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Perception of Physician Empathy Varies With Educational Level and Gender of Patients Undergoing Low-Yield Computerized Tomographic Imaging

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Abstract

Objective: Lack of empathic communication between providers and patients may contribute to low value diagnostic testing in emergency care. Accordingly, we measured the perception of physician empathy and trust in patients undergoing low-value computed tomography (CT) in the emergency department (ED). **Methods:** Multicenter study of ED patients undergoing CT scanning, acknowledged by ordering physicians as unlikely to show an emergent condition. Near the end of their visit, patients completed the Jefferson Scale of Patient Perception of Physician Empathy (JSPPPE), Trust in Physicians Survey (TIPS), and the Group Based Medical Mistrust Scale (GBMMS). We stratified results by patient demographics including gender, race, and education. **Results:** We enrolled 305 participants across 9 sites with diverse geographic, racial, and ethnic representation. The median scores (interquartile ranges) for the JSPPPE, TIPS, and GBMMS for all patients were 29 (24-33.5), 55 (47-62), and 18 (12-29). Compared with white patients, nonwhite patients had similar JSPPPE and TIPS scores but had higher (worse) GBMMS scores. Females had significantly lower JSPPPE and TIPS scores than males, and scores were lower (worse) in females with college degrees. Patients in the lowest tier of educational status had the highest (better) JSPPPE and TIPS scores. Scores were invariant with physician characteristics. **Conclusion:** Among patients undergoing low-value CT scanning in the ED, the degree of patient perception of physician empathy and trust varied based on the patients' level of education and gender. Given this variation, an intervention to increase patient perception of physician empathy should contain individualized strategies to address these subgroups, rather than a one-size-fits-all approach.

Keywords

empathy, imaging, trust, emergency medicine

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Introduction

Many emergency physicians are aware that failure to order diagnostic tests comprise the largest cause of medical malpractice claims (1–3). Surveys have suggested that physicians order low-value diagnostic tests primarily out of perceived normative behavior, rationalizing that other physicians would do so under similar circumstances, even though they believe the test is unlikely to be positive (3,4). Taken together, this literature suggests that emergency physicians feel pressure to make decisions quickly with a "worst-case" thought process, even when the physician believes the probability of an emergency medical diagnosis is near zero. Many physicians order low-value computed tomography (CT) scanning when they believe the patient wants the CT, coupled with fear of missing an unlikely diagnosis, and to avoid the time and effort required to explain why the CT is unlikely to add benefit (3). Increased empathic communication may increase patient trust and therefore allow the communication needed for both sides to be comfortable with foregoing low-value CT scanning. Qualitative research intended to reduce unnecessary advanced imaging reveals the need to improve bedside manner, communication, and trust to reduce anxiety in both patients and providers, while being sensitive to time constraints (5). Empathic communication has been associated with improved patient health literacy, which may enhance understanding of emergency department (ED) discharge instructions (6–9). This raises the question of whether empathy training—aimed at effective and efficient perspective-taking, reciprocal communication, together with at least a limited degree of shared decision-making—can safely reduce unnecessary advanced diagnostic imaging.

We have previously reported results of a multicenter study that indicated the specific preferences of patients for phrases that physicians can use to enhance understanding of the patient's point of view, and to build trust (10). The overarching goal of this work is to determine whether empathy training in emergency care can improve the value of tests ordered, patient adherence, and subsequent health-care utilization. However, we recognize the value of designing an empathy intervention that could be tailored to patient subpopulations and informed by demographic and social determinants of patient perceptions. The present report stratifies the results of the Jefferson Scale of Patient Perception of Physician Empathy (JSPPPE) and Trust in Physicians Scale (TIPS) according to immediately available patient demographic features, including gender, race, and educational level, as well as the type of imaging ordered, and the patient's past history of advanced imaging. We sought to compare the JSPPPE, TIPS, and Group Based Medial Mistrust Scale (GBMMS) scores based upon patient gender, race, and educational level (11).

