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RESEARCH ARTICLE

Empathic Divergence: Partially Blunting an Affective Empathic Response While Maintaining Cognitive Empathy is an Important Skill for Medical Students to Acquire

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ABSTRACT

Background: Establishing an empathic bond of trust with patients is a trait that is important to learn during medical school. There are two types of empathy: affective and cognitive. Being able to partially blunt a detrimental affective response while maintaining cognitive empathy is beneficial for both the patient and the physician.

AIM: To find those students who have partially blunted their affective empathy while maintaining or enhancing their cognitive empathic skills.

Methods: Affective and cognitive empathy was measured using the Balanced Emotional Empathy Scale and the Jefferson Scale of Empathy, respectively. The survey instruments were given during entrance into medical school, at the start of years 3-4, and a final administration just before graduation. Students who fit the aim of the study, had blunted their BEES score by -0.5 to -1.5 s.d. below the male or female population norms, as well as being at or above the 75th percentile for JSE scores as established by the Project in Osteopathic Medical Education and Empathy study. Desired specialty choice and sex was also collected at each timepoint. Five specialties are "people-oriented" and have a large amount of patient contact and continuity of care, and include Family and Internal Medicine, Ob/Gyn, Pediatrics and Psychiatry. Most other specialties are more "procedure- or technical-oriented" and are those with little or no patient contact and/or continuity of care (e.g., Surgery, Emergency Medicine, Anesthesiology).

Results: Only a small subset of students (n = 15/345) fell within the above parameters upon entering medical school. It was a different, small cadre (n = 13) that had these traits upon graduation. Ergo, there was no student who fell within the parameters for all four years of their undergraduate medical education.

Conclusions: Few students had the ability to partially blunt their affective empathic response while maintaining the ability to give a reassuring cognitive empathic response to patients. This indicates an increased emphasis needs to be placed on teaching empathic skills during the basic science years of the curriculum. However, the onus needs to fall upon the physicians who are empathic role-models during the clinical rotation year.

Introduction

Developing and maintaining an empathic bond of trust with patients is a skill that needs to be nurtured for students in osteopathic and allopathic medical schools. Studies have shown that when a physician is considered empathetic by patients, the patients are more compliant to the physician's instructions, have better outcomes, and are less likely to sue for malpractice.[1-4] However, Hafferty,[5] who described the "hidden curriculum", revealed the hinderance of the development of professionalism among medical students during their medical education. The results of his study prompted an increased interest to promote professional attributes among allopathic and osteopathic medical students. One of these professional traits is empathy, and subsequent studies have shown an unexpected erosion of student empathic skills as they progress through their undergraduate medical education; with the most profound drops occurring after completion of the first year of basic science courses and after finishing the first year of clinical rotations.[6-8] These drops in empathy can most likely be attributed to inadequately challenged undergraduates, lack of face-to-face communication due to the detrimental increased use of social media, the pressures of longer medical school study hours, finally treating actual patients, longer clinical work hours, depersonalization/burnout, and deidealization with the realities of the medical profession.[9-13]

Although there are numerous definitions for the emotion called "empathy", there are two basic types: affective/vicarious and cognitive/role-playing. Affective empathy is the "gut feeling" one experiences when faced with an emotionally charged situation and is closely related to the pain axis within the CNS. This affective empathic reaction, using more primitive CNS structures, e.g., the limbic system, is then followed by a cognitive empathic response using phylogenetically newer CNS regions. (See refs. 14-16 for more thorough explanations.)

Because there are two types of empathy, two different survey instruments were developed to measure the amount of affective or cognitive empathy people possess. Affective empathy is defined by Mehrabian and colleagues as "an individual's vicarious emotional response to perceived emotional experiences of others" and is measured via the Balanced Emotional Empathy Scale (BEES) they developed in 1996.[17,18] Although the BEES was not specifically designed for the health professionals, for medical students this type of empathy would be the initial vicarious reaction they would feel in an emotionally charged situation.

Cognitive empathy, specifically in relation to health professional education and patient care, is defined by Hojat and colleagues as "predominantly a *cognitive* (as opposed to affective or emotional) attribute that involves *understanding* (as opposed to feeling) of the patient's pain, experiences, concerns, and perspectives combined with a capacity to *communicate* this understanding and an *intention to help*" (italics and parenthetical statements by Hojat, et al), and is measured by the Jefferson Scale of Empathy (JSE) they developed in 2001.[19,20]

