CLINICAL & BASIC RESEARCH

Measuring Empathy Levels among Kurdish Medical Students in Erbil City, Iraq
Cross-sectional study

*Awring M. Raof[1] and Bervian A. Yassin[2]

قياس مستوى التعاطف لدى طلاب الطب الكرد في مدينة أربيل في العراق
دراسة مقطعية

أورينك معروف رؤوف و بيرفان عدنان ياسين

ABSTRACT: *Objectives:* Empathy is a crucial attribute within the physician-patient relationship. This study aimed to evaluate the empathy levels of students in the College of Medicine at Hawler Medical University (HMU) in Erbil city, Iraq. *Methods:* This cross-sectional study took place between January and May 2015 and included all medical undergraduates enrolled at HMU (n = 989). The validated self-administered English language version of the Jefferson Scale of Physician Empathy-Student Version (JSPE-SV) was used to measure empathy levels. Students reported their conformity to each statement of the 20-item questionnaire on a 7-point Likert scale. Levels of empathy were considered directly relative to their final score. *Results:* A total of 927 students completed the questionnaire (response rate: 93.7%). The male-to-female ratio was 0.72:1 and the mean age was 21.3 ± 1.4 years. The mean empathy score was 101.9 ± 19.2. Female students had significantly higher empathy (*P* = 0.023) and more frequently chose people-oriented specialties (*P* = 0.001) than males. First-year students reported the highest mean score (112.9 ± 20.1) while fourth-year students had the lowest (92.7 ± 16.0). There was a significant decline in mean scores between first- and second-year male students (*P* = 0.020) and first- and fourth-year male students (*P* = 0.050). Students who chose people-oriented specialties had significantly higher scores than those who chose technology-oriented specialties (*P* = 0.002). *Conclusion:* The studied cohort of HMU students demonstrated low empathy levels. As such, the inclusion of empathy instruction in medical school curricula is recommended to promote professionalism and patient welfare.

Keywords: Empathy; Attitudes; Medical Students; Physician-Patient Relations; Medical Education; Iraq.

الملخص: **الهدف:** يعد التقمص العاطفي صفة مهمه في علاقة الطبيب مع المريض. كان الهدف من هذه الدراسة تقييم مستوى التعاطف لدى طلاب كلية الطب في جامعة هولير الطبية (HMU) بمدينة أربيل في العراق. **الطريقة:** أجريت هذه الدراسة المقطعية في كلية الطب في مدينة أربيل بين شهر كانون الثاني و شهر مايو من عام 2015، وتضمنت جميع الطلاب المسجلين للدراسة في HMU (989 = n). تم إعطاء الطلاب استبيان Jefferson Scale الموثق ذاتي الإكمال باللغة الإنكليزية لقياس مستوى التعاطف. تضمن الإستبيان عشرين سؤالا على مقياس ليكرت ذوي النقاط السبعة. وتم قياس درجة التعاطف منسوبا إلى عدد النقاط النهائيةالتي سجلها الطالب أو الطالبة. **النتائج:** تم إكمال الإستبيان من قبل 927 طالبا (نسبةالاستجابة: 93.7%). كانت نسبة الذكور إلى الإناث 0.72:1. وكان معدل أعمارهم 1.4 ± 21.3 سنة. كان معدل التعاطف للطلاب 19.2 ± 101.9 وكانت درجة تعاطف الإناث نسبة إلى الذكور أكبر بدلالة إحصائية (0.023 = P) وكانت نسبة اختيار الإناث للفروع السريرية أكبرمن الذكور مع دلالة إحصائية (0.001 = P). كانت أعلى الدرجات لطلاب السنة الأولى (20.1 ± 112.9) بينما درجات طلاب السنة الرابعة كانت الأقل (16.0 ± 92.7) كان هناك نقصان في معدل الدرجات لطلاب السنة الثانية مقارنة مع طلاب السنة الأولى ذا دلالة إحصائية (0.002 = P) وسجل طلاب الفروع السريرية معدل أعلى من طلاب الفروع التكنولوجية. **الخلاصة:** كان معدل التعاطف متدنيا في المجموعة المدروسة من HMU. توصي هذه الدراسة بإعطاء الأهمية للتوجيه المعنوي في المناهج الدراسية للكلية لتعزيز الأداء المهني ورعاية المرضى.