Methods

The methods of this report have been published previously (10). We performed a prospective cross-sectional survey of adult ED patients undergoing CT of the head, chest, or abdomen as part of usual care in 9 academic, teaching EDs in California, Illinois, Indiana, Minnesota, Mississippi, New York, North Carolina, Texas, and Virginia. Inclusion criteria required adult patients (>17 years) undergoing CT scanning of the head, chest, or abdomen. The protocol was reviewed and approved by all Institutional Review Boards (IRB) for the conduct of research in human subjects. At all sites, either written or verbal informed consent was obtained from the patient.

Data Collection

Research associates first identified patients undergoing CT scanning from the ED electronic tracking system (the "Dashboard"). The clinician who ordered the CT had to agree with the statement "I believe it is unlikely the CT scan will show a true emergency." We provided an explicit definition of true emergency as an immediate threat to life, organ, or body function. Patients were enrolled by trained research coordinators who surveyed the ED in real time for patients undergoing a qualifying CT scan. Under partial waiver of authorization for the release of medical records, the research associate then reviewed the patient's chart and verified eligibility with the ordering clinician. To allow the greatest degree of patient–provider interaction, the surveys were administered as near as possible to the end of the ED visit. Patients were considered screen failures and excluded from the study if they were admitted or had an emergent finding on CT scanning. To determine which physician was being evaluated, the research associate first asked the physicians whom they thought had spent the most time with the patient. Based upon this answer, the research associate approached the patient with this physician's photograph, and the associate determined if the patient recognized the physician. If the patient did not recognize the physician, then the patient was a screen failure. Patients who recognized the physician were then asked to complete the JSPPPE, the TIPS, and the GBMMS (12,13). For the TIPS, questions 1, 5, 7, and 11 were reverse coded and for the GBMMS, questions 2, 8, and 10 were reverse coded. A higher score for the JSPPPE and TIPS is favorable, whereas a higher score for the GBMMS is unfavorable. Study personnel then recorded patient's verbal statements of their own perceptions of their race (using the words "white race" to describe Caucasian race, and using either "Black or African American" or "Other race" to describe non-white race, as represented in the results section), gender ("Male" or "Female"), and educational level (stratified into "less than or some high school", "high school diploma", and "college degree or higher"). The category "less than or some high school" also included those with no high school, and the category "high

school diploma" also included those with a general educational degree and those with some college experience but no college degree. We did not ask patients about their income. At the time of enrollment, research personnel reviewed the medical record and documented present and past medical information, CT scan type, and prior CT exposures. Data were transferred to a REDcap database for analysis (14). Because of variable IRB requirements, we were unable to uniformly record training level or race and ethnicity of the physician but did uniformly record the physician's age and gender.

Data Analysis

This was a preplanned subgroup analysis to examine differences in mean or median values for JSPPPE, TIPS, and GBMMS based upon hospital, patient gender, race, and educational level. We assessed internal consistency with Cronbach's α. We also wanted to examine the scores for individual questions of the JSPPPE and TIPS. Data were tested for normality with the Wilk-Shapiro test ($P < 0.1$ failing normality). We compared medians with the Mann Whitney U test or the Kruskal-Wallis test followed by multiple comparisons with Dunn's post hoc. Statistical analyses and graphing were performed by exporting data from REDcap into GraphPad Prism version 7.00 for Windows (GraphPad Software, La Jolla, California).

Results

Characteristics of Study Patients

We screened 344 patients from July 1, 2016, to January 31, 2017. Subsequently, 39 patients were excluded because the patient refused or did not recognize the physician (n = 24), the patient was admitted (N = 10), the CT scan demonstrated a potential emergency (n = 5), the patient requested withdrawal after consent (n = 2), or the patient eloped (n = 4). Three hundred five (89%) were eligible and completed the surveys. The mean age was 49 ± 17 years, 55% were female, 44% self-identified as non-Hispanic white, 40% were from the South, 30% from the Midwest, 22% from the Northeast, and 9% from the West. The distribution of educational level was 18% with none or some high school, 50% with a high school diploma or general educational degree, and 32% with college degree or higher. Fifty-seven (19%) had a prior CT scan within the previous 6 months. The median reported pain was 6 on a 10-point scale (interquartile range [IQR]: 2.9-8.0). As shown in Table 1, patients had a wide variety of chief complaints. Computed tomography of the head and abdomen were the most common study-qualifying CTs. The median physician pretest probability for the presence of a life-threatening process was 10% (IQR: 5%-18.5%). Table 1 also shows distribution of comorbidities, which were infrequent because of the inclusion criterion specifying low-risk patients with negative CT results.