As medical students learn to become physicians, how are the cognitive empathic communication skills they need to develop related to the need for the students to also realize they need to partially blunt an excessive affective empathic response to patients.[14,21] Blunting an affective empathic response is necessary for health care professionals; because a pronounced affective empathic response by a student or physician to an emotionally charged situation can overwhelm their ability to give their full attention to the patient.[22] This detrimental response diminishes the therapeutic ability of the student or physician to adequately care for the patient because they are focused on their own vicarious emotions. Thus, there needs to be an empathic divergence within the medical student or physician that needs to be controlled. This dissonance occurs between their initial, internal, nonverbal, negative affective empathic reaction, vs. their need to make an appropriate, verbal, cognitive empathic response to the patient. Thus, ideally, medical students need to learn to diminish their affective, vicarious response to "heartsink" patients,[23] and to emotionally charged/upsetting patient interactions, while learning how to establish empathic physician-patient communication skills. Yet, enhancing or maintaining empathy on daily basis for a medical student or physician is cognitive hard work and many do not want to put in the effort[24,25]

Purpose

One of the main hypotheses of the Campbell University School of Osteopathic Medicine (CUSOM) longitudinal empathy study was to determine if osteopathic education, with its strong emphasis on the osteopathic philosophy of "mind, body and spirit",[26] combined with an emphasis on effective patient-physician communication skills, would result in a partial drop in affective empathy (via BEES scores) with commensurate increases in cognitive empathy (via JSE scores).[8,27,28] This current analysis of the CUSOM longitudinal empathy data set shows there is a small cadre of entering medical

students who have this ability, and that there is another small, different subset that acquire this ability upon graduation.

Methods

This longitudinal study was reviewed and approved by the Institutional Review Board of Campbell University (IRB #30). The BEES and JSE student version (JSE-S) were voluntarily taken five times by the CUSOM classes of 2017-2019 (n = 345/459; 75.2% of the graduates, consisting of 176 women (51%) and 169 men (49%). There were no missing data points for the osteopathic medical students who participated at all five timepoints. Students who did not complete the surveys for all five timepoints are not included.

The two surveys were given to the OMS I students during their orientation to medical school (M1 time-point on tables). This served as a baseline data point since the students had not yet taken any medical school classes. The OMS II-IV surveys were given during the first week of the sophomore, junior and senior years, respectively (M2-M4 time-points on graphs). Therefore, the M2 timepoint reflects any changes in empathy scores that occurred after finishing the first basic science year of the curriculum, the M3 timepoint reflects any changes that occurred during the second basic science year, etc. A final, fifth administration of the surveys was given several weeks before graduation (M4F time-point on tables).

In addition to filling out the survey instruments, the students were asked to indicate their sex since the BEES and JSE-S are sex-sensitive with women having significantly higher scores than men.[18,20] The students were also asked each time to choose which of 23 specialties they desired to enter. Like previous studies by the main author,[6,27,28] the 23 specialties were divided into five "Core" and 18 "Non-Core" specialties, with Core specialties representing those with a large amount of patient contact and/or continuity of care, i.e., "people-oriented", and Non-Core specialties being represented by specialties which are more "procedure- or technology-oriented" and have minimal or no patient contact or continuity of care. There are five Core specialties: Family and Internal Medicine, Ob/Gyn, Pediatrics and Psychiatry. Examples of Non-Core specialties are: Anesthesiology, Surgery, Diagnostic Radiology, Emergency Medicine, and Pathology.

Each student was assigned a random ID number so their data could be tracked throughout their undergraduate medical education. The survey instruments were hand scored and the data entered in a password protected Excel spreadsheet.

Survey Instruments

The JSE-S is a well-established, 20-item self-report survey using a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) to respond to the medical profession-oriented questions.[29] Scores can range from 20-140, with higher scores reflecting a higher level of cognitive empathy. The JSE-S has a Cronbach α coefficient of 0.89.[29] Nation-wide osteopathic medical student norms (n = 16,149) have been calculated via the POMEE study.[30]

The BEES consists of 30 positively or negatively worded items (15 in each category) measuring responses to fictional situations and particular life events. The survey uses a 9-point Likert scale ranging from +4 (very strong agreement), 0 (neither agreement nor disagreement), to -4 (very strong disagreement). Scores can range from -120 to 120. Higher scores reflect a greater capacity for an individual to be altruistic, prosocial, pleasant, and tolerant.[18,31] The population norm is a score and s.d. of 45 ± 24; the male norm is 29 ± 28 and the female norm is 60 ± 21. Z-score designations range from ± 2.5 s.d. from the norm and go from very extremely high to very extremely low. The BEES Cronbach α coefficient is 0.87.[18] Sample items include: "Unhappy movie endings haunt me for hours afterward", and "I cannot feel much sorrow for those who are responsible for their own misery".

