Internal Medicine Residents' Attitudes Toward Simulated Depressed Cardiac Patients During an Objective Structured Clinical Examination: A Randomized Study

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BACKGROUND: Physician biases toward mental conditions such as depression have been shown to adversely affect medical outcomes.

OBJECTIVE: To explore the relationship between residents' explicit bias toward depressed patients and their clinical skills on a cardiac case during an objective structured clinical exam (OSCE).

DESIGN: Prospective parallel randomized controlled study.

PARTICIPANTS: One hundred eighty-five internal medicine residents from three residency programs in two states.

INTERVENTION: During October–November 2015, residents were randomized to either a depressed or non-depressed standardized patient (SP) presenting with acute chest pain.

MAIN MEASURES: The Medical Condition Regard Scale (MCRS) assessed residents' explicit bias toward patients with depression. Their clinical skills (history-taking, physical examination, patient counseling, patient-physician interaction (PPI), differential diagnosis, and workup plan) and facial expressions were rated during an OSCE.

KEY RESULTS: No significant relationships were found between resident explicit bias and clinical skill measurements. Residents who examined the depressed SP scored lower, on average, on history-taking (t [183] = -2.77 , $p < 0.01$, Cohen's $d = 0.41$) and higher on PPI (t [183] = 2.24 , $p < 0.05$, Cohen's $d = 0.33$) than residents examining the non-depressed SP. There were no differences, on average, between stations on physical examination, counseling, correct diagnosis, workup plan, or overall SP satisfaction. Facial recognition software demonstrated that residents with a non-depressed SP had more neutral expressions than depressed-SP residents (t [133] = -2.46 , $p < 0.05$, Cohen's $d = 0.46$), and residents with a depressed SP had more disgusted expressions than non-depressed-SP residents (t [83.52] = 2.10 , $p < 0.05$, Cohen's $d = 0.28$).

CONCLUSIONS: Extrinsic bias did not predict OSCE performance in this study. Some differences were noted in the OSCE performance between the two stations. Further study is needed to examine the effects of patient mental

health conditions on physician examination procedures, diagnostic behaviors, and patient outcomes.

J Gen Intern Med 33(6):886–91

DOI: 10.1007/s11606-017-4276-7

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INTRODUCTION

A prior review of literature linking depression and coronary artery disease (CAD) found evidence of a bidirectional relationship, with depression being an independent risk factor for CAD and its complications, and CAD in turn being a cause of depression.¹ Unfortunately, evidence suggests a lack of awareness of such links between mental and physical conditions among physicians. Indeed, studies have shown that physicians who attribute physical symptoms to mental conditions are less likely to investigate or treat the physical condition,^{2,3} especially if they are unaware of strong links between specific conditions, such as that between CAD and depression. This sort of diagnostic overshadowing is particularly likely in cases where the mental illness is complex and accompanied by communication or behavioral challenges that interfere with the clinical presentation. Diagnostic overshadowing is defined as the “process by which a person with a mental illness receives inadequate or delayed treatment because of the misattribution of their physical symptoms to their mental symptoms,”⁴ and can lead to suboptimal care for both the mental illness and any comorbid condition.

Research has shown that, when presenting to the emergency department (ED) with chest pain, patients with depression were more likely to be triaged to a lower level and to experience a longer wait time before receiving an EKG or fibrinolysis, and were nine times as likely to miss benchmark times in receiving a balloon procedure, even with a prior history of acute myocardial infarction (AMI), than someone without a comorbid diagnosis of depression.⁵ Beyond the ED, people with a history of depression were more likely to be referred to low-quality surgeons⁶ and lower-quality hospitals⁷ and were less likely to receive percutaneous transluminal angioplasty or coronary artery bypass graft surgery.⁸ Patients with acute myocardial infarction who also had mental illness were