مفتاح الكلمات: التعاطف؛ السلوكية؛ طلاب الطب؛ علاقة الطبيب مع المريض؛ التعليم الطبي؛ العراق.

Advances in Knowledge

- Low empathy levels were reported among a group of medical undergraduate students in Erbil city, Iraq.

- Female students had significantly higher empathy levels than male students among the studied group and a significant decline in empathy scores was observed among male students according to academic year.

- The results of this study suggest that students with higher empathy levels may select people-oriented over technology-oriented specialties.

Application to Patient Care

- While the results of this study cannot be generalised to all medical students in Iraq, the low levels of empathy reported among the studied medical students have alarming implications for future patient care. The inclusion of empathy education in medical school curricula is therefore of vital importance due to the significant impact of this attribute on physician-patient relationships.

[1]*Department of Community Medicine, Hawler Medical University, Erbil, Iraq;* [2]*Department of Preventive Health, Public Health Institute, Erbil, Iraq*
Corresponding Author e-mail: awringmaroof62@yahoo.com

In order to be effective, physicians need to form sympathetic and beneficial relationships with their patients.[1] One of the most important skills needed to form and maintain a relationship is empathy.[2] Although there are several different definitions of empathy, it is generally defined as the capacity to "see the world as others see it, be nonjudgmental, understand another's feelings, and communicate the understanding".[3] Communications between patients and caregivers rely upon the empathetic nature of the medical doctor.[4] Hojat *et al.* verified that physician compassion is strongly related to enhanced patient outcomes, compliance and contentment and a decline in medicolegal problems.[5] Previous studies have determined various factors that affect levels of empathy, including gender, academic performance and an individual's relationship with their mother.[6,7] A study from the USA observed significant differences in empathy levels between genders and between physicians in people-oriented versus technology-oriented specialties, suggesting that certain aspects of empathy may be related to gender and choice of medical specialty.[8,9]

The Hawler Medical University (HMU) is a public university in Erbil city, Iraq. The recently revised six-year undergraduate medical curriculum in the HMU College of Medicine includes a series of courses on medical ethics and communication skills with the aim of strengthening future patient-physician relationships. This training is intended to guarantee that medical graduates will have the necessary clinical skills to competently and empathetically consider patients' feelings and experiences, thus improving care by reducing patient suffering and helping them to feel more relaxed. This study therefore sought to measure empathy levels among a sample of medical students at HMU. Specifically, differences in empathy levels were assessed according to gender, academic year and choice of specialty. To the best of the authors' knowledge, no such study has yet been conducted among Kurdish medical students and this is the first time that the Jefferson Scale of Physician Empathy-Student Version (JSPE-SV) has been used in Erbil city.

Methods

This cross-sectional study was carried out between January and May 2015 and included all undergraduate students enrolled in the 2014–2015 academic year at the College of Medicine at HMU (n = 989; male-to-female ratio: 0.74:1). Empathy levels were determined using the JSPE-SV. This self-administered English language 20-item questionnaire was originally developed in 2001 to measure medical students' attitudes towards physician empathy in a patient-care situation.[8] It has been validated in the USA, Mexico and Japan.[8,10,11] The measurement of internal consistency (Cronbach's alpha) is 0.76.[12] The English language version of the JSPE-SV questionnaire was distributed to all students at the end of each class.[8] The questionnaire was completed anonymously in approximately 30 minutes and returned to the researchers. Respondents reported their degree of agreement with each item on a 7-point Likert scale; however, 10 of the items were negative statements and were marked in reverse order.[9] The final score ranged between 20–140 and a participant's level of empathy was considered directly relative to their score. A non-responder was defined as a student who failed to return the survey. Surveys with less than 16 completed items were excluded from the results.

