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Do medical students' assessments of a patient's pain vary significantly with gender and year of medical training?

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Art in Medicine

Abstract

Chronic pain is a common ailment among US adults and can lead to high cost of healthcare when not treated effectively. Unfortunately, studies show that characteristics of the patient population and physician may also influence their treatment of patient pain. Increased years of medical training is associated with a decline in empathy, which may be measurable by a decline in physician's assessment of patient's pain. Doctors with the least experience tend to underestimate their patient's pain. However, very little is known about medical students' assessment of patient-reported pain. The objective is to determine the significant differences in medical students' perceptions of a patient's pain, as witnessed in a short video, depending on years of medical training and/or gender. This is an observational study that was implemented through an anonymous survey conducted with all enrolled medical students from the Boonshoft School of Medicine. The survey asks respondents to answer a few demographic questions that include their level of education (medical school years) and their gender. Separate ANOVA evaluated differences across class years within males and females, and differences between males and females within class years. The results show that there was no statistically significant difference in perception of patient's pain between genders ($p = 0.051$). However, the only significant difference was the score between first and third-year students ($p = 0.023$). Perceived pain scores compared between gender and class year showed no difference in how males and females scored the patient's pain across all four classes. Reasons for the difference between the first and third years could be the difference in starting classes in the basic science, physiology, and pathology phase and beginning clinicals in the third year.

Introduction/Literature Review

The prevalence of chronic pain among adults is approximately 2-40%¹. Yet, current U.S. expenditures of pain management estimate to a total of \$560-635 billion, which is higher than the annual costs of heart disease, cancer, and diabetes². Reasons for costly pain management care include expensive medications, licensing, prescribing regulations, healthcare worker's lack of training, and cultural factors¹. For all these reasons, patients are not receiving effective pain management. This lack of care precipitates a lower quality of life and loss of productivity².

A physician's role in providing effective pain management begins with correctly assessing the magnitude of the patient's pain. When the physician fails to do so appropriately, the patient may continue to suffer, schedule additional doctor's appointments, and spend more time and money². Unfortunately, studies have shown that physicians often underestimate their patient's pain³⁻⁵. There are a variety of factors that influence a physician's perspective of patient's pain. Studies have revealed that recognition of patient pain is determined by patient gender, age, ethnicity, and level of pain reported^{6,7}. Women typically report more pain than men based on a numerical rating scale (NRS) from 0 to 10⁸. Patients scoring 0 had no pain, whereas patients with higher scores had more pain. The older the patient, the more it is likely that patient's pain will be undertreated⁹. However, it is important to note

that older patients score lower pain scores for certain kinds of illnesses such as renal colic, pancreatitis, appendicitis, and headache/migraine⁸. It appears that physicians are more likely to underestimate the pain in the elderly. Race also plays a role in pain assessment: physicians are more likely to underestimate patient pain in African Americans compared to White Americans⁴, but not when White Americans were compared with Hispanics¹⁰. Intensity of patient-reported pain influences a physician's assessment of patient pain. It has been shown that the more intense the pain the patient claims, the more the physician will underestimate it, whereas the less severe the patient complains of pain, the more the physician may overestimate it¹¹.

The characteristics of the physician may also influence their treatment of patient pain. A study finds that deficits in knowledge, training, or experience determine how physicians vary in their treatment of chronic pain¹². In terms of patient pain perception, those with the least experience and those with the most are found to underestimate patient's pain more than those with moderate experience⁷. These studies suggest there are differences between how patients perceive their own pain and how their doctors perceive it. However, very little is known about medical students' assessment of patient-reported pain. Perhaps better understanding how medical student perceive patient's pain may shed some light on how those future doctors will practice medicine. Our study aimed to determine whether years of medical training (whether in the pre-clinical phase or on clinical clerkships) and gender impact medical students' assessment of pain, as portrayed in a brief video of a patient in sickle cell crisis.