Received June 16, 2017

Revised October 30, 2017

Accepted December 11, 2017

Published online January 16, 2018

marginally less likely to receive diagnostic angiography.⁹ Kilbourne et al. interviewed providers from high- and low-performing sites in the Veterans Health Administration facilities and found that providers from low-performing sites reported stigma as a major concern.¹⁰ Stigmatizing attitudes on the part of healthcare providers toward mental illness influences medical outcomes in ways that are not yet fully understood.^{9,11,12}

Stigma among primary care providers may contribute to lower quality of care in the mentally ill population,¹³ and can stem from either implicit or explicit attitudes. Explicit attitudes are conscious thoughts that are associated with controlled behaviors and are influenced by social demands. Because expressions of prejudice or stereotypes associated with explicit attitudes may be modified or controlled with education, motivation, skill, and cognitive resources,¹⁴ the purpose of this study was to explore the role of explicit bias in residents' diagnoses and treatment plans for a standardized patient (SP) presenting as mildly depressed, and compare their performance with residents encountering an SP without depression. Both SPs presented with acute chest pain.

The following specific research questions were addressed in this study:

1. What is the incidence and degree of internal medicine residents' extrinsic bias toward patients with depression as measured by the Medical Condition Regard Scale (MCRS)?
2. What relationships, if any, exist between residents' MCRS scores and objective structured clinical exam (OSCE) evaluation scores?
3. What differences in OSCE performance and facial expressions are observed in residents who encounter a depressed SP compared to residents who encounter a non-depressed SP?

METHODS

Design

This randomized controlled trial was conducted in October and November 2015 in two states (California and Louisiana).

Recruitment

One hundred eighty-five (112 male) internal medicine (IM) residents from three programs (a large internal medicine residency program from a large urban setting in California [$N=158$], and two smaller programs from Louisiana, site 1 [$N=15$] and site 2 [$N=12$]) were recruited and enrolled in this study. IM residents in California participated as part of their program requirements but could choose to opt out of having their data included for research; all Louisiana residents volunteered to participate. Residents from all years of training

were included (postgraduate year [PGY]1 [$N=63$], PGY2 [$N=62$], and PGY3 [$N=60$]). Institutional review boards of Los Angeles County-USC Medical Center and LSU Health Sciences Center approved this study.

Randomization

This was a single-blinded study, with residents randomly assigned to one of two OSCE stations: 1) an SP portraying vague chest pain with no history of depression, or 2) an SP portraying vague chest pain and symptoms of depression. The same actors who portrayed the SPs were used for the encounters in both states.

Intervention Process

SPs were trained at the USC Clinical Skills Education and Evaluation Center (CSEEC) to portray a patient presenting with acute chest pain. Half of the SPs were trained on symptoms of depression as well as acute chest pain. Presentations were standardized with instructions to the depressed SPs to appear somewhat sad but to avoid mentioning their depression diagnosis or treatment unless specifically asked. After being asked, depressed SPs were instructed to more obviously express depressed symptoms or even cry during the interview. In the presenting chart of the depressed SP, a Patient Health Questionnaire (PHQ-9) score of 9 was included, versus a score of 2 included for the non-depressed SP. Scores on this instrument range from 0 to 27, with 0–4 indicating no to minimal depression, 5–9 mild depression, 10–14 moderate, 15–19 moderately severe, and 20–27 severe depression. Residents were given 15 min with the SP to obtain a history, perform a physical examination, and educate the SP about their diagnostic impression and treatment plan. Following each encounter, SPs completed an OSCE checklist to assess the resident (history, physical examination, and patient–physician interaction). The clinical encounter was videotaped and analyzed using facial expression recognition software (Noldus FaceReader).

After the SP interaction, residents completed a structured post-encounter note (PEN) that included their primary diagnoses (up to three) and workup plan. The PENs were scored by a physician rater based on a scoring rubric approved by the California Consortium for the Assessment of Clinical Competence (CCACC). The PENs contributed to correctness of diagnosis and workup plan scores for the OSCE. After completing their PENs, residents completed a questionnaire to measure their self-reported extrinsic bias toward depressed patients.