Table 1. Demographics, Chief Complaints and Past Medial History of Patient Participants (N = 305).

Demographics	
Female gender	168 (55%)
White race	134 (44%)
Age < 40	98 (32%)
Age 40-60 years	129 (42%)
Age > 60 years	78 (26%)
Education	
None or some high school	55 (18%)
High school diploma or GED	153 (50%)
At least some college	98 (32%)
Complaint	
Abdominal pain	75 (25%)
Head pain	36 (12%)
Chest pain	35 (11%)
Flank pain	18 (6%)
Limb/shoulder or neck pain	18 (6%)
Back pain	11 (4%)
Dizziness	12 (4%)
Dyspnea	10 (3%)
Fall	8 (3%)
Vomiting	7 (2%)
Syncope/loss of consciousness	7 (2%)
Medical history	
Current smoker	58 (19%)
Obesity	40 (13%)
Myocardial infarction	82 (27%)
Heart failure	31 (10%)
Dementia	11 (4%)
Lung disease	23 (7%)
Diabetes mellitus	29 (9%)
Renal failure	14 (4%)
Active malignancy	5 (2%)

Survey Characteristics

The Shapiro-Wilk test showed $P < 0.0001$ for the results of the individual questions, and the sum values of all 3 instruments, indicating that none of the data were not normally distributed and attempts to transform the data to achieve normality failed. Therefore medians are reported and compared. The internal consistency was good for all 3 surveys with Cronbach's α equal to 0.87, 0.84, and 0.84 for the JSPPPE, TIPS, and GBMMS, respectively. The JSPPPE and TIPS scores were significantly correlated (Spearman's rank correlation coefficient, Rho = 0.57, $P < 0.001$) and were both negatively correlated with the GBMMS (Rho = −0.28 and Rho = −0.52, respectively, $P < 0.001$ for both). Figure 1 shows the median and IQR for the total score of all 3 surveys by hospital. Comparison by the Kruskal-Wallis test with Dunn's pairwise comparison showed generally good parity for the JSPPPE and TIPS, and only one site stood out as different on the GBMMS. Supplemental Table 1 shows the mean and median values for the individual questions of all 3 surveys and the results of the comparisons to determine which questions differed among the study population. The median score on the JSPPPE was 29 (IQR: 24-33.5), the median TIPS score was 55 (IQR: 48-62), and the