Methods

This observational study was implemented through an anonymous survey conducted with all enrolled medical students, excluding students with dual degree or off-cycle students (repeating a year), at the Boonshoft School of Medicine in Dayton, Ohio. Potential respondents were sent a letter of invitation that explains the purpose of the study, the study methods, and anticipated time to completion. Students were told that completion of the survey implies their consent to participate. Reminder emails were sent out from 9/23/2019 to 10/14/2019, with links to the survey.

Respondents answered demographic questions that include their level of education (medical school years) and their gender. Participants watched a two-minute video of a patient experiencing a sickle cell pain crisis, then asked to rate the patient's pain based on a Numerical Rating Scale⁸ pain score of 1 to 10, with 1 being the lowest pain rating, and 10 being the highest pain intensity. See Survey in Appendix.

Statistical analysis

The survey was created in Qualtrics web-based survey software (Provo, Utah) available at Wright State University. The number of emails and the response rate were recorded. Responses that participants clicked on "other" or "dual-degree" were excluded from the study. Data collected in Qualtrics were transferred to Excel and analyzed via two-way analysis of variance (ANOVA). The variables evaluated were class level (factor 1), gender (factor 2), and interaction (factor 1 X 2). Separate ANOVA evaluated the differences across class years between males and females.

Results

Descriptive and Perceived Pain Score Results

There was a total of 151 responses. However, a total of 10 responses were excluded from this study because they were off-cycle students (7) and 3 students did not complete the survey. Thus, the analysis sample was based on 141 valid responses. Student gender and year in medical school are shown in Table 1. Most respondents (63.8%) were female. Over 30% of the responses were from third-year medical students (MS3), followed first-year medical students (MS1), then second-year medical students (MS2) and finally fourth year medical students (MS4). The numerical range for Question 3 of the survey regarding the student's perception of patient's pain ranged from 2 to 10 on a 1-10 point pain score. The median score was 8.00, and mean score is 7.61 (Standard deviation, SD 1.46).

Table 1. Demographic Characteristics of Study Participants Based on Gender and Year in Medical School

Gender	N (%)
Male	51 (36.2)
Female	90 (63.8)
Year in Medical School	
MS1	41 (29.1)
MS2	36 (25.5)
MS3	43 (30.5)
MS4	21 (14.9)

Analysis of results

Comparing Perceived Pain Score Based on Gender

The perceived pain scores were compared between genders and are shown in Table 2. The mean value for the 51 male students was lower than the 90 female students. The difference in pain scores between males and females was analyzed using an independent sample t-test where equal variances were not assumed. The P value was 0.051, indicating that at $\alpha = 0.05$, the difference was not considered statistically significant.

Table 2. Group Statistics in Responses Between Genders

Gender	N	Mean	Std. Deviation	Std. Error Mean
Male	51	7.25	1.79	0.25
Female	90	7.81	1.20	0.13

Comparing Perceived Pain Scores Based on Class

Summary statistics for perceived pain scores for each medical student class are shown in Table 3. MS1's had the highest scores, followed by MS4, then MS2, and lastly MS3's. MS3 students had the widest range on scores from 2 to 10, whereas MS1 and MS2 students had the narrowest range in scores from 6 to 10. Differences in scores between the four classes were analyzed with Welch one-way analysis of variance (ANOVA) due to heterogeneity of variances among the four groups. The p value was 0.044, indicating at least one difference among the four groups. Multiple comparisons of the scores were then made between each class (Table 4) using Games-Howe II unequal variance. The only statistically significant difference appreciated were scores between MS1 and MS3 students, which had a mean difference in scores of 0.976, and significance of 0.023.

Table 3. Group Statistics in Scores Between Years

Class	N	Mean	Std. Deviation	Std. Error
MS1	41	7.98	1.084	.169
MS2	36	7.78	.898	.150
MS3	43	7.00	1.877	.286
MS4	21	7.86	1.590	.347
Total	141	7.61	1.458	.123

Table 4. Comparing Scores Between Classes

Class	N	Mean	SD
MS1	41	7.98 ^a	1.08
MS2	36	7.78	0.90
MS3	43	7.00 ^b	1.88
MS4	21	7.61	1.46

Abbreviation: SD, Standard Deviation

^aStatistically significantly different from MS3 ($p < 0.05$)

^bStatistically significantly different from MS1 ($p < 0.05$)

Comparing Responses Based on Gender and Class

Since there was a significant difference in patient pain score between MS1 and MS3 students, the perceived pain scores were compared between gender and class using a two-way ANOVA to determine whether interactions occurred between gender and class. Responses are shown in Table 5. The result of this analysis was found to be not significant (p value 0.15), meaning that there is no statistically significant difference in how males and females score patient's pain across all four classes (MS1-4).

