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Effect of a Coaching Intervention to Improve Cardiologist Communication
A Randomized Clinical Trial

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IMPORTANCE Communication between cardiologists and patients can significantly affect patient comprehension, adherence, and satisfaction. To our knowledge, a coaching intervention to improve cardiologist communication has not been tested.

OBJECTIVE To evaluate the effect of a communication coaching intervention to teach evidence-based communication skills to cardiologists.

DESIGN, SETTING, AND PARTICIPANTS This 2-arm randomized clinical trial was performed at outpatient cardiology clinics at an academic medical center and affiliated community clinics, and from February 2019 through March 2020 recruited 40 cardiologists and audio recorded 161 patients in the preintervention phase and 240 in the postintervention phase. Data analysis was performed from March 2022 to January 2023.

INTERVENTIONS Half of the cardiologists were randomized to receive a coaching intervention that involved three 1:1 sessions, 2 of which included feedback on their audio-recorded encounters. Communication coaches taught 5 skills derived from motivational interviewing: (1) sitting down and making eye contact with all in the room, (2) open-ended questions, (3) reflective statements, (4) empathic statements, and (5) "What questions do you have?"

MAIN OUTCOMES AND MEASURES Coders unaware of study arm coded these behaviors in the preintervention and postintervention audio-recorded encounters (objective communication). Patients completed a survey after the visit to report perceptions of communication quality (subjective communication).

RESULTS Analysis included 40 cardiologists (mean [SD] age, 47 [9] years; 7 female and 33 male) and 240 patients in the postintervention phase (mean [SD] age, 58 [15] years; 122 female, 118 male). When controlling for preintervention behaviors, cardiologists in the intervention vs control arm were more likely to make empathic statements (intervention: 52 of 117 [44%] vs control: 31 of 113 [27%]; $P = .05$); to ask, "What questions do you have?" (26 of 117 [22%] vs 6 of 113 [5%]; $P = .002$); and to respond with empathy when patients expressed negative emotions (mean ratio of empathic responses to empathic opportunities, 0.50 vs 0.20; $P = .004$). These effects did not vary based on patient or cardiologist race or sex. We found no arm differences for open-ended questions or reflective statements and were unable to assess differences in patient ratings due to ceiling effects.

CONCLUSIONS AND RELEVANCE In this randomized clinical trial, a communication coaching intervention improved 2 key communication behaviors: expressing empathy and eliciting questions. Empathic communication is a harder-level skill that may improve the patient experience and information comprehension. Future work should explore how best to assess the effect of communication coaching on patient perceptions of care and clinical outcomes and determine its effectiveness in larger, more diverse samples of cardiologists.

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Supplemental content

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Evidence links effective communication to patient outcomes, including adherence, satisfaction,[1,2] and malpractice suits.[3] Furthermore, evidence links effective communication to clinician satisfaction,[4] which can decrease medical errors and departure from the workforce.[3,5] Clinicians can learn effective communication via face-to-face courses[6-9] and interactive computer programs[10,11] that include practice and tailored feedback.[12] Communication coaching shows signals for improving communication, patient satisfaction, and clinician burnout.[4,13-15] However, studies have been small, nonrandomized, and lacked objective assessments. We chose to study cardiologists because they frequently navigate challenging conversations with patients with serious illness, yet are understudied.[16-18]

Our aim was to determine whether communication coaching improved (1) objectively rated cardiologist communication from audio-recorded encounters, (2) subjectively rated cardiologist communication reported by patient surveys, and (3) cardiologist burnout.

Key Points

Question What is the effect of a communication coaching intervention on an objective measure of the quality of communication during cardiology encounters?

Findings In this randomized clinical trial including 40 cardiologists, 161 preintervention patients, and 240 postintervention patients, a communication coaching intervention improved cardiologist use of empathic statements, their responses to empathic opportunities, and their elicitation of questions from patients.

Meaning Cardiologists can learn more effective ways to communicate with patients via 1:1 communication coaching.