Instruments

Medical Condition Regard Scale (MCRS). A self-report questionnaire, the MCRS, was used to measure residents' extrinsic bias toward depressed patients. This instrument assesses "whether students find particular medical conditions to be enjoyable, treatable, and worthy of medical resources."¹⁵ The scale consists of 11 items with six anchors ranging from 1

(strongly disagree) to 6 (strongly agree). Scores range from 11 to 66, with higher scores representing higher regard for the condition. The instrument has shown evidence of validity in several previous studies.^{16–18}

Objective Structured Clinical Exam (OSCE) Checklist. The SP setting has been demonstrated as a useful way to measure intervention outcomes that are sensitive or prone to social desirability biases.¹⁹ The OSCE checklist is an assessment of specific dimensions of learner performance including history-taking (17 items), physical examination (6 items), patient counseling (3 items), and patient–physician interaction (10 items), using a criterion-based proprietary checklist (developed by the CCACC), plus a global rating for SP satisfaction with the encounter. The history and physical examination portion of the checklist was based on the expert opinions of clinicians and on the Validated Clinical Decision Rule to Predict CAD as a Cause of Chest Pain.²⁰ For the assessment of the patient–physician interaction, a modified SEGUE was used. The SEGUE framework is a research-based list of medical communication tasks and is recommended by the ACGME for the assessment of interpersonal and communication skills.²¹ Noldus FaceReader software²² was used to analyze facial expressions of residents during the encounter.

Post-Encounter Notes (PENs). The PEN was assessed using the rubric developed by Park et al.,²³ and modified by the CCACC. Differential diagnosis scores ranged from 1 to 4, with the highest score of 4 representing all correct diagnoses (myocardial infarction/unstable angina/acute coronary syndrome) listed and correctly rank-ordered. Workup scores ranged from 1 to 4, with the highest score of 4 requiring the inclusion of EKG, cardiac enzymes, and a reasonable workup, with few or no unnecessary tests (see Fig. 1).

RESULTS

All 186 residents were randomized to SP stations (depressed or not depressed). Four residents in the non-depressed-SP station group at California were unavailable for the OSCE at their assigned times and were reassigned to the depressed SP station. One resident did not participate in the OSCE, resulting in 97 residents in the depressed SP group and 88 residents in the non-depressed SP group.

Table 1 summarizes MCRS scores. Scores can range from 18 to 108, with a median of 64. Overall, scores ranged from 34 to 66 ($M = 51.3$, $SD = 7.2$; median = 51.0). Independent samples t tests showed that MCRS scores did not differ significantly between SP stations, genders, or study locations, providing evidence for randomized group equivalency. Our MCRS data are congruent with what others have reported for physician attitudes toward depressed patient conditions using the instrument.¹⁷ No significant differences were noted in resident MCRS scores by gender.

With regard to our second research question, MCRS scores did not correlate significantly with any of the OSCE subscales (history-taking, physical examination, patient counseling, patient–physician interaction, correct differential diagnoses, correct workup plan, or SP satisfaction with the encounter).

Table 2 shows performance on the OSCE subscales by SP station. Independent samples t tests showed that, on average, residents meeting with the depressed SP scored significantly lower on history-taking than did residents meeting with the non-depressed SP. However, on patient–physician interaction, residents meeting with the depressed SP scored significantly higher on average than residents meeting with the non-depressed SP. There were no significant differences between stations on physical exam, patient counseling, or SP satisfaction with the encounter.

Differences were found between genders on overall patient satisfaction, with the SPs reporting being more likely to return to see and/or recommend female clinicians (male $M = 0.76$, $SD = 0.16$; female $M = 0.81$, $SD = 0.13$; $t [183] = -2.22$, $p = 0.028$). Other components of the OSCE did not differ by gender or by resident PGY.