Table 5. Group Statistics in Responses Between Genders and Year

Gender	Year	Mean	Std. Deviation	N
Male	MS1	7.50	1.168	12
	MS2	7.86	1.027	14
	MS3	6.33	2.114	18
	MS4	8.00	2.236	7
	Total	7.25	1.787	51
Female	MS1	8.17	1.002	29
	MS2	7.73	.827	22
	MS3	7.48	1.558	25
	MS4	7.79	1.251	14
	Total	7.81	1.198	90

Discussion

The findings in this study are based on 141 responses unevenly distributed across all four classes. Most respondents were female. Analysis of the data concludes insignificant differences in scoring patient's pain between genders and between genders in all four classes. The major finding is that there was a significant difference between the MS1 and MS3 students. MS1 students rated a higher patient's pain score (mean 7.98) compared to MS3 students (mean 7.0). The difference was found to be significant ($p = 0.023$). A possible explanation for this is the difference in level of training. First year marks the start of medical school and learning basic sciences, physiology, and pathology. Third year is the beginning of clinical rotations and being exposed to patients. When the survey was sent out, the MS3 students were well into five months of training, whereas the MS1 students had two months of school and were learning the foundations of microbiology.

Empathy is known to decline with years of medical training. Several reasons include intense schedules, exhaustion, and burnout. A decline in empathy may be associated with lower estimations of pain. It is understood that doctors with the least experience tend to underestimate their patient's pain⁷, yet not much is known about medical students. This study was designed to observe how medical students at different stages of school would perceive and score a patient's pain, which would indicate a level of empathy. In doing so, it could further our understanding in how training in medical school shapes the next generation of doctors. In the original hypothesis, the researchers expected differences between all classes and genders, however, that proved to be untrue, since statistically significant differences were found between two classes. Reasons for this could be due to a small sample size and suggest that a larger sample size is needed. Although it was not recorded, we do not know the specialty each student was interested in and whether that had any impact on the results (confounding factor). Thus, it would be fascinating to see how interest in specific specialties would play a role in assessing

patient's pain. Perhaps it would be a factor that plays into reasons why doctors with less experience often underestimate patient's pain compared to doctors with moderate experience.

Although significant results came from this study, there were also several limitations. The total responses were 141, which is a small sample study. Thus, perhaps there would be different findings with a larger cohort was sent a survey (sending to different medical schools). Another flaw was the lack of response from MS4 students. They have the most experience in the clinical field, therefore increasing their response could have yielded difference results. There were differences, yet they lack statistical significance ($p < 0.05$), suggesting the need for a larger sample size. Another explanation for the lack of significant differences could be that some students had other areas of training (EMT, scribe, etc.) before medical school. Perhaps some already had experience interacting with patients in pain. These experiences prior to starting medical school could impact how students assess patient's pain, depending on their level of exposure.

As mentioned earlier, high costs of treatment, time taken to go into clinic for treatment, and prescribing regulations can all lead to high pain management costs. Regarding patient care, if a physician cannot accurately assess the level of patient's pain, it can negatively impact the patient's quality of life and increase the expenses of inadequate pain treatment. Some of these differences can already be seen in this small study of medical students. Perhaps some changes need to take place in the medical school curriculum to better equip students with the tools to accurately assess patient's pain, thus improving future doctors' level of empathy in his/her practice.