Methods

Study Setting and Population

Our methods have been reported elsewhere,[19] and the trial protocol is included in Supplement 1. We enrolled cardiologists at an academic medical center or affiliated community-based clinics. We asked clinic leaders to enroll themselves and introduce the study. We recruited either via group presentations or via email. Cardiologists completed written informed consent and a baseline survey. We randomized cardiologists in a 1:1 ratio to either the intervention or control arm via a method of minimization[20] to ensure balance across: cardiologist sex, prior communication training, and specialty (procedural/nonprocedural). Based on our prior communication studies, we paid cardiologists $200 as an incentive for potentially receiving feedback.[11,21,22] Eligible patients consented to have their encounter audio recorded and completed a survey after the encounter. Eligible patients were adults (≥18 years of age), were seen in the outpatient setting by an enrolled cardiologist, were Black or White (50% each), and spoke English. We paid patients $20 for their time. This study received approval by the Duke Health Institutional Review Board. This study followed the Consolidated Standards of Reporting Trials (CONSORT) reporting guideline.

Intervention Arm

An experienced coach met with each cardiologist in the intervention arm to teach 5 evidence-based communication skills that have been linked to higher patient satisfaction and comprehension. The coach taught an acronym, "WISER," we hoped would help cardiologists remember the behaviors that were derived from core skills included in motivational interviewing[23-25] (eFigure 2 in Supplement 2)[6-8]: (1) walk in, sit down, and make eye contact with all in the room, (2) invite: ask open-ended questions (cannot be answered with a yes or no), (3) say back: make reflective statements (paraphrasing what patients said to show active listening), (4) emotion: use empathic communication (eg, naming the emotion "You seem scared" or using the "Wish statement," such as "I wish things were different")[16-18] and (5) revisit concerns: ask "What questions do you have?"[26-30] Open-ended questions allow patients to tell their story. Reflective statements show patients they are being heard. Addressing emotion shows care and improves comprehension and reduces distress.[27-30] "What questions do you have?" increases patient comfort in asking questions.[26,31] The coaching model uses adult learning principles[9] that include strength-based, experiential learning, reinforcement of behaviors done correctly, and offering suggestions for minor "tweaks."[32]

The principal investigator (K.I.P.) developed the coaching intervention[33] that included 3 sessions: a 1:1 didactic session (approximately 30-45 minutes) and 2 feedback sessions reviewing 2 audio-recorded and coded encounters (30 minutes each and approximately 1.75 hours each, respectively). Cardiologists audio recorded 2 of their challenging encounters. Coaches coded transcriptions using WISER. Coaches emailed cardiologists the skills they performed well and those they suggested they tweak. There was variation in the length of time for cardiologists to complete the coaching intervention, as some took longer to audio record their encounters (mean [SD], 5.9 [3.4] months; range, 2.25-15 months).

Control Arm

Cardiologists randomized to the control arm did not receive coaching.

Data Collection and Measures

Cardiologists completed a baseline survey that included demographic data and the Maslach Burnout Inventory.[34] Prior to randomization, we recruited 4 patients per cardiologist (eFigure 1 in Supplement 2). Front clinic staff handed eligible patients a tablet computer that contained the consent form. After consent, patients completed a baseline survey, audio recorded their encounter on a tablet, and then completed a post-encounter survey. All cardiologists completed a final survey that assessed burnout; intervention physicians also reported their impressions of the intervention and its influence on their communication. Finally, after randomization and coaching (if applicable), we audio recorded 6 additional patients per cardiologist using the same procedures. We attempted to standardize the length of time for audio recording postintervention

encounters across arms. Thus, we paired each cardiologist in the intervention arm with one in the control arm and started recording patients for both when the intervention arm cardiologist completed their coaching.

Audio Recording Outcomes

Cardiologist Behaviors: WISER

Three coders who were unaware of study arm coded the transcripts while listening to the audio-recorded encounter. They coded WISER based on established codebooks (ie, Motivational Interviewing Treatment Integrity manual,[35] and Suchman's codebook for patient emotion and empathic responses[36]). They double coded 10% of the encounters and achieved excellent interrater reliability (intraclass correlation coefficients, 0.84-0.99).