Demographic information such as age, gender and choice of specialty was also collected. Missing gender values for respondents who did not provide their gender was determined using a discriminate function test. Males and females were categorised using forms in which the gender was identified as the endpoint. This procedure was then applied to data from those in the unknown gender group. Choice of speciality was categorised as either technology- or people-oriented. Technology-oriented specialties included surgery and related subspecialties; oncology; preventative and social medicine; pathology; radiology; and anaesthesiology.[6] People-oriented specialties included family medicine; neurology; paediatrics; psychiatry; emergency medicine; obstetrics and gynaecology; ophthalmology; dermatology; and internal and rehabilitation medicine.[6] Students were asked to determine their choice of speciality by rating their future likelihood of entering each specialty mentioned above on a 4-point Likert scale ranging from 1 (very unlikely) to 4 (very likely).[8] Each student was then classified as choosing either technology- or people-oriented specialties after comparing their overall scores for each group.

Data were analysed using the Statistical Package for the Social Sciences (SPSS), Version 21 (IBM Corp., Chicago, Illinois, USA). Measures of central tendencies and distributions were determined. The one-way analysis of variance (ANOVA), Bonferroni *post hoc* test and Student's t-test were used to assess statistical significance. Pearson's Chi-squared test was used for group frequency comparisons. Statistical significance was set at $P \leq 0.050$.

This study was granted ethical approval by the Research Ethics Committee at the College of Medicine of HMU (meeting #1 paper #5). All students were informed that participation in the study was voluntary and anonymity was guaranteed. All forms were coded to avoid respondent identification.

Table 1: Questionnaire distribution by academic year among students at Hawler Medical University in Erbil city, Iraq (N = 989)

	Academic year						Total
	1st year	2nd year	3rd year	4th year	5th year	6th year	
Students per class	172	161	170	153	161	172	989
Questionnaires distributed	172	160	169	152	159	170	982
Respondents per questionnaires (response rate, %)	165 (95.9)	159 (99.4)	167 (98.8)	150 (98.7)	155 (97.5)	131 (77.1)	927 (94.4)
Response rate of class, %	95.9	98.8	98.2	98.0	96.3	76.2	93.7

Table 2: Distribution by mean empathy score* and gender of the studied sample of students at Hawler Medical University in Erbil city, Iraq (N = 927)

Gender	n (%)	Mean empathy score ± SD	P value
Male	391 (42.2)	98.6 ± 16.2	0.023
Female	536 (57.8)	102.5 ± 19.9	-
Total	927 (100.0)	101.9 ± 19.2	-

SD = standard deviation.

*Empathy was self-assessed by respondents using the English version of the 20-item Jefferson Scale of Physician Empathy-Student Version.[8]

Results

Of the 989 students included in the study, a total of 927 completed the survey (response rate: 93.7%) [Table 1]. There were 391 male respondents (42.2%) and 536 female respondents (57.8%) with a male-to-female ratio of 0.72:1. The mean age of the respondents was 21.3 ± 1.4 years (range: 17–25 years old). Overall, the mean empathy score of the students was 101.9 ± 19.2. Table 2 displays the mean empathy scores of male and female students, respectively (98.6 ± 16.2 versus 102.5 ± 19.9). This difference was statistically significant ($P = 0.023$).

Mean empathy scores decreased as academic years increased; first-year medical students reported the highest mean empathy score (112.9 ± 20.1) while the lowest mean score was observed among the fourth-year medical students (92.7 ± 16.0) [Table 3]. When adjusted for age, gender and choice of future specialty, the difference in empathy scores between first- and fourth-year students was 16.1. A significant decline in mean empathy scores was noted between male students in their first versus second academic year (Bonferroni test = 8.7; $P = 0.020$) and between male students in their first versus fourth academic year (Bonferroni test = 10.1; $P = 0.005$) [Table 4].

