5. This means that an experience as patient did not affect any empathetic factors in preclinical students. A survey of medical students undergoing clinical training is also required to confirm the result.

Our longitudinal study has limitations. First, because of the small sample size and that first and fourth-year students from only one Japanese medical school were involved, 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 a decline in empathy scores. It implies that a program of medical mediation for first and fourth-year students may be required. Further longitudinal design studies of medical schools in Japan and other countries are needed to confirm these hypotheses. Nevertheless, these results demonstrate the importance of incorporating empathy education in medical schools for creating empathetic doctors and improving patients' satisfaction and treatment adherence.

In conclusion, we did not detect decrease in the empathy scores of the students at Yamagata University in Japan between their first and fourth years in medical school. We found a weak correlation between factor 2 (importance of empathic care) and factor 3 (understanding patients' views). Empathy education that reinforces the awareness that the emotional perspectives of others are just as important as one's own is necessary in preclinical medical students.

Acknowledgments

The authors thank all the students who participated in this study and Dr. Ivana Buric for the comments on the manuscript.

Declaration of Interests

The authors declare no conflicts of interest.

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