Global Ratings of the Communication

Although not a priori, our team created global codes to rate the overall tone of the encounter. A different team of 3 coders applied these codes. Each global code used a 5-point Likert scale: flow (how well conversation flowed between cardiologist and patient), attentiveness (how attentive cardiologists were to patients), concerns (how much cardiologists addressed patient concerns), warmth (how warm cardiologists were), and respect (how much cardiologists showed respect for patients). Coders started each cardiologist at a "3" and used dynamic coding throughout the encounter when cardiologists did something that either improved or worsened their score. The last score given became the final score. We double coded 10% of the encounters with excellent interrater reliability (intraclass correlation coefficients, 0.92-0.99).

Patient Outcomes

Interpersonal Processes of Care

We used the short form of the Interpersonal Processes of Care (IPC) to measure interpersonal aspects of care[37]: hurried communication, elicited concerns, explained results, patient-centered decision-making, perceived physician level of respect, and perceived discrimination due to race or ethnicity scale (1 = never to 5 = always); α < .70, with several scales requiring reverse scoring.

Trust in Physician

We used the 5-item Trust in Physician scale (1 = strongly disagree to 5 = strongly agree); α = .87.[38] In a prior study, we found differences in trust among patients seen by oncologists in the intervention vs control arm.[11]

The CARE Measure

Patients completed the consultation and relational empathy (CARE) measure to report cardiologist empathy (1 = poor to 5 = excellent); α = .93.[39]

Physician Outcomes

Burnout

At baseline and the final survey, we assessed the Maslach Burnout Inventory,[40] which has 3 subscales: emotional exhaustion, depersonalization, and personal accomplishment.

Process Data

We asked cardiologists how helpful they found the intervention (1 = not at all helpful and 6 = extremely helpful) and whether they would recommend it to a colleague (1 = definitely would not recommend and 6 = definitely would recommend).

Statistical Analysis

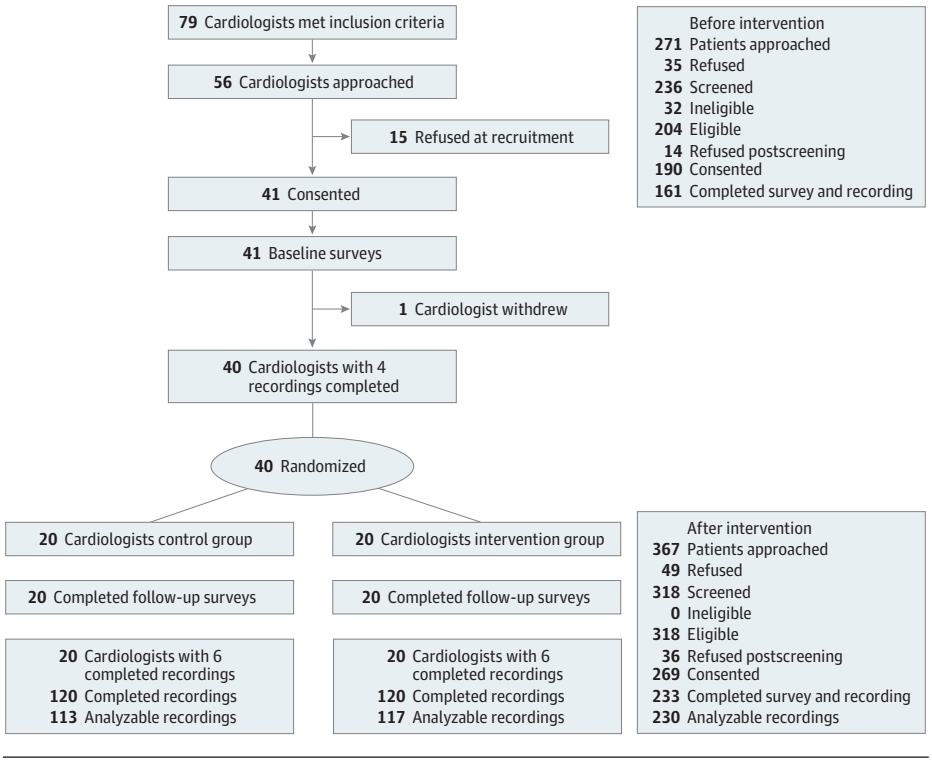
Sample size calculations were based on the quality of communication statements exhibiting a count distribution. Methods for the difference in 2 Poisson rates (ie, incident rate ratio [IRR]) in a cluster randomized design were implemented via PASS 2018.[41] A clinically meaningful IRR was defined as at least 1.5.[41] With a sample size of 240 patient encounters in the postintervention period (6 per cardiologist, with 40 randomized cardiologists) and a type I error of 5%, we had 80% estimated power to detect an IRR of at least 1.5 between intervention and control.

