



The Journal of Education in Perioperative Medicine

ORIGINAL RESEARCH

I Read, Therefore I Am: Examining Nonmedical Reading and Its Relationship to Empathy in Anesthesia Training

JENNY E. PENNYCUFF, MD, MS
DANIEL RUIZ, MD
ALLISON MULLINS, MD

JESSE D. SUPERNAW, MD, BS
JAYALAKSHMI PULIPAKA, BS
CLARK R. ANDERSEN, MS

M. JAMES LOZADA, DO
PRAMEELA KONDA, MD
MICHELLE SIMON, MD

INTRODUCTION

Empathy is the action of understanding and vicariously experiencing the feelings, thoughts, and experiences of another person.¹ Physicians who form empathetic connections with their patients are perceived as providing better care.² Studies have found an association between resident empathy and improved patient experiences and outcomes^{2,3}; however, during medical school and residency, empathy levels decline.² Because empathy evolves from experience, it is possible that physicians in training who participate in activities outside of medicine, such as reading for leisure, may have increased exposure to empathy scenarios. This practice can provide the foundations for increased empathy and, in turn, improved patient experiences and outcomes.

Neumann et al.³ hypothesized that a high workload, social support problems, and mistreatment by superiors are all key determinants of empathy decline. These are all factors that residents and fellows may experience during training. A survey of health science students found most students felt that reading books helped them to develop empathy, yet time constraints and fatigue were barriers to leisure reading.⁴ Bal and Veltkamp⁵ described how readers of fiction might practice empathy using fictional narratives or stories, which allows readers to identify with characters, and even

become emotionally involved in the events. With this transportation into the fictional narrative, readers vicariously feel and process emotions of characters, which is the practice of empathy.⁵ Bal and Veltkamp⁵ found that students who experienced transportation into the fictional narrative had increased levels of empathy over time. This increase in empathy was thought to allow for the reader to sympathize more with others.⁵ In physician-patient relationships, empathy bridges the gap between the physician's self-experience and plays a significant role in patient satisfaction and clinical outcomes. For example, in the case of a common cold, physician empathy is a significant predictor of illness duration and severity.³ With these facts in mind, it is possible that medical trainees who take part in fictional narratives may be more able to practice empathy. Moreover, the decrease in empathy as mentioned by Neumann et al.³ can possibly be protected through the reading of fictional narratives.

The primary aim of our study was to determine if trainees who self-reported nonmedical leisure reading were more empathetic based on Toronto Empathy Questionnaire (TEQ) score compared with residents who reported no leisurely reading.⁶ We hypothesized that trainees who spend more time engaging in nonmedical leisure reading are more empathetic. The secondary aim of our study was to determine if empathy scores

are associated with the postgraduate year (PGY) of training. We hypothesized that empathy scores would be lower as clinical training progressed.

MATERIALS AND METHODS

Procedure

This study was institutional review board exempted by the University of Texas Medical Branch-Galveston. An email with the survey link to our questionnaire was distributed to program directors (PDs) at Accreditation Council on Graduate Medical Education (ACGME)-accredited anesthesiology residency and fellowship programs. The list of PDs was obtained from the public database located on the ACGME's website.⁷ The email link instructed PDs to distribute the survey to current residents and fellows. PDs were not instructed to report if the survey was distributed to trainees. Potential study participants were informed that the purpose of the study was to "learn more about anesthesia resident and fellow empathy in relationship to extracurricular activities conducted." The survey was formatted using SurveyMonkey by Momentive Inc. PDs were also sent an email containing a consent statement as well as institutional review board approval for the questionnaire. The survey link also contained a statement for consent for participation and publication of responses.

continued on next page

continued from previous page

A statement of consent was deemed necessary to assure the trainees that the survey was entirely voluntary and had no effect on their educational status. The survey link remained open and active for a period of 4 weeks, with 1 reminder email being sent to complete the survey. After the 4-week data collection period, the survey link was deactivated, and data analysis was started. Responses were collected on a unique account created specifically for this project. The information was secured by password protection and all survey responses were de-identified before being shared with University of Texas Medical Branch-Galveston biostatisticians.

Population

The total number of potential subjects was approximately 6346 residents and fellows, with a study goal of 10% response rate. Inclusion criteria for this study were that the participants be United States anesthesiology residents and fellows currently enrolled in an ACGME-accredited program. Residents and fellows at every level of training were sent the survey, and those who completed the survey questionnaire were included in the study results. Participants were excluded from the study if they were a resident or fellow not currently enrolled in an ACGME-accredited anesthesiology program. Partial survey responses were excluded so as to not skew the data analysis.