Conclusion

Increased years of medical training is associated with a decline in empathy which may be measurable by a decline in measurements of assessed patient's pain. Doctors with the least experience (and closest to medical training from medical school) tend to underestimate their patient's pain. Our study aimed to determine whether years of medical training and gender impact medical students' assessment of patient's pain. The major finding was a significant difference in perceiving patient's pain between MS1 and MS3 students. This suggests there is a possible difference between starting medical school and starting clinical rotations, and questions for further analysis. There was no significant difference found between genders or classes, or between genders and class. Limitations of the study included a small sample size and the lack of response from the MS4 class. Other areas for further study include patient-interaction experiences of the student prior to entering medical school, and student's interest in a specific field of medicine. The difference in scores of patient's pain between some classes suggest a change in level of empathy as one progresses through medical school, and perhaps shape the practices of the next generation of doctors.

References

1. Hopp M, Bosse B, Dunlop W. The Socioeconomic costs of the undertreatment of pain. *Value in Health*. 2014;17(7):A785. Accessed July 6, 2018.
2. Gaskin DJ, Richard P. The economic costs of pain in the United States. *Journal of Pain*. 2012;13(8):715-24. Accessed July 6, 2018.
3. Lin RJ, Reid MC, Chused AE, Evans AT. Quality Assessment of Acute Inpatient Pain Management in an Academic Health Center. *American Journal of Hospice & Palliative Medicine*. 2016;33(1):16-19. Accessed July 12, 2018.
4. Statin LJ, Panda M, Chen I, et al. When Race Matters: Disagreement in Pain Perception between Patients and their Physicians in Primary Care. *Journal of National Medical Association*. 2007;99(5):532-8. Accessed July 12, 2018.
5. Guru V, Dubinsky I. The patient vs. caregiver perception in acute pain in the emergency department. *The Journal of Emergency Medicine*. 1999;18(1):7-12. Accessed July 12, 2018.
6. Bertakis KD, Azari R, Callahan EJ. Patient Pain in Primary Care: Factors That Influence Physician Diagnosis. *Annals of Family Medicine*. 2004;2(3):224-30. Accessed June 9, 2018.
7. Ruben MA, Osch MV, Blanch-Hartigan D. Healthcare providers' accuracy in assessing patients' pain: A systematic review. *Patient Education and Counseling*. 2015;98:1197-1206. Accessed July 6, 2018.
8. Daoust R, Paquet J, Piette E, Sanogo K, Bailey B, Chauny JM. Impact of age on pain perception for the typical painful diagnoses in the emergency department. *The Journal of Emergency Medicine*. 2016;50(1):14-20. Accessed July 6, 2018.
9. Singh S, Bajorek B. Pharmacotherapy in the ageing patient: The impact of age per se (A review). *Aging Research Reviews*. 2015;24:99-110. Accessed July 6, 2018.
10. Todd KH, Lee T, Hoffman JR. The Effect of Ethnicity on Physician Estimates of Pain Severity in Patients With Isolated Extremity Trauma. *JAMA*. 1994;271:925-928. Accessed June 11, 2018.
11. Lesho E, Foster L, Wang Z, et al. The Accuracy of Physicians' Perceptions of Patients' Suffering Findings From Two Teaching Hospitals. *Academic Medicine*. 2009;84(5):636-642. Accessed July 12, 2018.
12. Duenas M, Salazar A, Sanchez M, De Sola H, Ojeda B, Failde I. Relationship Between Using Clinical Practice Guidelines for Pain Treatment and Physicians' Training and Attitudes Toward Patients and the Effects on Patient Care. *Pain Practice*. 2018;8(1):38-47. Accessed June 25, 2018.

Appendix

Survey:

Research Question: Do medical students' assessments of a patient's pain vary significantly with gender and year of medical training?

Survey:

1. Are you a:

Male

Female

Other

Dual-degree, repeating, or otherwise off-cycle student

Year: 1 2 3 4

2. Please take two minutes to watch this video: https://www.youtube.com/watch?v=v2eb_9RM9w0

3. On a scale of 1-10, how severe do you believe this patient's pain to be? Please mark the appropriate number on this pain scale.

No pain

1

2

3

4

5

6

7

8

9

10

Excruciating, unbearable pain