There was a statistically significant difference between genders with regards to choice of specialty. Females more frequently chose people-oriented specialties in comparison to males (62.3% versus 25.8%; $P = 0.001$) [Table 5]. Furthermore, students who chose people-oriented specialties had higher mean empathy scores, whereas those who selected technology-oriented specialties had lower scores (109.9 ± 20.2 versus 99.8 ± 16.1; $P = 0.002$) [Table 6].

Table 3: Distribution by academic year and mean empathy score* of the studied sample of students at Hawler Medical University in Erbil city, Iraq (N = 927)

Academic year	n (%)	Empathy score			
		Mean ± SD	95% CI	Lowest score	Highest score
1st year	165 (17.8)	112.9 ± 20.1	112.4–121.3	35.0	139.0
2nd year	159 (17.2)	110.5 ± 20.0	94.3–114.7	44.0	134.0
3rd year	167 (18.0)	101.8 ± 20.0	97.1–106.5	33.0	137.0
4th year	150 (16.2)	92.7 ± 16.0	91.1–101.4	53.0	130.0
5th year	155 (16.7)	94.7 ± 17.0	90.8–106.5	56.0	134.0
6th year	131 (14.1)	93.7 ± 17.0	91.8–106.5	45.0	131.0
Total	927 (100.0)	101.9 ± 19.2	99.2–104.6	33.0	139.0

SD = standard deviation; CI = confidence interval.

*Empathy was self-assessed by respondents using the English version of the 20-item Jefferson Scale of Physician Empathy-Student Version.[8]

Table 4: Mean difference* in empathy scores[†] between male students according to academic year[‡] among the studied sample at Hawler Medical University in Erbil city, Iraq (N = 927)

Academic year		Mean difference I - J	*P* value	95% CI
I	J			
1st year	2nd year	8.7	0.020	0.9–18.5
1st year	4th year	10.1	0.005	2.2–20.0
2nd year	1st year	-8.7	0.020	-18.5–-0.9
4th year	1st year	-10.1	0.005	-20.0–-2.2

CI = confidence interval.

*Calculated using the Bonferroni post hoc test to assess dependent variable scores with multiple comparisons. †Empathy was self-assessed by respondents using the English version of the 20-item Jefferson Scale of Physician Empathy-Student Version.[8] ‡There were no significant differences between empathy scores among female students according to academic year and between empathy scores among male students in other academic years.

Discussion

The current study sought to measure self-assessed empathy levels among a sample of medical students at a public university in Erbil city. The response rate to the questionnaire was much higher than those reported from similar studies in the USA, Iran, Portugal, Japan, Kuwait and the UK.[10,11,13–16] The overall mean empathy score among the studied sample in the current study (101.9) was close to scores from studies conducted in Japan (104.3) and Iran (104.1), but lower than those reported from Western countries.[11–14] However, the mean empathy score for first-year medical students in the current study (112.9) was similar to that reported in Iran (110.3) and the USA (115.5).[13,14] Additionally, the higher level of empathy among female students noted in the current study was consistent with previous research.[9,17,18]

In the current study, the mean empathy score reported by first-year students was highest, with mean empathy scores declining in the second and subsequent academic years—second-year students

Table 5: Distribution by gender and choice of specialty* of the studied sample of students at Hawler Medical University in Erbil city, Iraq (N = 927)

Specialty	n (%)	
	Male	Female
People-oriented	101 (25.8)	334 (62.3)[†]
Technology-oriented	290 (74.2)	202 (37.7)
Total	391 (100.0)	536 (100.0)

*Students rated their future likelihood of entering various specialties categorised as either people- or technology-oriented on a 4-point Likert scale ranging from 1 (very unlikely) to 4 (very likely).[8] Each student was then classified according to their overall scores for each group. †Statistically significant at P = 0.001.