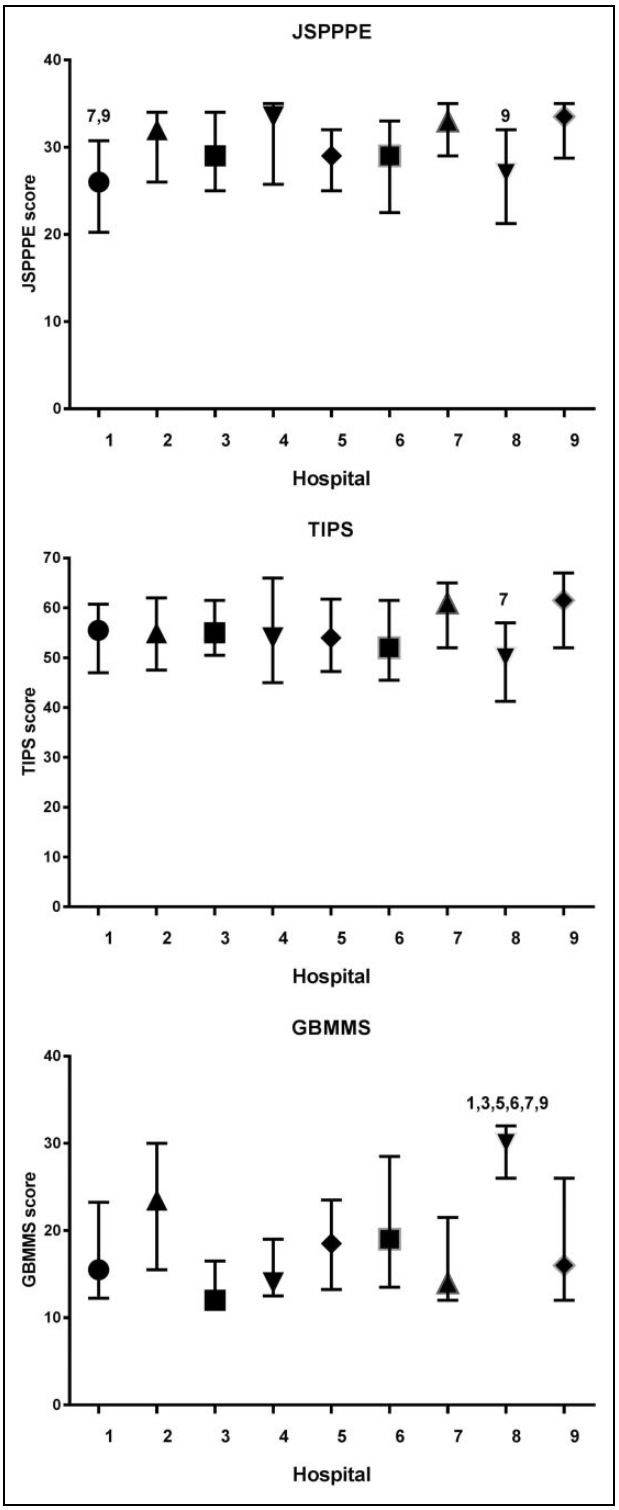

Figure 1. Comparison of total scores of the Jefferson Scale of Patient Perception of Physician Empathy (JSPPPE), Trust in Physicians Survey (TIPS), and the Group Based Medical Mistrust Scale (GBMMS) provided by emergency care patients undergoing low-value (negative) computed tomographic testing at 9 hospitals. The plots show the medians and interquartile ranges for the 9 participating hospitals. The numerals above the symbols indicate differences by Kruskal–Wallis with Dunn's pairwise comparison ($P < 0.05$).

median GBMMS was 18 (IQR: 12-29). We found no significant correlation in any of the 3 scores with patient age (Rho < 0.1, with $P > 0.05$ for all 3 regressions). Comparison of the individual questions of the JSPPPE revealed that the median scores were relatively close (range in medians: 4.9-6.1), although with the Kruskal–Wallis test with Dunn's comparisons, the median result of question #2 ("My physician asks about what is happening in my daily life") was significantly lower than questions 3 to 5. Comparison of the median scores for the individual questions of the TIPS revealed that the scores were more diverse (range in medians 3.7-6.1), and with the Kruskal–Wallis test with comparisons, the median result of all 3 "negative" and reverse coded questions were lower than all positive questions. Of relevance to the issues of low-value test ordering and subsequent searching for answers, Question #5 ("I sometimes distrust my doctor's opinion and would like a second one") had the lowest numeric value with a median score of 4.0, which was lower on Dunn's testing than all other questions.

Main Results

Figure 2 shows a composite of the median and IQRs for each score, stratified by patient gender, race, and education. To allow more direct comparison with precedent literature, which all reported means from these instruments, Supplemental Table 2 shows the mean and standard deviation data stratified by gender, race, and education. Female patients scored emergency physicians on average 1 point lower than male patients on the JSPPPE ($P = 0.04$, Mann Whitney U) and on average 3 points lower than male patients on the TIPS ($P = 0.001$, Mann Whitney U). Nonwhite patients scored physicians on average 4 points worse than white patients on the GBMMS ($P = 0.0004$, Mann Whitney U). Patients with less than a high school education had higher JSPPPE and TIPS scores than those with more education. Based on these observations, we performed 2 more detailed analyses. First, we found nonwhite patients without a high school diploma had higher JSPPPE (median 33, IQR: 25-25) and higher TIPS scores (median 61, IQR: 50-65) despite having higher GBMMS scores (median 23.5, IQR: 16-31), compared with the rest of the sample (all 3 $P < 0.05$ by Mann Whitney U). Second, we found that women with a college education had TIPS scores that were lower (median 50, 30-56, $P = 0.007$) than the rest of the sample.

The median values did not differ for any of the 3 surveys based upon type of CT scan ordered (head, abdomen, and chest, data not shown). We also found no difference in median scores for patients who had undergone prior CT scanning in the past 6 months compared with those who had no recent history of CT scanning (data not shown).