Two of the outcomes (empathic statements and elicited questions [eg, "What questions do you have?"]) had a low frequency, with more than half of the encounters equal to 0; therefore, we dichotomized these as 0 vs greater than 0. Generalized linear models with a binomial link for the dichotomous variables and a negative binomial link for the count variables were used to estimate the effect of the intervention compared with control of outcomes in the postintervention period. Models were fit using PROC GENMOD in SAS, version 9.4 (SAS Institute), with standard errors accounting for clustering of encounters by cardiologist and adjusted for the randomization stratification variables (see eFigure 4 in Supplement 2 for SAS code). Because the preintervention and postintervention patients were different, the models also adjusted for each cardiologist's mean of the outcome across the preintervention recordings. Intervention effects are presented as adjusted IRRs for the count variables and adjusted odds ratios for the binary variables.

Additionally, for the a priori communication behavior outcomes, we conducted prespecified analyses to investigate the differential effect of the intervention in encounters with Black patients as compared with White patients. We also conducted post hoc analyses based on the literature[42-45] to investigate the differential effect of the intervention in encounters with (1) female compared with male patients; (2) female compared with male cardiologists; (3) White compared to non-White cardiologists; (4) cardiologists with more than 15 years of training compared to 15 or fewer years of training. Model specification details are in the footnotes of the tables presenting these results. For all analyses, we calculated 2-tailed *P* values, with a value of .05 considered statistically significant.

In further post hoc analyses, we examined each of the global rating scales individually. In addition, we used exploratory factor analysis on the total sample of preintervention and postintervention recordings to determine if the 5 global codes could be combined. General linear models with normal distribution link function (PROC GENMOD) were used to estimate the effect of the intervention compared with control for each of the scales individually as well as the factor score.

Figure. CONSORT Diagram



We used general linear models to estimate the intervention effect on changes from preintervention to postintervention in the 3 subscales of the Maslach Burnout Inventory. Models were adjusted for the randomization stratification variables and fit using PROC MIXED in SAS (version 9.4), with an unstructured correlation to account for repeated measures within each cardiologist.

Finally, due to ceiling effects across the patient outcomes (ie, trust, IPC, CARE) both at preintervention and postintervention, we were unable to test intervention effects with inferential methods.

Results

We recruited 41 cardiologists starting in February 2019 through March 2020 (40 included in analyses; mean [SD] age, 47 [9] years; 7 female and 33 male). We recruited 161 patients in the preintervention phase and 240 different patients (mean [SD] age, 58 [15] years; 122 female, 118 male) in the postintervention phase (**Figure**). Our refusal rates were low among cardiologists and patients (15 of 79 [19%] and 35 of 271 [13%], respectively). We did not see any significant predictors of refusal among cardiologists and patients. Most cardiologists were male and White (**Table 1**). Almost a third reported having some communication training in the past. More cardiologists in the intervention arm were White than in the control arm. Cardiologists reported low burnout for depersonalization and personal accomplishment and moderate burnout for emotional exhaustion.[46] About half of the patients were female and Black (**Table 2**); their mean age was 58 years, with younger patients among cardiologists randomized to the intervention arm. Most had education beyond high school, were married, and had some form of insurance. The mean (SD) length of time from randomization to the time of each encounter was 8.6 (4.8) months and 9.0 (6.0) months in the intervention and control arms, respectively (eFigure 3 in Supplement 2).