Table 6: Mean empathy scores* by academic year and choice of specialty[†] among the studied sample of students at Hawler Medical University in Erbil city, Iraq (N = 927)

Academic year	Mean score ± SD	
	People-oriented specialty	Technology-oriented specialty
1st year	120.1 ± 21.2	106.8 ± 17.2
2nd year	111.4 ± 21.2	99.0 ± 16.1
3rd year	110.8 ± 20.2	99.1 ± 16.1
4th year	110.8 ± 20.2	96.3 ± 15.1
5th year	104.2 ± 20.1	98.7 ± 16.2
6th year	102.2 ± 20.0	98.7 ± 16.1
Total	109.9 ± 20.2	99.8 ± 16.1
ANOVA	4.940	-
P value	0.002	-

ANOVA = one-way analysis of variance.

*Empathy was self-assessed by respondents using the English version of the 20-item Jefferson Scale of Physician Empathy-Student Version.[8] †Students rated their future likelihood of entering various specialties categorised as either people- or technology-oriented on a 4-point Likert scale ranging from 1 (very unlikely) to 4 (very likely).[8] Each student was then classified according to their overall scores for each group.

displayed higher empathy scores than fourth-year students and final year students displayed lower empathy scores than students in their first academic year. This finding was consistent with other studies, which suggests that levels of empathy decline during clinical training.[10,13,14] After empathy scores were adjusted for age, gender and choice of future specialty, the difference in mean scores between first- and fourth-year students in the current study (16.1) was higher than that of an American study (11.9).[13] Another study conducted among dental students reported a decline in empathy levels after the introduction of clinical tasks.[19] In a longitudinal study of undergraduate nursing students conducted to evaluate changes in empathy levels, Ward *et al.* found that students showed a decline in empathy over the course of one year.[20]

There are a number of possible factors which may influence the reduction in empathy levels among students as education progresses. Low levels of empathy may be reflective of the prevalent teaching methods at a particular academic institution. The education and training of medical students may be stressful and include extensive work hours and a lack of sleep. Bedside communication may also become reduced due to time constraints, leading to a decrease in empathy.[21] The increasingly emotionally demanding and harsh conditions of their academic career could negatively affect feelings of compassion among medical students.[22–24] Furthermore certain

humanities topics are not included in most medical curricula; these subjects may help improve students' empathetic abilities.[25] Another possible explanation for the observed decrease in empathy among medical students is the sense of privilege that grows throughout a doctor's medical training; being part of an advantaged group has been suggested to contribute to changes in an individual's capacity for empathy.[26]

In the current study, students who chose a people-oriented specialty reported significantly higher empathy level scores than those who selected technology-oriented specialties. These findings are similar to another study which found that students who chose internal medicine, family medicine, psychiatry, paediatrics or obstetrics and gynaecology as specialties had higher empathy scores.[27] These specialties require more patient contact; students may therefore have scored higher on the empathy scale because of increased patient interaction. The authors of the current study believe that students with higher empathy levels may gravitate towards people-oriented careers. This construct does not imply that future career preference calibrates empathy but rather that students with greater empathy may naturally prefer specialties that require higher levels of patient contact. Nevertheless, it is important to note that the mean differences in empathy levels between the people-oriented and technology-oriented specialty groups were low. This may be because many students were not yet definite in their future speciality career decisions; additionally, many of them may change preferences during the course of their undergraduate studies. Future research should seek to determine whether the promotion of empathy skills impacts students' career preferences.