In addition to OSCE scales, 185 residents provided PENs that included up to three differential diagnoses and a workup plan that were reviewed for correctness. Reasonable and unreasonable diagnoses and workup plans are illustrated in Figure 1. One hundred forty-seven residents (79%) provided the correct differential diagnosis of an acute cardiac problem. Fisher's exact test (two-tailed) showed no significant difference in correctness of diagnosis by station (depressed or not depressed, $p = 0.653$; Table 3). Of the 97 residents in the depressed SP station, 36 (37%) included depression as one of their differential diagnoses; eight (8.7%) of these residents wrongly listed depression as the top differential diagnosis.

Workup plans showed that 68% of residents in the depressed station selected the correct workup plan (score of 3 or 4) versus 76% of residents in the non-depressed station. Thirty-two percent of residents in the depressed station and 24% in the non-depressed station chose only EKG or cardiac enzymes for their workup. There was no significant difference between the two stations on the residents' workup plans (Table 4).

The occurrence of specific facial expressions along with overall affective valence during patient interactions was analyzed using facial expression recognition software. Forty-five of the participants had no readable video to analyze, while six were analyzed but provided insufficient data; thus, the sample was reduced to 134 for these analyses. Stations did not differ on happy, sad, angry, surprised, or scared expressions, nor on overall valence. Non-depressed-SP residents ($M = 0.28$, $SD = 0.10$) had more neutral expressions than depressed-SP residents ($M = 0.24$, $SD = 0.07$, $t [133] = -2.46$, $p < 0.05$, Cohen's $d = 0.46$), and depressed-SP residents ($M = 0.02$, $SD = 0.05$) had more disgust expressions than non-depressed-SP residents ($M = 0.01$, $SD = 0.01$, $t [83.52] = 2.10$, $p < 0.05$, Cohen's $d = 0.28$), but these differences were not significant at a

Score	DIAGNOSTIC ACCURACY
4 Points	All three differentials are reasonable diagnoses, and the top differential must include one of the acceptable correct answers (MI/UA/ACS)
3 Points	All three differentials are reasonable diagnoses, and the second or third differential includes one of the acceptable correct answers (MI/UA/ACS)
2 Points	Two of the three differentials include two reasonable diagnoses, with one of them being an acceptable correct answer (MI/UA/ACS)
1 Point	Correct diagnoses (MI/UA/ACS) not listed in the differential
Note: Depression was accepted in the depressed SP station as a reasonable diagnosis, but if it was listed first, resident's score was down-graded. Acceptable/Correct diagnostic answers: Myocardial Infarction (MI), Unstable Angina (UA), Acute Coronary Syndrome (ACS). Valid answers, but would not get top score: Angina, Stable angina, GERD, Aortic dissection, Pulmonary embolism. Unreasonable answers: Atypical Chest Pain, Hypertension, Aortic Stenosis, Pericarditis, Arrhythmia, Costochondritis, Esophageal Spasm, Gastritis, Cancer	
Score	WORKUP PLAN ACCURACY
4 Points	Effective and efficient plan for diagnostic workup, includes EKG and cardiac enzymes. Has few or no unnecessary tests
3 Points	Reasonable plan for diagnostic workup, includes EKG and cardiac enzymes. May have some unnecessary tests
2 Points	Ineffective plan with most essential tests missed (EKG and cardiac enzymes), AND/OR inefficient plan with many irrelevant tests included
1 Point	Diagnostic workup ordered or omitted would place patient in unnecessary risk or danger

Figure 1 Post-encounter note scoring rubric.

Bonferroni-corrected alpha value of 0.006. PGY groups did not differ on specific facial expressions or overall valence, nor did specific expressions or overall valence correlate with OSCE or MCRS scores. However, differences were noted by gender on the facial affect measurements. Male and female residents differed on sad, angry, scared, and overall valence. Male residents were more likely to demonstrate an angry affect (males 0.07 [0.07] vs. females 0.04 [0.05], t [131.57] = 3.60, $p < 0.001$). Female residents were more likely to demonstrate a sad (males 0.09 [0.07] vs. females 0.17 [0.09], t [92.27] = -5.48, $p < 0.00$) or scared affect (males 0.01 [0.02] vs. females 0.02 [0.04], t [65.08] = -2.13, $p = 0.015$). When looking at the overall valence of the affect, male residents had an overall more positive affect than female residents (males 0.05 [0.12] vs. females -0.01 [0.14], t [133] = 2.64, $p = 0.009$).