Cardiologist Communication Behavior Counts

Of the 240 conversations recorded, 230 were included in the analyses (n = 117 intervention and n = 113 control). We found no arm differences in the mean number of open-ended questions or reflective statements (**Table 3**). Cardiologists in the intervention arm were more likely to make empathic statements than cardiologists in the control arm (percentage of encounters with ≥1 empathic statements, intervention: 52 of 117 [44%] vs control: 31 of 113 [27%]; P = .05) and more likely to ask, "What questions do you have?" (26 of 117 [22%] vs 6 of 113 [5%] encounters; P = .002). Among the conversations with at least 1 empathic opportunity (n = 48 intervention arm and n = 35 in control arm), intervention cardiologists were more likely to respond with empathy (mean ratio of empathic responses to empathic opportunities for intervention cardiologists, 0.50, vs 0.20 for control cardiologists; P = .004).

Intervention Effects by Patient Race

When examining whether the intervention effect differed by patient race, we found no significant interactions among the models for which we had adequate sample size to conduct interaction analyses (eTable 2 in Supplement 2).

Table 1. Cardiologist Characteristics

Characteristic	No. (%) Total (n = 40)	Intervention (n = 20)	Control (n = 20)	*P* value
Sex at birth				
Female	7 (17)	3 (15)	4 (20)	>.99
Male	33 (83)	17 (85)	16 (80)	
Specialty type: procedural	15 (38)	8 (40)	7 (35)	>.99
Training: no prior communication training	27 (68)	14 (70)	13 (65)	>.99
Age, mean (SD), y	47 (9)	46 (9)	48 (9)	.59
Race[a]				
American Indian or Alaska Native	0	0	0	.05
Asian	10 (25)	4 (20)	6 (30)	
Black or African American	2 (5)	0	2 (10)	
Native Hawaiian or Pacific Islander	0	0	0	
White	25 (63)	16 (80)	9 (45)	
Another race[b]	2 (5)	0	3 (15)	
Prefer not to answer	2 (5)	1 (5)	0	
Ethnicity				
Hispanic or Latino	3 (8)	1 (5)	2 (10)	NA
Prefer not to answer	1 (3)	0	1 (5)	
Average No. of direct patient care hours per week, mean (SD)	30 (15)	29 (15)	32 (14)	.51
Practice specialty[c]				
General	14 (35)	6 (30)	8 (40)	NA
Electrophysiology	7 (18)	4 (20)	3 (15)	
Interventional	7 (18)	3 (15)	4 (20)	
Advanced heart failure	8 (20)	5 (25)	3 (15)	
Cardiac imaging	3 (8)	1 (5)	2 (10)	
Congenital disease	1 (3)	1 (5)	0	
Years in practice[d]				
<1	1 (3)	0	1 (5)	.75
1-5	3 (8)	0	3 (15)	
6-10	7 (18)	5 (25)	2 (10)	
11-15	9 (23)	6 (30)	3 (15)	
>15	20 (50)	9 (45)	11 (55)	

Abbreviation: NA, not applicable.

[a] *P* value represents White vs non-White comparison between arms.

[b] "Another race" was an option; this included 1 Middle Eastern participant, 1 Mexican participant, and 1 who preferred not to answer.

[c] *P* value not calculated because practice specialty categories not collapsed.

[d] *P* value represents greater than 15 years vs 15 years or fewer comparison between arms.

Post Hoc Analyses

In post hoc analyses, we examined these behaviors within the intervention arm from intervention completion to time of audio recording completion. We found no patterns of depreciation of these behaviors from those for whom we collected the data within 1 month compared with those for whom it took greater than 6 months (eTable 1 in Supplement 2). We also examined whether the intervention differed based on patient sex, cardiologist race, cardiologist sex, and cardiologist years from training. We found no significant interactions that the intervention was affected by any of these factors (Table 3; eTables 3 and 4 in Supplement 2).