Statistical Analysis

Cut-off points for the determination of individuals who blunted their affective empathy (BEES scores), while maintaining or increasing their cognitive empathy (JSE-S scores), were those students who had BEES z-scores ranging from -0.5 to -1.5 s.d. off the male or female population norms and are designated as "slightly low to very low" by the descriptors assigned by Dr. Mehrabian to the standard deviations above or below the male and female norms. (See ref. 19 for a table showing the descriptors assigned by Dr. Mehrabian to the standard deviations above or below the norm.) In addition, the JSE-S scores were at or above the 75th percentile for the US osteopathic student norm (JSE-S score ≥ 109) as determined by the Project in Medical Education and Empathy (POMEE) study.[30] In this case, matriculating student JSE-S scores (M1 timepoint) were compared to Table 2 of the POMEE study; the M2 and M3 scores compared to Table 3 and the M4 and the scores just before graduation (M4F timepoint) were compared to Table 4.[30] Comparison of the CUSOM data to multiple tables

in the POMEE study was used since the cutoff points for the percentile JSE-S scores differ as the students progressed through their undergraduate osteopathic medical education.

The longitudinal data set was analyzed using IBM SPSS version 26.0 software.[32] The data set itself is comprised of both categorical (DO Program Year, Class, Sex, Specialty Choice, and Core vs Non-Core) and numerical variables (BEES and JSE-S). When examining the values for skewness and kurtosis, it was determined that the BEES and JSE-S data could be viewed as normally distributed. Therefore, parametric methods were appropriate to use for analysis and thus provide the foundation for the results that follow.

Results

Figures 1 and 2 show scatter plots of BEES vs. JSE-S scores of three entering and graduating classes of osteopathic medical students, respectively. Within the green boxes in either figure are those students whose BEES scores are between -0.5 to -1.5 s.d. below the male or female population norm, and who have JSE-S scores at or above the 75th percentile compared to the POMEE study data.[30] During orientation to medical school (M1 timepoint) 15/345 students (4.3%) fell within those parameters, and just before graduation (M4F timepoint) there were 13/345 students (3.8%). (Note: In Fig. 2, one M4F student had the maximum JSE-S score of 140 and is considered an outlier and not was included with the green box.) Any students who fell to the left of the boxes had BEES scores that were lower than -1.5 s.d. from the population norm; even though some of their JSE-S scores were above the 75th percentile. Note that there are far fewer students with very low BEES scores upon entering medical school (Fig. 1) vs. those who are about to graduate (Fig. 2).