Survey Instruments

The TEQ was used to determine the level of empathy of trainees. This questionnaire consists of 16 questions that encompass theoretical facets of empathy. These domains are the perception of an emotional state in another that stimulates the same emotion in oneself, assessing the emotional state of others by indexing the frequency of behaviors demonstrating appropriate sensitivity, emotion comprehension, sympathetic physiological arousal, and altruism. Of these questions, 8 of them are scored negatively. For the positively scored items, the Likert scale is scored as follows: *Never* = 0; *Rarely* = 1; *Sometimes* = 2; *Often* = 3; *Always* = 4. The negatively scored items are reverse scored. The highest score for the TEQ is 64, with higher scores indicating higher levels of empathy.⁶

Statistical Analysis

Results of the survey were examined using logistic regression, multivariable analysis (relative risk and odds ratio), and bivariable analysis (absolute risk difference and relative risk) as was appropriate. Univariate summaries of demographic and other variables were provided including means and SDs or counts and percentages. TEQ score was modeled by a multiple variable regression model with relation to sex (female versus male), duty hours (40-60, 60-80, or 80-100 hours per week), training year (PGY-1, PGY-2, PGY-3, PGY-4, PGY-5 or greater), time spent reading (none/zero, less than 1 hour, about 1-2 hours, about 3-4 hours, about 5-6 hours, more than 6 hours), and avid reader status (no versus yes). More complex models with the addition of other variables including age, relationship status, residency year, and time spent at home were ruled out due to yielding worsened models per higher Akaike Information Criteria. A 95% level of confidence was assumed ($\alpha = .05$). Statistical analyses were performed using R statistical software (R Core Team, 2019, version 3.6.0). Catseye plots⁸ were produced using the catseyes package.⁹

RESULTS

Of 136 responses received, 119 were included for data analysis and 17 partially completed surveys were excluded. The mean age of respondents was 31.1, with 41 of 119 women and 78 of 119 men (Tables 1 and 2). There were responses obtained from trainees from the years PGY-1 ($n = 23$), PGY-2 ($n = 24$), PGY-3 ($n = 34$), PGY-4 ($n = 32$), and PGY-5 or more ($n = 6$) (Table 2). There were 30 trainees who indicated they worked between 40 and 60 hours per week, 79 trainees who indicated they worked 60 to 80 hours per week, and 10 trainees who indicated they worked 80 to 100 hours per week (Table 2). In terms of time reading, there were 12 of 119 (10%) who reported spending no time reading, 31 of 119 (26%) who reported spending less than 1 hour reading per week, 36 of 119 (30%) who reported spending about 1 to 2 hours reading per week, 24 of 119 (20%) who reported spending about 3 to 4 hours reading per week, 8 of 119 (7%) who reported spending about 5 to 6 hours reading per week, and 8 of 119 (7%) who reported reading more than 6 hours per

week (Table 2). Seventy-four respondents noted themselves to be avid readers, which is defined as reading approximately 2 or more books a year. Forty-five respondents noted themselves to not be avid readers (Table 2).

The mean TEQ score for all respondents was 46.1 (Table 1). The mean TEQ score for woman and men were 50.2 and 43.8, respectively, with women being more likely to have a higher TEQ score ($P < .0001$) (Table 3). Trainees who worked between 40 and 60 hours per week, 60 to 80 hours per week, and 80 to 100 hours per week had a mean TEQ score of 45.0, 48.8, and 47.2, respectively (Table 4). TEQ scores for residents with duty hours of 60 to 80 hours per week exceeded those working 40 to 60 hours per week by 3.8 units ($P = .035$), as summarized in Table 4. There was no significant evidence of differences to those working 80 to 100 hours per week compared with those working either 40 to 60 hours or 60 to 80 hours (Table 4). The multiple regression model suggests significant associations between TEQ score with duty hours ($P = .039$) and sex ($P < .0001$), as summarized in Table 5. There was no significant evidence of association with time spent reading or avid reader status, with P values of .16 and .85, respectively (Table 5). Statistical interpretation also did not find any significant association with year in training and empathy scores.

DISCUSSION

Although the results of our study did not confirm our initial hypotheses, the data collected from the survey responses presented some noteworthy findings. Female residents were more likely to be empathetic compared with their male colleagues ($P < .0001$). This finding is consistent with previous studies on empathy in orthopedic residents and board-certified physicians.^{10,11} Because of our small sample size, we recommend doing additional studies to determine if this gender gap with empathy exists on a larger scale.

