Can the Medical Humanities Make Trainees More Compassionate? A Neurobehavioral Perspective

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In recent years, the medical humanities have been increasingly incorporated into medical school and residency curricula. However, medical humanities interventions have been criticized for being amorphous in their objectives and outcomes. We argue that, though limited, emerging evidence on the neurobehavioral construct of empathy and the effects of humanities-based interventions on such a construct might provide a path forward in terms of operationalizing medical humanities education. To do so, we examine existing evidence suggesting medical humanities education may increase medical trainee empathy and then contextualize this evidence in a discussion of the neurobehavioral basis of the relationship between empathy and the humanities.

The Medical Humanities: What They Are, and Why We Need Them

The medical humanities involve the study and/or practice of various humanistic endeavors (such as law, history, and philosophy) and arts (including music, visual, literary, and performing arts) in relation to healthcare. Although the medical humanities constitute an emerging field, medicine and the humanities have been linked since antiquity [1]. Many of the great physicians of pre-modernity (Aristotle, Hippocrates, Maimonides, and Chekov, among others) exerted influence not only in medicine but also in the arts and humanities, positioning medicine as part of—rather than separate from—intellectual and cultural life. More recently, American physicians up until about the mid twentieth century were often

closely integrated into their communities, standing as examples (at least in theory) of moral rectitude, and providing personalized, humanistic care to multiple family members—in the home, in the hospital, and over the lifespan.

However, in the mid to late twentieth century, the humanistic aspects of medicine became increasingly deemphasized. Medical specialization and sub-specialization, rapidly evolving technologies, and the hegemonic biomedical model of medicine came to define medical progress, with more humanistic aspects of medicine receding into the background. Furthermore, system-level issues in the practice of medicine have placed increasingly restrictive documentation and administrative burdens on physicians. And the ever-expanding financial pressures of large health systems have decreased the quantity of time physicians have to spend with and think about patients in a humanistic frame. The results of these shifts in medicine include the decline in the traditional doctor-patient relationships, the emergence of challenging new ethical dilemmas, an increase in systemic restrictions and requirements, and mounting dissatisfaction with the experience of medicine among both patients and clinicians [2].

Perhaps in response to these factors, over the past several decades, there has been a resurgent interest in medical humanities [1]. Medical humanities have become an increasingly visible part of medical education, scholarship, and practice. For instance, the Association of American Medical Colleges is currently in the second phase of a broad project to “better delineate the current landscape of the arts and humanities in medicine and determine how best to approach a broader effort to integrate them,” involving a review of current practices and the formation of a humanities “integration” committee to direct medical humanities education [3]. Proponents of the medical humanities suggest that humanistic engagement may offer a plethora of benefits to physicians and medical students, including improvements in medical acumen, deeper connections with patients and colleagues, and more personal satisfaction in the practice of medicine [1, 4].

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However, even as the medical humanities have become *de rigueur* in medical education, critiques have mounted: The medical humanities are perceived by many to be too impressionistic and lacking in objective outcome measures to justify their practice. In response to such critiques, one might argue that part of the humanities' intrinsic worth is its resistance to the measurable, objective outcomes that are given primacy within the biomedical framework. Nonetheless, the continued evolution of the medical humanities is contingent on justifying them in an epistemic age of data, evidence, and outcomes [5, 6].

Do the Medical Humanities Impact Empathy?

Proponents argue that the medical humanities can confer a plethora of benefits to trainees and practitioners, including facilitating personal and professional growth, enhancing meaning, and improving interactions with patients [7]. Perhaps the most consistently cited benefit of the medical humanities interventions is increased empathy [8]. Empathy is the capacity to cognitively and affectively experience a reaction congruent to the observed experiences of someone else [9], or put more simply, “the ability to share the feelings of others” [10]. Empathy is critically important in the practice of medicine; more empathetic physicians are less prone to burn-out and error-making [11]. And their patients—in general—are more adherent to treatment, have better outcomes, and report subjectively better experiences of their care [12]. Empathy is not a static trait; it can rise and fall over time. Unfortunately, evidence suggests that medical training is associated with a decline in empathy over time [13, 14].