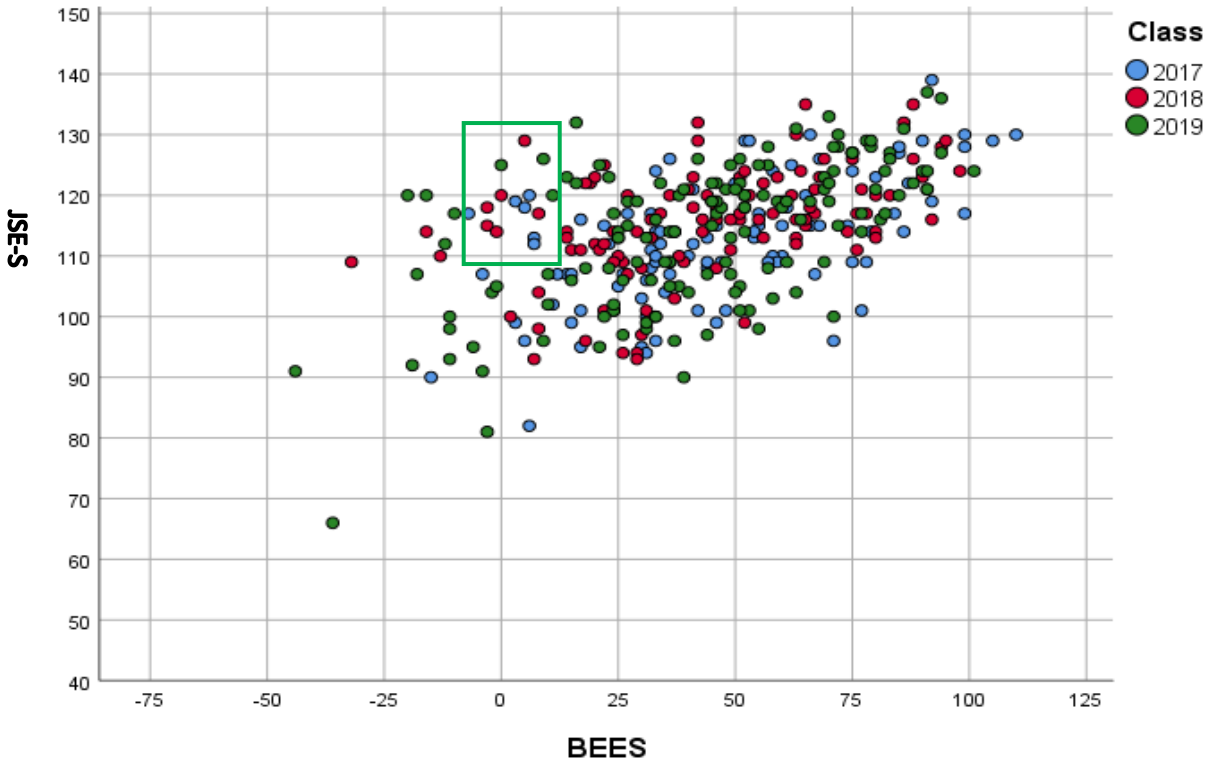

Figure 1. BEES vs. JSE-S scores during orientation to medical school (M1 timepoint in Figs. 3 & 4) for the CUSOM classes of 2017-2019. The green box encloses those students who have partially blunted affective empathy while maintaining their cognitive empathy.

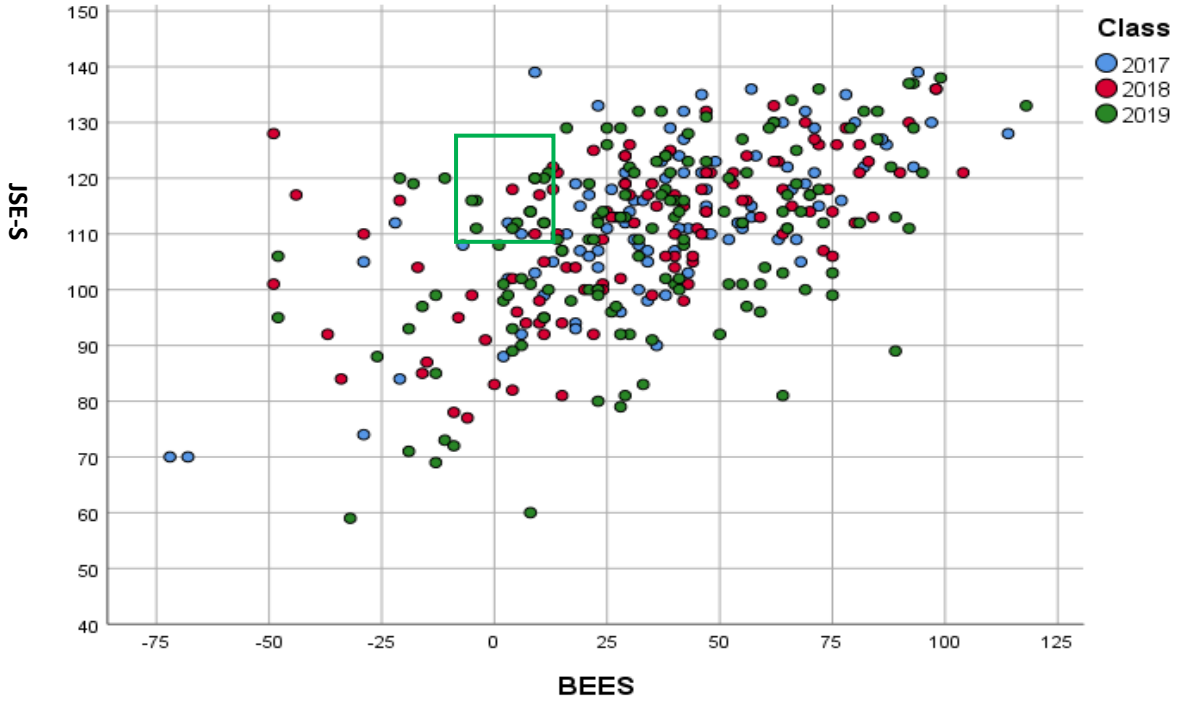

Figure 2. BEES vs. JSE-S scores just before graduation from medical school (M4F timepoint in Figs. 3 & 4) for the CUSOM classes of 2017-2019. The green box encloses those students who have partially blunted affective empathy while maintaining their cognitive empathy.

Overall, the M1 BEES and JSE-S scores are larger, and the data points are more compact when compared to the M4F timepoint. Those students who fell to the right of the green box had larger BEES scores, but not necessarily larger JSE-S scores. These individuals would have a greater affective empathic response, some with BEES scores >2.5 s.d. above the male and female norms, which is considered by the BEES classification scheme as being "very extremely high" affective empathy. Note the overall lower JSE-S scores of graduating students (Fig. 2) as compared to when they entered medical school (Fig. 1), and that the data points are less concentrated and are distributed over a larger area. Therefore, in general, BEES and JSE-S scores are lower after the students have completed their four years of undergraduate osteopathic medical education.