Table 2 compares the medians for each survey based upon physician race. These data are limited to 193 (63%) of the sample. In this table, all nonwhite clinicians, including those of black race (N = 8), were aggregated with physicians of Asian or Indian descent. The GBMMS

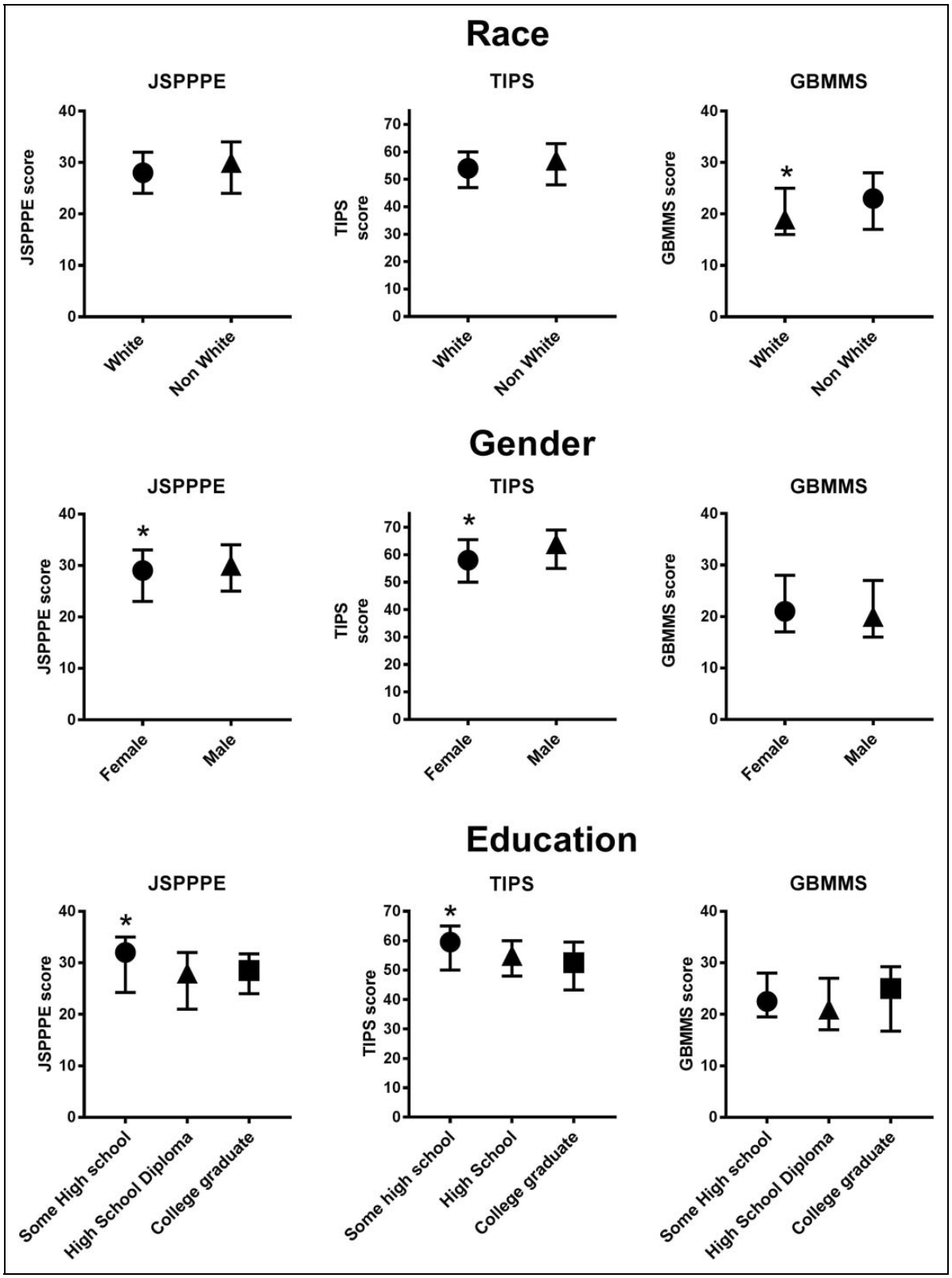

Figure 2. Comparison of total scores of the Jefferson Scale of Patient Perception of Physician Empathy (JSPPPE), Trust in Physicians Survey (TIPS) and the Group Based Medical Mistrust Scale (GBMMS) provided by emergency care patients undergoing low-value (negative) computed tomographic testing at 9 hospitals. The plots show the medians and interquartile ranges stratified by race, gender, and educational level. The asterisks indicate significance by Mann-Whitney *U* or Kruskal–Wallis with Dunn's pairwise comparison ($P < .05$).