DISCUSSION

In this study, we explored the incidence and degree of extrinsic bias among internal medicine residents toward patients with depression as measured by the MCRS, and we correlated residents' MCRS scores with their scores from an acute cardiac case OSCE. We predicted that resident physicians who explicitly endorsed negative biases against individuals with depression on the MCRS would not perform as well during the OSCE if the SP presented with comorbid depression. While we did find that the MCRS reflected overall low regard for patients with depression in our sample, our results are actually more positive than the results from the original study that validated the scale. Our results did not support the hypothesis that this low regard was related to OSCE performance. One possible explanation for this null finding is that residents can and do suppress their conscious biases while examining and treating patients. Although we did not collect any data that could speak directly to this possibility, explicit biases are, by virtue of being explicit, under conscious control and therefore susceptible to willful concealment or modification.²⁴ With

regard to our final research question, SP stations did differ on two OSCE subscales. Average scores of residents in the depressed SP station were lower on the history-taking component and higher on the patient-physician interaction component of the OSCE than were scores of residents in the non-depressed-SP station. However, these effects were not large (i.e., Cohen's d values between 0.33 and 0.41). Residents who encountered the depressed SP may have taken more time to speak with the SP about her depression, resulting in some of the "history-taking" checklist items being missed. It was interesting to find residents in the depressed SP station scoring higher, on average, on patient-physician interaction than residents in the non-depressed-SP station. The patient-physician interaction portion of the OSCE is a 10-item checklist measuring rapport, empathy, and communication skills. Residents who met with the depressed SP were perceived to have more of these qualities than residents who met with the non-depressed patient.

When reviewing the PENs, our results showed that 79% of residents from both the depressed and non-depressed stations provided the correct differential for an acute cardiac problem. In our study, there was also no significant difference between stations in workup plans submitted by the residents (68% of

Table 1 MCRS Mean Scores (Extrinsic Bias Toward Depressed Patients)* by OSCE Station, Gender, and Study Location

Variable	Descriptor	No. (%)	Mean (SD)	Significance
OSCE station	Depressed	97 (52%)	51.77 (7.61)	NS
	Not depressed	88 (48%)	50.72 (6.710)	
Gender	Male	112 (61%)	50.95 (7.50)	NS
	Female	73 (39%)	51.76 (6.75)	
Study site	CA program	158 (85%)	51.56 (7.08)	NS
	LA programs	27 (15%)	49.56 (7.79)	

*Higher scores reflect higher regard for the patient

Table 2 Comparison of Resident Performance by Station Assignment (Depressed SP vs. Non-Depressed SP) on Five OSCE Components in an Acute Cardiac Case

Variable	Depressed SP station N=97	Non-depressed SP station N=88	Significance
	Mean (SD)	Mean (SD)	
History	11.97 (2.01)	12.80 (2.05)	$t(183) = -2.77, p = 0.006$, Cohen's $d = 0.41$
Physical exam	2.18 (1.14)	2.11 (1.23)	NS
Patient counseling	2.49 (0.81)	2.49 (0.83)	NS
Patient-physician interaction	7.97 (1.73)	7.36 (2.09)	$t(183) = 2.24, p = 0.027$, Cohen's $d = 0.33$
SP satisfaction with encounter	0.80 (0.15)	0.77 (0.16)	NS

residents in the depressed station selected the correct workup plan vs. 76% of residents in the non-depressed station). This is different from studies in real-life situations, where patients with a charted history of depression received a lower-priority triage score than did those without a documented history of depression.⁵ It may be that residents in our testing situation chose the correct workup plan, as AMI has been taught as a “rule-out” diagnosis in acute chest pain. Alternatively, awareness of the simulated patient encounter and the nature of the encounter as an assessment of resident skills may have made the residents more acutely aware of their decision-making, and that awareness may have helped them overcome any potential cognitive bias.