Figures 3 & 4 show the male or female students, respectively, who fell within both cutoff parameters (green and yellow shading) *at any timepoint* over the five times the surveys were given. (M1 = entering students, M2-M4 = start of the sophomore, junior and senior years, the M4F timepoint is just before graduation.) These are the male and female students who have partially blunted their affective empathy while maintaining or increasing their cognitive empathy. Almost equal numbers of men and women (20/169 men (11.8%) and 21/176 women (11.9%) qualified at one or more timepoints and represents 11.9% of the total cohort.

In Figs. 3 and 4, timepoints shaded in green are those students who maintained their cognitive empathy and blunted their affective empathy by up to -.99 s.d. below the population norm. Yellow shading are those students who blunted their affective to an even great extent (-.99 to -1.5 s.d. below the norm, while maintaining their cognitive empathy. Orange shading reveals those students whose JSE-S scores were at or above the 75th percentile, but whose BEES scores were lower than -1.5 s.d. below the male or female norms. Data points with no shading show students who had BEES or JSE-S scores that fell outside of both parameters and, therefore, did not qualify at that/those timepoint(s). These data are then compared to what specialty the students entered upon graduation (PGY-1 column). Specialties shaded in blue are those with little or no patient contact or continuity of care (i.e., Non-Core specialties). Those with no shading are considered as primary care specialties (i.e., Core specialties) with large amounts of patient contact and continuity of care.

There are 20 men (Fig. 3) and 21 women (Fig. 4) who fell within the parameters mentioned above. As shown in previous studies,[20,27,28] men are more likely to enter Non-Core specialties (blue shading) vs.

women. There are equal numbers of men and women who have BEES scores, at some point during their medical education, that are lower than -1.5 s.d. below the male or female population norms (orange shading). At these timepoints their affective empathy scores are so low that they may be considered as distant or uncaring by their patients. Note that for men, the number of these lower BEES scores gradually increases from the M1-M3 timepoints (n = 4/13) when compared to a concentration at the M4 and M4F timepoints (n = 9/13; 69%) which reflect those years students are in their clinical rotations. In contrast, women tend to better maintain their BEES scores after being exposed to patients in their clinical rotations (n = 6/13 low BEES scores; 46%). Indeed, upon graduation six men had very low BEES scores as compared to just two women. For men (Fig. 3), the number of very low BEES scores are concentrated during the last year of medical school, while the very low BEES scores for women (Fig. 4) are dispersed over a wider number of their medical education years.

M1	M2	M3	M4	M4F	PGY-1
-1.04	-2.50	-2.86	-2.79	-2.79	Family Medicine
-1.75	-1.04	-0.93	-0.50	-0.61	Emergency Medicine
-0.71	-0.75	-1.18	-0.93	-0.89	Emergency Medicine
0.14	-0.79	-0.96	-0.96	-1.82	Dermatology
-0.82	-0.39	-0.50	-0.64	-0.82	Diagnostic Radiology
0	-0.57	-1.25	-1.46	-1.79	Emergency Medicine
-0.93	0	-0.32	-1.39	-0.57	General Surgery
0.39	-0.29	-0.54	-0.96	-0.71	Family Medicine
-0.75	0.25	-0.54	-2.14	-2.07	Emergency Medicine
-0.54	0.29	0.32	-0.11	0	Internal Medicine
-1.04	0.32	0.18	1.39	1.64	Internal Medicine
-0.11	-0.71	-1.18	-1.07	-0.39	Psychiatry
-0.29	0	-0.07	-0.36	-0.54	Internal Medicine
-0.25	-0.68	-0.21	0.36	0.21	Psychiatry
-0.14	-1.43	-0.75	-0.57	-0.89	Anesthesiology
-1.50	-1.25	-1.21	-2.86	-2.79	Emergency Med
-0.96	-0.36	-1.32	-0.82	-0.57	Internal Med
-1.07	-0.86	-1.68	-0.93	-1.79	Radiology
-0.18	-0.61	-1.11	-0.54	0	Physical Med
-0.14	-0.32	-0.96	-0.86	-1.43	Psychiatry

Figure 3. Male JSE-S scores > 75th % from the POMEE study and BEES scores -0.5 to -1.5 s.d. off the population norm.[18,30] Some BEES scores may be in the above range, but the JSE-S score was not; ergo these M1-M4F cells have no shading.
Shadings: Green – meets BEES (-0.5 to -0.99 s.d. below the norm) and JSE-S parameters; Yellow – Meets BEES parameter (-1.0 to -1.5 s.d. below the norm) and JSE-S parameters; Orange – BEES is > -1.5 s.d. below population norm. PGY-1 year shading: Blue = "Technical, Non-Core specialties"; No shading = "Primary Care, Core Specialties".