Not only did the trainees who worked 60 to 80 hours a week have the highest empathy scores, but they were also found to have higher empathy scores when compared with those who worked 40 to 60 hours a week ($P = .035$). This is particularly

continued on next page

continued from previous page

interesting because one would believe that working fewer hours would result in higher empathy scores because there is a perception of work-life balance. It is possible that trainees who work fewer than 40 hours do not have enough facetime to connect empathetically with patients. Another possibility is that trainees who are innately more empathic opt to work more hours so that they can have more of a connection with patients. Empathy is one of the characteristics of servant leadership.¹² Servant leadership is a model that focuses on serving the highest needs of others to help them achieve their goals.¹² This form of leadership in health care is beneficial because one's main goal as a servant leader is to help others, which in this term is the patient. Having high levels of empathy as a servant leader can help with interpersonal communication with patients. Productive conversations with patients are more likely to have an "empathetic listener" who fully concentrates and is invested in what a patient expresses.¹³ This in turn can lead to a strong bond or trust with a patient.

Conversely, it can be argued that the work culture of the training program can also negatively influence trainee empathy. Whether the difference in empathy level is based on resident drive, culture of the training program, or physical contact with patients cannot be determined with this study.

Limitations of this study consist of a smaller sample size that may not take into account the views of all residents and fellows. Given

the fact that trainees do not have ample free time, the response rate of the survey is what was expected. If further studies were to be done on this subject in the future, offering residents and fellows incentives (ie, gift cards) could increase the response rate. The lack of follow-up with PDs also did not allow for us to see how many individuals received the survey. Last, this study focused on physical books and electronic books. It is possible that trainees use audiobooks, and this could have led to participants selecting that they do not participate in nonmedical fiction reading.

By studying the effects of nonmedical reading on empathy in trainees, we were able to see that variables such as time spent reading, age, year in training, relationship status, and time spent at home had no correlation with empathy levels. We found that residents who have a higher number of duty hours, specifically 60 to 80 hours, had higher levels of empathy. These results suggest that there may be other intangible aspects to empathy levels that were not addressed in our research. Further studies should be done to determine what these factors may be, as well as the role that empathy can play in leadership in graduate medical education.

Acknowledgments

Clark Andersen assisted in the statistical review for this study.

References

1. "Empathy Definition & Meaning." *Merriam-Webster*. <https://www.merriam-webster.com/dictionary/empathy>. Accessed March 3, 2023.
2. Wilkinson H, Whittington R, Perry L, Eames C.

Examining the relationship between burnout and empathy in healthcare professionals: a systematic review. *Burn Res*. 2017;6:18-29.

3. Neumann M, Edelhäuser F, Tauschel D, et al. Empathy decline and its reasons: a systematic review of studies with medical students and residents. *Acad Med*. 2011;86(8):996-1009.
4. Watson EM. The importance of leisure reading to health sciences students: results of a survey. *Health Info Libr J*. 2016;33(1):33-48.
5. Bal PM, Veltkamp M. How does fiction reading influence empathy? An experimental investigation on the role of emotional transportation. *PLoS One*. 2013;8(1):e55341.
6. Spreng RN, McKinnon MC, Mar RA, Levine B. The Toronto Empathy Questionnaire: scale development and initial validation of a factor-analytic solution to multiple empathy measures. *J Pers Assess*. 2009;91(1):62-71.
7. Accreditation Council on Graduate Medical Education. *Data Resource Book: Academic Year 2017-2018*. Chicago, IL: Accreditation Council on Graduate Medical Education; 2018.
8. Cumming G. The new statistics: why and how. *Psychol Sci*. 2014;25(1):7-29.
9. Andersen, Clark R. *Create Catseye Plots Illustrating the Normal Distribution of the Means*. R Package Catseyes Version 0.2.5. <https://CRAN.R-project.org/package=catseyes>
10. Sabharwal S, Lin C, Weistroffer JK, LaPorte DM; and the Collaborative Orthopaedic Educational Research Group. Empathy Among orthopaedic surgery trainees. *JB JS Open Access*. 2021;6(3):e21.00041.
11. Gleichgerricht E, Decety J. Empathy in clinical practice: how individual dispositions, gender, and experience moderate empathic concern, burnout, and emotional distress in physicians. *PLoS One*. 2013;8(4):e61526.
12. Trastek VF, Hamilton NW, Niles EE. Leadership models in health care - a case for servant leadership. *Mayo Clin Proc*. 2014;89(3):374-81.
13. Stahel PF, Ahankoo N, Nguyen C. Servant leadership: an endangered species? *Patient Saf Surg*. 2022;16(1):9.

continued on next page

continued from previous page

Jenny E. Pennycuff is an Anesthesiologist in the Department of Anesthesiology at Michael E. DeBakey Veterans Affairs Medical Center in Houston, TX. **Daniel Ruiz** is a Pediatric Anesthesiologist at Mission Regional Medical Center in Mission, TX. **Allison Mullins** and **Michelle Simon** are Obstetric Anesthesiologists, **Prameela Konda** is an Assistant Professor of Anesthesiology, and **Jayalakshmi Pulipaka** is a Medical Student in the Department of Anesthesiology at The University of Texas Medical Branch-Galveston in Galveston, TX. **Jesse D. Supernaw** is an Anesthesiology Resident in the Department of Anesthesiology at Baylor Scott & White in Temple, TX. **Clark R. Andersen** is a Research Biostatistician in the Department of Biostatistics & Data Science at The University of Texas Medical Branch, Galveston, TX. **M. James Lozada** is an Obstetric Anesthesiologist in Houston, Texas.