The differences in facial expressions of residents when working with the depressed patients (more occurrences of the disgust affect) versus non-depressed patients (more occurrences of a neutral affect) were small but interesting. These could be explained by differences in the content of the discussion between the resident and patient or perhaps by an unconscious bias of which the resident was unaware. The differences noted in the facial expressions of residents by gender might represent a mirroring of the patients' expressions by the female residents, a manifestation of empathy,²⁵ and could help

Table 4 Workup Plan by OSCE Station (Depressed SP vs. Non-Depressed SP)

Score	Workup		OSCE station		Total
			Depressed	Not depressed	
1	No mention of EKG or cardiac enzymes	Count % within OSCE station	0 _a 0.0%	0 _a 0.0%	0 0.0%
2	EKG or cardiac enzymes	Count % within OSCE station	31 _a 59.6%	21 _a 40.4%	52 100.0%
3	EKG and cardiac enzymes but no additional workup	Count % within OSCE station	26 _a 51.0%	25 _a 49.0%	51 100.0%
4	EKG, cardiac enzymes, plus reasonable workup	Count % within OSCE station	40 _a 48.8%	42 _a 51.2%	82 100.0%
Total count			97	88	185
Total %			52.4%	47.6%	100.0%

Results of comparisons between column counts/proportions are shown using subscripts (a). Proportions with the same subscript are not significantly different, while proportions with different subscripts are significantly different from one another at $p \leq 0.05$

explain the increased likelihood of patient satisfaction with the encounter when the clinician was female.

In terms of limitations, the most obvious is the artificiality of the situation. Although previous research has suggested that the OSCE is appropriate for testing interventions susceptible to social desirability bias,¹⁹ we cannot rule out the possibility that residents may have adopted an apprehensive participant role during the study, thus altering their behavior so as to appear unbiased against those with mental health issues. In support of the idea that demand characteristics may have influenced residents' behaviors, the encounter videos showed that SP depression behaviors were frequently exaggerated (i.e., crying) relative to the diagnosis of mild depression found

Table 3 Diagnosis by OSCE Station (Depressed SP vs. Non-Depressed SP)

Score	Differential diagnosis (DDX)		OSCE station		Total
			Depressed	Not depressed	
1	DDX no mention of AMI/UA/ACS	Count	21 _a	17 _a	38
2–4	2 = reasonable DDX including AMI/UA/ACS, 3 = all 3 reasonable DDX AMI/UA/ACS not first, 4 = all 3 reasonable DDX AMI/UA/ACS mentioned first	% within OSCE station	21.6%	19.3%	20.5%
		Count	76 _a	71 _a	147
		% within OSCE station	78.4%	80.7%	79.5%
		Total count	97	88	185
		Total %	100.0%	100.0%	100.0%

Results of comparisons between column counts and proportions are shown using subscripts (a). Proportions with the same subscript are not significantly different, while proportions with different subscripts are significantly different from one another at $p \leq 0.05$
AMI acute myocardial infarction, UA unstable angina, ACS acute coronary syndrome

in their chart. The increased salience of depressive symptoms may have been a cue to residents as to the purpose of the study. Although all participants volunteered for the study, the OSCE was a requirement of the residency program at one site, and optional at the other site.

In summary, our study revealed differences in the evaluation and care of a person with depression and cardiac illness. However, there was no correlation with explicit bias. Additional studies with even larger groups are needed to examine the effects of physician attitudes and behaviors on the care of people with comorbid physical and mental health conditions, to understand the factors that impact clinical outcomes for this population.

Acknowledgements: *This project was supported by funding from the Association of American Medical Colleges (AAMC) Southern Group on Educational Affairs and the Western Group on Educational Affairs. The authors thank them both for their support.*

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Compliance with Ethical Standards:

Conflict of Interest: *The authors declare that they do not have a conflict of interest.*

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