One of the limitations of this study was that the measurement of empathy was self-reported, focusing on the students' perceptions of empathy rather than their performance. A second limitation was the use of a cross-sectional study design, which did not allow for demonstration of causal relationships. Lack of significant clinical exposure may also have affected how the students answered the questions on the survey as the first three years of medical school include only partial clinical exposure; this may have influenced empathy. Furthermore, participation in the survey and understanding of the questionnaire items may have been biased by events during data collection. Finally, as this study was limited to the College of Medicine at HMU in Erbil city, the results cannot be generalised to other medical colleges in Iraq. Nevertheless, the results of this study are still worthy of consideration. The development of empathy is vital to the advancement of a student's professionalism during their undergraduate education.[28] In order

to increase levels of empathy among medical students, programmes teaching empathetic skills are recommended for incorporation into medical syllabi. These programmes should involve small group teaching and include training in practical skills that can be maintained and reinforced throughout a student's medical training, such as effective patient interviewing and interpersonal communication techniques. Further research on empathy among medical students should focus on factors that contribute to the development of high empathy levels and methods for augmenting these factors in both medical education and practice.

Conclusion

Low empathy levels were reported among the studied group of medical students at HMU, which may be a reason for concern. Specifically, males demonstrated significantly lower overall mean empathy levels in comparison to females. Mean empathy scores were also found to decline with academic progression. Programmes highlighting empathy are therefore recommended for incorporation into medical curricula in order to encourage the development of empathetic skills among medical students.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

References

1. Jani BD, Blane DN, Mercer SW. The role of empathy in therapy and the physician-patient relationship. Forsch Komplementmed 2012; 19:252–7. doi: 10.1159/000342998.

2. Charon R. The patient-physician relationship: Narrative medicine - A model for empathy, reflection, profession, and trust. JAMA 2001; 286:1897–902. doi: 10.1001/jama.286.15.1897.

3. Kaplan SH, Greenfield S, Ware JE Jr. Assessing the effects of physician-patient interactions on the outcomes of chronic disease. Med Care 1989; 27:S110–27.

4. Larson EB, Yao X. Clinical empathy as emotional labor in the patient-physician relationship. JAMA 2005; 293:1100–6. doi: 10.1001/jama.293.9.1100.

5. Hojat M, Zuckerman M, Magee M, Mangione S, Nasca T, Vergare M, et al. Empathy in medical students as related to specialty interest, personality, and perceptions of mother and father. Pers Individ Dif 2005; 39:1205–15. doi: 10.1016/j.paid.2005.04.007.

6. Hojat M, Gonnella JS, Nasca TJ, Mangione S, Veloksi JJ, Magee M. The Jefferson Scale of Physician Empathy: Further psychometric data and differences by gender and specialty at item level. Acad Med 2002; 77:S58–60. doi: 10.1097/00001888-200210001-00019.

7. Roh MS, Hahm BJ, Lee DH, Suh DH. Evaluation of empathy among Korean medical students: A cross-sectional study using the Korean Version of the Jefferson Scale of Physician Empathy. Teach Learn Med 2010; 22:167–71. doi: 10.1080/10401334.2010.488191.

8. Hojat M, Mangione S, Nasca TJ, Cohen MJM, Gonnella J, Erdmann JB, et al. The Jefferson Scale of Physician Empathy: Development and preliminary psychometric data. Educ Psychol Meas 2001; 61:349–65. doi: 10.1177/00131640121971158.

9. Hojat M, Gonella JS, Nasca TJ, Mangione S, Vergare M, Magee M. Physician empathy: Definition, components, measurement, and relationship to gender and specialty. Am J Psychiatry 2002; 159:1563–9. doi: 10.1176/appi.ajp.159.9.1563.

10. Hojat M, Mangione S, Nasca TJ, Rattner S, Erdmann JB, Gonnella JS, et al. An empirical study of decline in empathy in medical school. Med Educ 2004; 38:934–41. doi: 10.1111/j.1365-2929.2004.01911.x.

11. Kataoka HU, Koide N, Ochi K, Hojat M, Gonnella JS. Measurement of empathy among Japanese medical students: Psychometrics and score differences by gender and level of medical education. Acad Med 2009; 89:1192–7. doi: 10.1097/ACM.0b013e3181b180d4.