Research as to whether medical humanities interventions can increase empathy is limited; sample sizes in relevant studies are often small, there is generally a lack of robust pre- and post- intervention data, and measurement tools tend to be qualitative (e.g., surveys, Likert scales, focus groups). However, these caveats notwithstanding, there exists a body of data suggesting that humanities-based interventions may increase clinician and trainee empathy [15, 16]. These data exist across a range of interventions, including narrative medicine experiences (e.g., close reading and reflective writing interventions), which have been shown to increase participants' subjective sense of empathy and increase their scores on the Jefferson Scale of Empathy—a validated and broadly used empathy scale [16–19].

Although research on the relationship between the health humanities and empathy seems to focus on narrative medicine, there are also some studies examining the impact of other types of medical humanities. For example, internal medicine residents at Virginia Commonwealth University who received training sessions led by theater professors (who taught techniques related to listening, empathizing, body language,

breathing, and speech) demonstrated significant improvement in empathic communication (as rated by observers) when compared with peers who did not receive the same training [20].

While the level of evidence that medical humanities activities increase clinician empathy remains modest, we will point out that there is an intriguing parallel line of inquiry into empathy and the humanities emerging from neuroscience and suggest that findings from neuroscience support deeper and more robust inquiry into how much (and how) medical humanities may bolster empathy among clinicians.

Towards a Mechanistic Understanding of Empathy

Empathy has been an area of increasing interest to evolutionary biologists and neuroscientists. It is believed that empathy confers advantages to both groups and individuals. By allowing one person at least partial access to the experience of another, empathy would seem to promote pro-social, helping behavior and the pursuit of shared goals (a benefit to the group), while also allowing the empathic individual to more accurately anticipate the actions of others (potentially a benefit to the self) [10, 12, 21].

Studies show that witnessing another person's pain can promote activation of the same brain areas associated with the experience of pain in the brain of the witness [10, 21, 22]. The regions of the brain most implicated in this phenomenon—the anterior cingulate cortex (ACC) and the anterior insula (AI)—are highly interconnected, and their activity has been extensively studied, specifically in the context of human suffering. The ACC, AI, and other brain areas are active not only when we are in pain (i.e., if our hand is plunged into a bucket of ice water or if we receive an electric shock) but also when we see someone whom we love experiencing an electric shock, or even when we see facial expressions of people who are in distress [10, 23–25].

This notion that empathy “happens” when we activate neural networks that are also active in the person with whom we are empathizing squares soundly with the etymologic origins of the word “empathy” (from the Greek *em* and *pathos*, literally *in feeling*). Intriguingly, differences in functional magnetic resonance imaging (fMRI) activity in brain areas thought to be related to empathy seem to correlate with clinical measures of empathy: Compared with people with low empathy, people who score highly on self-report empathy scales seem to have proportionally more activity in the ACC and AI when they see another person in pain [10].

The ACC and AI are not the only brain areas thought to be involved in empathy. Other implicated neural systems include the mirror neuron network (roughly localized to the premotor cortex and the parietal lobe), which is thought to include

visuomotor neurons that fire when we engage in a physical action, and when we see others perform the same action [26]. Humans are also thought to possess mentalizing or “theory of mind” networks that enable us to conceptualize the thoughts and motivations of others [10].

Behavioral Neuroscience Supports the Idea That Empathy Can Be Taught

While neuroscientists used to conceive of empathy as a static, in-born trait, emerging research suggests that empathy is actually a learnable, “neurobiologically based competency” [12]. To take a medically relevant example from the literature, a cohort of otolaryngology residents who received three 90-min sessions of empathy training (which included information about the neurobiology and physiology of emotion) reported feeling more empathy towards patients, both immediately after the training, and a year later [27]. Admittedly, this study is limited by the fact that the data is drawn from self-report measures. However, there is evidence to suggest that empathy-related training increases not only self-reported empathy but also activation of relevant brain structures. For example, fMRI studies suggest that experienced practitioners of loving-kindness meditation (which, among other things, involves focusing on feelings of compassion for other people) exhibit more insula activity than novice meditators when they hear sounds of a person in distress [28].

Understanding empathy as teachable, coupled with appreciation of the benefits of empathy to medical practice, suggests that fostering empathy ought to be a priority within medical training. Research related to education, human development, and neuroscience is indeed demonstrating that engagement with the humanities may increase empathy and related aspects of social cognition, such as mentalization (the ability to understand mental states) [15, 16, 29–31]. In particular, the effects of fiction-reading on empathy have been well studied. Adults who read more fiction as part of their everyday lives appear to be more empathetic than their peers who read less; they score higher on empathy self-report scales, and they are better able to decipher what other people are feeling (a skill that can be roughly tested with the “Reading the Mind in the Eyes” test, in which a person is asked to determine someone’s affective state based on a cropped image of a face showing only the eye region) [32].