Nine of the 20 male students (Fig. 3) fell within the parameters upon entering medical schools as compared to six of the 21 women. Of these individuals only two men and one woman still maintained their ability to fall within the parameters at the M2 timepoint, while the remainder did not. The results were variable with no discernable trend during the M3 timepoint that reflects the empathy scores after finishing the second year of the basic science courses and before clinical rotations have started. Upon completing the first year of clinical rotations (M4 timepoint) more of the men (7/21) were within the parameters vs. the women (5/21). This substantially changed upon completion of the last clinical year (M4F timepoint) where the number of qualifying women increased to eight, but the qualifying men dropped to five.

Of the 20 men that partially blunted their affective empathy while maintaining or increasing their cognitive empathy: 13 qualified at only 1 timepoint; 5 qualified at 2 timepoints; 1 qualified at 3 timepoints and 1 qualified at 4 timepoints. Nine entered primary care, and 11 entered specialties with little or no patient contact or continuity of care. Of the 21 women: 12 qualified at only 1 timepoint, and 9 qualified at 2 timepoints. None of the women qualified at 3 or 4 time points. Fifteen women entered primary care, and 6 entered the low or no patient contact specialties.

M1	M2	M3	M4	M4F	PGY-1
0.05	-0.57	-0.43	-0.86	-0.57	Family Medicine
-0.62	-0.43	-1.14	0.33	-1.76	Pediatrics
-0.29	-0.43	-0.67	-0.86	-0.62	Family Medicine
0.95	0.05	0.57	0.38	-1.00	Pediatrics
-2.14	-1.95	-1.71	-0.76	-1.43	Family Medicine
-0.24	-1.19	1.33	0.48	-0.19	Psychiatry
-1.24	-0.76	-2.00	-2.14	-1.43	Psychiatry
-1.05	-1.48	-0.76	-2.00	-1.33	Dermatology
-0.67	-1.10	-0.19	-0.57	0.38	Internal Medicine
-0.86	-1.71	-1.90	-1.19	-1.62	Pediatrics
-0.33	-1.67	-0.86	-0.95	-0.95	Emergency Medicine
-0.14	-1.33	-1.00	-0.62	-1.33	Family Medicine
-1.86	-1.24	-1.90	-0.33	-1.05	Internal Medicine
-0.52	-0.57	-0.38	-1.05	-1.00	General Surgery
-0.38	-0.76	0.38	-1.76	-1.00	Radiology
1.52	1.24	-1.10	-0.67	-0.86	Internal Medicine
-1.14	1.19	1.10	-0.24	-0.86	Internal Medicine
-0.38	-0.50	-2.76	-1.71	0.76	Neurology
0.14	-0.67	-0.43	-1.24	-0.24	Anesthesiology
0.57	-0.10	-0.71	-0.33	0.33	Family Medicine
-0.43	0.38	0.10	-0.19	-0.62	Internal Medicine

Figure 4. Female JSE-S scores > 75th % from the POMEE study and BEES scores -0.5 to -1.5 s.d. off the population norm.[18,30] Some BEES scores may be in the above range, but the JSE-S score was not; ergo these M1-M4F cells have no shading.
Shadings: Green – meets BEES (-0.5 to -0.99 s.d. below the norm) and JSE-S parameters; Yellow – Meets BEES parameter (-1.0 to -1.5 s.d. below the norm) and JSE-S parameters; Orange – BEES is > -1.5 s.d. below population norm. PGY-1 year shading: Blue = "Technical, Non-Core specialties"; No shading = "Primary Care, Core Specialties".

Discussion

Empathy changes in the didactic and clinical years of training

In Figs. 3 and 4, the M2 and M3 timepoints represent the changes that occurred in the first and second years of the basic science training. During these first two years, the students are exposed to standardized patients to practice communication and empathic skills. The M4 and M4F timepoints represent changes in empathy scores what occurred during their third and fourth year of clinical rotations where they are encountering actual patients.

For those students who demonstrated divergent empathic skills, males (Fig. 3) dropped from nine individuals upon entering medical school (M1 timepoint) to three individuals at the M2 timepoint, indicating that the first year of medical school experiences caused six of the students to have their affective and cognitive empathy scores to change beyond the desired parameters. One of the men had divergent scores at both the M1 and M2 timepoints. In one sense, the women fared better with six individuals entering medical school having the desired parameters, and increasing to seven once they completed their first didactic year of medical school (Fig. 4). Like the one man, one woman had the empathic divergence at both the M1 and M2 timepoints. However, three women at the M2 timepoint had over blunted their affective empathy as compared to one man (orange shading).

After finishing the second year of medical school (M3 timepoint in Figs. 3 and 4) the men rebounded to six who met the parameters, but the women fell to four individuals. Considering the very low numbers of students who met any of the parameters, any suggestion as to why this difference occurred is unknown and an attempt to give an explanation would be pure speculation.