Corresponding author: Jenny E. Pennycuff, MD, MS, Department of Anesthesiology, Michael E. DeBakey Veterans Affairs Medical Center, 2002 Holcombe Boulevard, Houston, TX 77030. Telephone: (713) 791-1414 ext. 26279

Email address: Jenny Pennycuff: Jenny.pennycuff@va.gov

Financial disclosure: None

Conflicts of interest: None

Abstract

Background: High levels of empathy among resident physicians are associated with improved patient outcomes. Empathy may be learned and practiced when reading nonmedical writing through narrative transportation, a process by which

readers identify with characters and become emotionally involved in the plot. We hypothesized that residents and fellows who reported more nonmedical reading would have higher empathy levels and that empathy would decrease during training.

Methods: An emailed survey was sent to program directors of Accreditation Council on Graduate Medical Education–accredited anesthesiology residency and fellowship programs, with a request to distribute the survey to trainees. The Toronto Empathy Questionnaire, reading volume, and demographics were included in the survey. Response data were analyzed using a multiple variable regression model.

Results: Of 136 responses, 119 were included for data analysis. Seventeen partially completed surveys were excluded. Higher empathy scores were reported among women ($P < .0001$) and residents who worked 60 to 80 hours per week ($P = .039$). Age, postgraduate year of training, relationship status, time spent with family, and avid reading were not significantly associated with increased empathy.

Conclusion: In this study, we examined whether nonmedical fiction reading would increase empathy in medical trainees. Our study was not able to find any significant association with time spent reading and increased empathy; however, we found that trainees who worked more hours, specifically 60 to 80 hours, had higher empathy scores. Limitations for this study included a smaller sample size. Further research should be done in this field to determine if there are other intangible factors that affect empathy in trainees.

Keywords: Empathy, residency training, well-being, patient care, humanities

continued on next page

continued from previous page

Tables

Table 1. Univariate Summaries of Age and TEQ Score

	Mean	SD	Median	Min	Max
Age	31.1	6.0	30	25	87
TEQ score	46.1	7.5	47	27	62

Abbreviations: TEQ, Toronto Empathy Questionnaire; Max, maximum; Min, minimum.

Table 2. Univariate Summaries of Demographics and Other Variables

	n	%
Sex		
Female	41	34
Male	78	66
Year		
1	23	19
2	24	20
3	34	29
4	32	27
5	6	5
Duty hours per week		
40-60	30	25
60-80	79	66
80-100	10	8
Time reading, hours per week		
None/zero	12	10
Less than 1	31	26
About 1-2	36	30
About 3-4	24	20
About 5-6	8	7
More than 6	8	7
Avid reader^a		
False	45	38
True	74	62

^aAs defined by reading approximately 2 or more books a year.

continued on next page

continued from previous page

Tables continued

Table 3. Model Estimates of the Sex Effect on TEQ Score

	Adj. Mean	SE	
Female	50.2	1.5	
Male	43.8	1.1	
	Contrast Estimate	SE	P Value
Female-Male	6.4	1.5	<.0001

Abbreviations: Adj., adjusted; SE, standard error; TEQ, Toronto Empathy Questionnaire.

Table 4. Model Estimates of the Effect of Duty Hours per Week on TEQ Score

	Adj. Mean	SE	
40-60	45.0	1.4	
60-80	48.8	0.9	
80-100	47.2	2.3	
	Contrast Estimate	SE	Tukey P Value
40-60 to 60-80	-3.8	1.5	.035
40-60 to 80-100	-2.2	2.6	.68
60-80 to 80-100	1.6	2.4	.77

Abbreviations: Adj., adjusted; SE, standard error; TEQ, Toronto Empathy Questionnaire.

Table 5. Analysis of Variance Table Summarizing the Multiple Regression Model Relating TEQ Score to Sex, Duty Hours, Time Spent Reading, and Avid Reader Status

	df	Sum Sq	Mean Sq	F Value	P Value
Sex	1	763.2	763.16	16.2032	<.0001
Duty hours	2	315.9	157.94	3.3533	.039
Time spent reading	5	359.4	71.89	1.5263	.16
Avid reader	1	1.7	1.66	0.0353	.85

Abbreviations: Sq, squared; TEQ, Toronto Empathy Questionnaire.