Table 2. Survey Results Based Upon Physician Race.

Value	JSPPPE, White	JSPPPE, Nonwhite	TIPS White	TIPS, Nonwhite	GBMMS White	GBMMS, Not white
Median	30	27	57	57.5	15	19
First-third quartile	25.0-34.0	22.8-33.3	49.0-63.0	45.0-63.3	12.0-22.0	15.0-25.0
P (Mann-Whitney *U*)	.24		.623		.013	
N	169	26	169	26	169	25

Abbreviations: GBMMS, Group Based Medical Mistrust Scale; JSPPPE, Jefferson Scale of Patient Perception of Physician Empathy; TIPS, Trust in Physicians Survey.

was significantly higher (worse) for nonwhite physicians than white physicians. The median (with IQR) scores for female (39% of sample) versus male physicians, respectively, for the JSPPPE were 31 (26–34) versus 29 (24–34; P = 0.064); for TIPS 59 (51.5-63) versus 55.5 (47.3-62; $P = 0.058$); and GBMMS 15.5 (12–21.5) versus 16 (12–24.9; $P = 0.52$).

Discussion

This study provides the first data to estimate patient perceptions of empathy and trust in emergency physicians using validated psychometric tests from a multicenter sample of patients who underwent CT scanning. We believe this work has 2 major findings. First, patient perceptions of empathy and trust in physicians were higher in patients with lower educational status, with patients who had the lowest level of education (no high school diploma) having the highest scores in empathy and trust. This finding compelled a post hoc analysis of the subgroup of nonwhite patients without a high school diploma. We found it remarkable that this subgroup had significantly higher JSPPPE and TIPS scores, despite having higher GBMMS scores, than all other patients (any patient of white race or any patient with a high school diploma or more education). Second, we found that female patients had lower empathy and trust scores in physicians than male patients, and with discrepancies even more pronounced among college educated female patients. Prior work by Freburger et al in rheumatology patients found an inverse relationship between trust and educational level but no change with patient gender (12). Our findings are novel and hypothesis generating because no study has examined patient perceptions of empathy and trust in an emergency care setting.

The first finding regarding differences based on education and race is relevant to the controversy surrounding the actual impact of implicit bias on physician behavior. On one hand, a large body of literature has documented inequalities in how physicians provide pain management (15–18) and diagnostic testing (19). On the other hand, a systematic review by Dehon et al on the effect of racial bias on physician behavior failed to find significant effect of implicit racial bias on physicians' decision-making (20). However, this review raised controversy because all the source data were from studies employing simulated patient scenarios rather than real practice (20–22). To our knowledge, our data are the first to measure the actual perceptions of empathy and trust among patients with significant pain (median pain score 6 of 10) undergoing active real-time diagnostic testing in clinical practice. Despite having higher mistrust of the medical establishment, as manifested by their higher GBMMS scores, nonwhite patients with lower educational level had higher perceptions of empathy and trust. This finding suggests that patients can generate opinions of individual caregivers independently of their preexisting perceptions of inequality in health care. A more speculative interpretation is that our data reflect a minor success in how physicians are being selected and trained in the domain of emergency care, given that they engendered positive reactions from a potentially disenfranchised segment of patients (low education, minority patients).