It was hoped that once students started their clinical rotations, that the divergence in empathy scores would become more apparent. This was not the

case. Whereas seven men had divergent empathy scores after finishing the first year of clinical rotations (Fig. 3; M4 timepoint), this dropped to just five right before graduation. In addition, after finishing their second year of clinical rotations (M4F timepoint) the number of men who over blunted their affective empathy was the largest (n = 6/20) seen at any of the five timepoints. Prior to the M4F timepoint, there were only seven individual timepoints among four men who had over blunted affective empathy scores while maintaining their cognitive empathy scores (orange shading).

Among the 21 women who qualified at any timepoint, five met the parameters after finishing their first year of clinical rotations (Fig. 4; M4 timepoint), and this increased to eight women just before graduation. Unlike the men, only two women over blunted their affective empathy just before graduation. Prior to the M4F timepoint, there were 11 separate timepoints among eight women who had over blunted affective empathy scores while maintaining their cognitive empathy scores (orange shading).

Once the clinical rotations started, for men, nine of the 13 over blunting timepoints occurred after seeing patients. For women, six of the 13 instances of over blunting affective empathy occurred after seeing patients during clinical rotations (M4 and M4F timepoints). Although the "n" is very small, this suggests the didactic years had a greater impact on women (n = 4/21) over blunting their affective empathy while still maintaining cognitive empathy vs. the men (n = 2/20); and that women were better at meeting the desired parameters than men after the clinical rotations were started.

Too much affective empathy can lead to burnout

For students who have much larger BEES scores. i.e., > 1.5 s.d. above the population norm, it is possible they may be more prone to job burnout than those who have lesser scores.[14,21] This is especially true for women who prefer to enter the people-oriented, primary care specialties. Female medical students have been shown to have BEES scores larger than male scores,[27,28] and this increased amount of affective empathy puts women at a greater risk of depression, anxiety, emotional exhaustion, and burnout than their male counterparts.[33-36] This is where learning to partially blunt an affective response becomes a useful skill to have learned so the health care provider does not "take home" the problems and issues they encounter while seeing non-complaint patients or dealing with an unavoidable patient death.

Too little affective empathy hardens the heart too much

Those students who have very low BEES scores, i.e., lower than -1.5 s.d. below the population norm, can be very competent physicians but may be considered by their patients as being distant, uncaring, and having a poor bedside manner.[37,38] However, this very low amount of affective empathy can be emotionally protective for the physician who has learned to not let patient suffering, or pain they may be inducing on the patient, to negatively impact their use of painful procedural treatments on a patient. In this regard, affective empathy involves the CNS pain axis,[15,16] and witnessing pain naturally causes a vicarious empathic response.[39] Studies have shown that physicians who, by necessity, must perform a painful procedure on a patient, rate the pain they are inducing as less than individuals who are not physicians.[40,41] Also, previous research has shown those male or female graduates who desire to enter residencies that are more procedure-oriented, e.g., various surgical specialties, have lower BEES scores than those who enter people-oriented, primary care specialties.[20,27,28]

Empathic divergence is preferable

Although partially blunting an affective empathic response is preferable for physicians, during their medical education they must still learn to have effective empathic communication with the patient to establish the empathic bond of trust. As an example, calm, reassuring empathic communication needs to occur within an Emergency Department during an event where the attending physician, via their affective response, understands the dire condition of a patient. In this scenario, the physician needs to blunt their affective response to be able to effectively treat the patient vs. worrying about their own heightened emotional state, and to be able to use cognitive empathy to communicate to the patient that the health care team will do their best for the patient, even though the physician may feel the patient will not survive. Unfortunately, only a disappointingly small number of students fall within the designated parameters upon entering medical school and just before graduation.

Specialty choice vs. possessing divergent empathy

The data in Figs. 3 and 4 show that just before graduation (M4F timepoint) 20% of men and 28% of the women entered primary care specialties with internal medicine being the predominant choice. It is this small cadre of students who possess the desired

abilities to partially blunt an affective response while maintaining the ability to use cognitive empathy to respond to patients. However, most primary care specialties do not have the physicians directly use techniques that cause pain to the patient; instead, the patients are referred to specialists who sometimes need to use painful techniques. Therefore, students entering primary care specialties may not need to use the desired ability to blunt affective empathy as much as those who enter procedure-oriented specialties with little or no patient contact.

Unfortunately, specialties where physicians do induce pain, or deal with critically ill patients, e.g., surgical specialties, orthopedics, who would potentially benefit the most by acquiring an empathic divergence were not among the selected specialties. Instead, those men and women who had over blunted their affective empathy upon graduation (orange shading in Figs. 3 and 4) entered pediatrics emergency medicine, radiology or dermatology.