Functional MRI data supports this idea that fiction-reading and mentalization are interrelated. The so-called narrative comprehension network overlaps with neural networks thought to be involved in theory of mind. Shared regions among these networks include the medial prefrontal cortex, bilateral posterior superior temporal sulcus, and the anterior temporal regions [30, 33]. Many of these areas are also part of the default mode network (DMN), which is active when we

are contemplating things outside of the immediate present—i.e., the future, the past, hypothetical events, and imagined places. Which is all to say that our capacities to wonder, speculate, and put ourselves in another person’s shoes—whether said shoes are real or imagined—seem to localize (roughly) to some of the same brain areas.

Intriguingly, fMRI data suggests that activity in these areas (in particular, a subnetwork of the DMN) may mediate the association between reading more fiction and having better mentalization skills. This invites the question: Can reading fiction train people to be better empathists? While one could argue that people who read more fiction are better at empathizing simply because they are more interested in contemplating the inner lives of others to begin with, it appears that the experience of reading fiction actually can improve a person’s empathic abilities, at least in the short term. Among a group of adults assigned to read a piece of short fiction, nonfiction, or nothing, the adults assigned to read fiction scored better on measures of empathy and theory of mind. Interestingly, the effects demonstrated by such studies are largely limited to literary fiction (as opposed to popular fiction or nonfiction) [29]. This may be due to literary fiction’s emphasis on describing and making sense of characters’ emotions and experiences; it challenges readers to perform some of the same mental processes that we go through when we are trying to make sense of another person’s inner life. These data suggest that the act of reading literary fiction may reinforce the neural networks underlying empathy.

Reading may also improve empathy through a second means. Empathy is not an “equal-opportunity” phenomenon; individuals have a tendency to experience greater empathy for individuals whom they perceive as being similar to themselves [12]. Studies show that empathic concern can be elicited by a sense of likeness to another person and also by a sense that another person has “value” (i.e., is virtuous or helpful), even if they are otherwise different from oneself [12, 34]. It stands to reason, then, that engagement with the humanities may bolster empathy by enhancing one’s concrete social knowledge, particularly about people from different backgrounds. This may render the experiences of others more accessible, potentially helping people enhance their sense of likeness to a wider range of fellow humans. The humanities may also serve to broaden and strengthen our sense that “others” have moral and characterological traits worthy of being valued, and thus empathized with.

Conclusions

Despite their increasing dissemination, the medical humanities suffer criticism for lack of operationalized objectives and measurable outcomes [5]. These critiques have generated an interest in measuring the effect of medical humanities

interventions. The potential ability of the medical humanities to increase empathy (the capacity to share in the experiences of others) is potentially one such objective and outcome. Limited evidence from existing literature suggests that empathy may be increased by the health humanities. And evidence shows that empathy is associated with myriad benefits for both clinicians and patients.

By bolstering existing medical humanities evidence with literature on the neuroscience of empathy, we can arrive at the provocative idea that the humanities may be a means to enhance clinician empathy. The neuroscientific literature posits convincingly that empathy is a teachable competency with an identifiable neural signature and suggests that humanistic endeavors—such as engagement in fiction—increase empathy. Indeed, the existing literature suggests that as we engage with humanistic work depicting and exploring the experiences of others, we are literally training our brains to recognize and share in other peoples' experiences. Using the models and methods of neuroscience in studying the medical humanities may strengthen our ability to measure and optimize interventions and lend credence to the hypothesis that humanistic educational interventions increase empathy in the clinical setting.

However, empathy and the medical humanities can only have a place in medical training and practice if space is made. In many respects, our existing systems of healthcare allow healthcare providers to spend less and less time with patients, while adding on documentation and other clerical burdens that threaten to increase already high rates of physician burnout. A humanistic approach to training and clinical care and an emphasis on empathy are contingent not only on data, but also on systems of care that allow for those participating in such interventions to benefit from them and to practice accordingly.

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Compliance with ethical standards

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