Only one precedent study has addressed the potential relationship between emergency physician empathy and frequency of ordering of CT scans (23). Melnick et al measured physician self-assessed empathy using the Jefferson Scale of Empathy (JSE) and the frequency of ordering any CT scan. The authors found a weak inverse relationship between the JSE and CT ordering (odds ratio = 0.996 [0.992-1.001] $P = 0.163$). While not statistically significant, the JSE had a relatively stronger influence than did the scores of 2 other psychometric tests, namely the malpractice fear scale ($P = .86$) and the stress from uncertainty scale ($P = 0.79$). In this study, physician characteristics (age, years in practice, race, or gender) were not significantly associated with rate of CT ordering. In comparison, we found no significant effect of physician race or gender on patient perceptions of empathy or trust, but somewhat surprisingly, the GBMMS was higher (worse) for nonwhite physicians (Table 2). Overall, our data add to Melnick et al by showing that patient demographics may influence perceptions of empathy and trust as much as physician demographics.

Although a large body of work has suggested differences in empathy perception based upon physician gender, the literature examining the role of patient demographic features (including gender) on perceptions of physician empathy or trust contains only a few studies. Using a simulation laboratory, Hooper et al found that physicians generally demonstrated better information transfer and empathic behavior with female patients and Anglo-American patients as compared with men or Spanish Americans, respectively (24). Using focus groups, Lin et al found a disconnect between patients' needs and preferences, including a desire for psychological counseling, which the emergency physicians

generally eschewed, instead focusing on physical complaints (25). Marcinowicz administered the TIPS to primary care patients in Poland and found no difference in men and women patients overall except for 1 question "I doubt that my doctor really cares about me as a person," which more women strongly disagreed with compared to men (26). In view of the lack of precedent literature, and the fact that our work was not designed to conduct in-depth cognitive interviews, we consider this work to be hypothesis generating only regarding the finding that female patients have lower perceptions of physician empathy and trust in physicians. In prior work from this same data set to identify patient preferences for phrases intended to improve empathy and trust, we found patients preferred phrases from emergency clinicians that indicate a broad consideration of the patients' chief complaint (eg, "I have carefully considered what you told me about what brought you here today") (10). We speculate women with symptoms without an identifiable medical cause may have a particular desire for both cognitive and affective reassurance (27) but instead are receiving information focused on risk of serious disease (25,28).

Because of its relevance to the objective of reducing low-value diagnostic testing, especially in the case of repeated negative CT scanning, an observation that warrants comment is the relatively low (reversed) numeric response to the TIPS question #5 ("I sometimes distrust my doctor's opinion and would like a second one"). It is important to contextualize this observation, which occurred in the ED setting where patients have no prior—and likely no future—relationship with the emergency physician. Also, this individual response was low despite the fact that the overall mean (59) and median (55) TIPS scores were at least equal to those measured in other patient subpopulations (12,29). Accordingly, one interpretation of this finding is that patients generally trusted their emergency physicians, but also yearned for a more complete explanation of their symptoms, when emergency physicians were unable to provide a unifying medical diagnosis. This in turn implicates inadequate communication of diagnostic uncertainty, exacerbated by lack of access to primary care follow-up (28,30,31). This synergy may partially explain why so many patients undergo repeated negative CT scanning in the emergency care setting (32,33).

Limitations

The present results are preliminary and do not allow any inference into differences in perceived empathy and trust among patients who were considered for low-value CT imaging, but in whom no imaging was done, or a comparison with low-risk patients who underwent relatively low-value CT scanning but ultimately had a positive finding. We found no difference in empathy or trust scores of patients based upon prior CT scanning within reach of the site's electronic health records, but it is possible this method missed some patients with prior CT scanning. Beyond their gender and race, we cannot provide substantive data about physician characteristics that might have affected results (eg, physician experience, state of health/rest at time of survey, implicit biases). Because of variable policies with the different institutional review boards, we were unable to uniformly collect these data. Our study may be limited by the fact that we enrolled a convenience sample of respondents—for example, patients from the Northeast, Midwest, and South accounted for over 90% of patients. By design, the sample also only represents patients with relatively low illness acuity.

Conclusion

This multicenter study assessed perceptions of empathy and trust among emergency care patients undergoing low-value CT testing. Patients with the lowest educational level had the highest perceptions of physician trust and empathy, whereas female patients had the lowest perceptions of physician empathy and trust. These findings emphasize the need to develop targeted communication strategies to enhance patients' perceived empathy and trust in their physician as part of an empathy-centered intervention designed to reduce low-value CT ordering.

Declaration of Conflicting Interests

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Supplemental Material

Supplemental material for this article is available online.

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