There is a need for curricular change

The results of this study indicate that the didactic and the clinical aspects of the curriculum need to enhance the teaching of empathic skills to the medical students and to make basic scientists and clinicians aware of this need. Most medical students in their preclinical years of training look upon curricular subjects that are not a basic science course as being somewhat ancillary to their medical education, low on their priorities for perceived importance, and not well integrated into the clinical years.[42-44] This misperception needs to be addressed by inserting into the curriculum sessions where communication skills and opportunities to heighten a student's awareness of what patients may be experiencing. This needs to be continually reinforced with a thorough explanation of the importance of the sessions, and by making sure that graded course credits are assigned to those courses that help teach empathy. Furthermore, in the preclinical years, basic scientists can be more understanding/empathetic of the pressures the medical students experience as they master the didactic content. This can be especially true for faculty who teach dissection in the gross anatomy laboratory, where many students are experiencing an interaction with a cadaver for the first time.

Clinicians, whom the students generally respect more than faculty with PhDs, are in a better position to teach empathic skills either by direct teaching or by being good role-models to be emulated by students. Yet, when teaching and displaying empathic skills by clinicians is needed most,[45-47] many studies have shown a dramatic decline in affective and cognitive empathy after finishing the first year of clinical rotations.[6-8] Therefore, it appears the students in clinical rotations are not being exposed or taught empathic skills

A partial solution?

There are multiple ways in which increasing cognitive empathy can be taught. Riess and Kraft-Todd, in 2014,[48] proposed the use of their EMPATHY program to highlight the importance of teaching cognitive empathy skills, with the acronym standing for: Eye contact; Muscles of facial expression; Posture; Affect; Tone of voice; Hearing the whole patient and Your response. Other researchers have shown that cognitive empathy can be increased,[49] but it appears the effects are not long lasting and have to be repeated.[50,51] This can be helped by having authentic role-model physicians the students can emulate vs. being prejudiced by the insidious hidden curriculum as revealed by Hafferty.[5] Dr. Harden gives examples on how to deliver bad news in a more empathic fashion.[52] It is possible these interventions may be more effective on women since they have been shown to have higher cognitive empathy scores and are better at communicating their empathic understanding to patients than men.[6,8,20,53]

Increasing affective empathy can be taught by using simulations on students. For example you can increase their awareness of what it is like to be an elderly patient by having the students wear glasses smeared with grease to imitate visual impairment, to plug their ears to imitate hearing loss, or to get about in a manual wheelchair to understand the obstacles a paraplegic experience in daily life, etc.[54,55] Dr. Hojat has suggested ten ways to enhance cognitive or affective empathy, and these measures include improving interpersonal skills, audio- or video- taping of patient encounters, exposure to good role models, shadowing patients, participating in hospitalization experiences, Balint training, etc.[4]

Most, or all, of these interventions designed to increase cognitive or affective empathy are time consuming, some taking several days,[56] and take time away from other curricular activities the administration or faculty may not want to reduce. Nevertheless, they will be of value to students and patients when they start their clinical rotations and when they graduate to start their medical career. Although curricular interventions may be useful,[57] instead of inserting interventions into the curriculum, one possible option is to be preemptive and to admit applicants that have higher levels of cognitive empathy and are more "people-oriented". In this

regard, Hojat and colleagues have proposed the use of the attitudes toward osteopathic medicine scale (ATOMS) that can be given during the application process.[58] Although an administration of a survey during the interview process is also time consuming, this could be used by those medical schools who desire to produce more primary care physicians, e.g., osteopathic schools, vs. those schools where most graduates enter the more technical- or procedure-oriented specialties.

Limitations

This study was performed at a single osteopathic medical school, so the results may not be entirely applicable to other medical schools. The cutoff points for BEES and JSE-S scores were solely determined by the authors based on their previous studies of changes in empathy among allopathic and osteopathic medical students.

Conclusions

One goal for any program that teaches health professionals should be to empower the students with the ability to have a certain amount of detached affective empathy while promoting the use of cognitive empathy to build a physician-patient bond of trust. There is the desired divergence of empathy scores on at least one of the five timepoints in a small subset of students that constitute 11.8 % of the participating cohort (41/345 graduates). However, upon graduation only five men and eight women (3.8% of the cohort) had BEES and JSE-S scores that revealed a likely useful partial blunting of affective empathy while maintaining or increasing their cognitive empathy scores. Whereas six men and two women out of this cadre graduated with BEES scores that were lower than -1.5 s.d. off the male and female population norms, suggesting they have hardened their heart to the extent that patients may view them as uncaring or distant.[14,21] These results infer more emphasis needs to be placed in the didactic years and clinical rotations on teaching and showing students how to build a cognitive empathic bond of trust with patients while blunting deleterious affective responses.

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