12. Tavakol S, Dennick R, Tavakol M. Psychometric properties and confirmatory factor analysis of the Jefferson Scale of Physician Empathy. BMC Med Educ 2011; 11:54. doi: 10.1186/1472-6920-11-54.

13. Chen D, Lew R, Hershman W, Orlander J. A cross-sectional measurement of medical student empathy. J Gen Intern Med 2007; 22:1434–8. doi: 10.1007/s11606-007-0298-x.

14. Rahimi-Madiseh M, Tavakol M, Dennick R, Nasiri J. Empathy in Iranian medical students: A preliminary psychometric analysis and differences by gender and year of medical school. Med Teach 2010; 32:e471–8. doi: 10.3109/0142159X.2010.509419.

15. Magalhães E, Salgueira AP, Costa P, Costa MJ. Empathy in senior year and first year medical students: A cross-sectional study. BMC Med Educ 2011; 11:52. doi: 10.1186/1472-6920-11-52.

16. Hasan S, Al-Sharqawi N, Dashti F, AbdulAziz M, Abdullah A, Shukkur M, et al. Level of empathy among medical students in Kuwait University, Kuwait. Med Princ Pract 2013; 22:385–9. doi: 10.1159/000348300.

17. Austin EJ, Evans P, Goldwater R, Potter V. A preliminary study of emotional intelligence, empathy and exam performance in first year medical students. Pers Individ Dif 2005; 39:1395–1405. doi: 10.1016/j.paid.2005.04.014.

18. Tavakol S, Dennick R, Tavakol M. Empathy in UK medical students: Differences by gender, medical year and specialty interest. Educ Prim Care 2011; 22:297–303. doi: 10.1080/14739879.2011.11494022.

19. Sherman JJ, Cramer A. Measurement of changes in empathy during dental school. J Dent Educ 2005; 69:338–45.

20. Ward J, Cody J, Schaal M, Hojat M. The empathy enigma: An empirical study of decline in empathy among undergraduate nursing students. J Prof Nurs 2012; 28:34–40. doi: 10.1016/j.profnurs.2011.10.007.

21. Benbassat J, Baumal R. What is empathy, and how can it be promoted during clinical clerkships? Acad Med 2004; 79:832–9. doi: 10.1097/00001888-200409000-00004.

22. Branch W, Pels RJ, Lawrence RS, Arky R. Becoming a doctor: Critical-incident reports from third-year medical students. N Engl J Med 1993; 329:1130–2. doi: 10.1056/NEJM199310073291518.

23. Rakel D, Barrett B, Zhang Z, Hoeft T, Chewning B, Marchand L, et al. Perception of empathy in the therapeutic encounter: Effects on the common cold. Patient Educ Couns 2011; 85:390–7. doi: 10.1016/j.pec.2011.01.009.

24. Hojat M, Louis DZ, Markham FW, Wender R, Rabinowitz C, Gonnella JS. Physicians' empathy and clinical outcomes for diabetic patients. Acad Med 2011; 86:359–64. doi: 10.1097/ACM.0b013e3182086fe1.

25. Winefield HR, Chur-Hansen A. Evaluating the outcome of communication skill teaching for entry-level medical students: Does knowledge of empathy increase? Med Educ 2000; 34:90–4. doi: 10.1046/j.1365-2923.2000.00463.x.

26. Brazeau CM, Schroeder R, Rovi S, Boyd L. Relationships between medical student burnout, empathy, and profess-ionalism climate. Acad Med 2010; 85:S33–6. doi: 10.1097/ACM.0b013e3181ed4c47.

27. Newton BW, Savidge MA, Barber L, Cleveland E, Clardy J, Beeman G, et al. Differences in medical students' empathy. Acad Med 2000; 75:1215. doi: 10.1097/00001888-200012000-00020.

28. Shapiro J, Morrison E, Boker J. Teaching empathy to first year medical students: Evaluation of an elective literature and medicine course. Educ Health (Abingdon) 2004; 17:73–84. doi: 10.1080/13576280310001656196.