Cardiologist Global Scores

In further post hoc analyses, we found that cardiologists in the intervention arm had higher estimated mean scores for flow than those in the control arm (0.36; *P* = .05). The scores for the other factors also favored the intervention arm cardiologists, but none reached statistical significance (**Table 4**). Our factor analyses on the total sample of preintervention and postintervention recordings (n = 392) revealed a single-factor solution with warmth, attentiveness, respect, and concerns yielding factor loadings (0.73, 0.74, 0.70, and 0.66, respectively) above the common benchmark of 0.6.[47] The 4 items were combined into a single standardized score, ie, Global Score Factor. There was no statistically significant improvement on the 4-item Global Score Factor (adjusted mean difference, 0.20; *P* = .10; Table 4).

Patient Outcomes

We were unable to test for arm differences in patient perceptions of cardiologist communication. Among the 233 patients, the median score on the CARE measure was 50 in both the intervention and control arms (144 [62%] reported the maximum value of 50). Similar ceiling effects were seen across the IPC subscales, with 156 (67%) and 213 (92%) reporting a minimum value of 1.0 (most positive) on the "hurried communication" and "discrimination" subscales, respectively; and 191 (82%), 192 (89%), 176 (78%), and 197 (85%) with a maximum

Table 2. Postintervention Patient Characteristics

Characteristic	No. (%) Total (n = 240)	Intervention (n = 120)	Control (n = 120)	*P* value
Age, mean (SD), y	58 (15)	56 (15)	60 (14)	.04
Sex at birth				
Female	122 (52)	59 (48)	63 (52)	.60
Male	118 (48)	61 (52)	57 (48)	
Race				
Black or African American	118 (49)	58 (48)	60 (50)	.90
White	122 (51)	62 (52)	60 (50)	
Ethnicity: Hispanic or Latino	2 (1)	1 (1)	1 (1)	NA
Education[a]				
Eighth grade or less	1 (<1)	0	1 (1)	.54
Some high school, completed high school or GED	53 (22)	29 (24)	24 (20)	
Vocational or trade school	15 (6)	7 (6)	8 (7)	
Some college or university but no degree	39 (16)	15 (13)	24 (20)	
Associate's degree from college or university	23 (10)	10 (8)	13 (11)	
Bachelor's degree	46 (19)	25 (21)	21 (18)	
Some graduate or professional school	8 (3)	2 (2)	6 (5)	
Graduate or professional degree	48 (20)	28 (23)	20 (17)	
Missing	7 (3)	4 (3)	3 (3)	
Marital status				
Married or live with a partner	139 (58)	66 (55)	73 (61)	.35
Single, widowed, separated, divorced	91 (38)	49 (41)	42 (35)	
Missing or prefer not to answer	10 (4)	5 (4)	5 (4)	
Employment				
Working full time or part time	85 (35)	43 (36)	42 (35)	.86
Unemployed, retired, disabled, student, stay-at-home parent	148 (62)	73 (61)	75 (63)	
Missing	7 (3)	4 (3)	3 (3)	
Insurance				
Plan purchased via employer or union	89 (37)	49 (41)	40 (33)	NA
Plan, self or family purchased	6 (3)	4 (3)	2 (2)	
Medicare	95 (40)	38 (32)	57 (48)	
Medicaid	27 (11)	16 (13)	11 (9)	
TRICARE	8 (3)	6 (5)	2 (2)	
Some other source	4 (2)	1 (1)	3 (3)	
None	4 (2)	2 (2)	2 (2)	
Missing	7 (3)	4 (3)	3 (3)	
Income[b]				
After paying the bills, you still have enough money for special things that you want	117 (49)	56 (47)	61 (51)	.95
You have enough money to pay the bills, but little spare money to buy extra or special things	69 (29)	33 (28)	36 (30)	
You have money to pay the bills, but only because you have cut back on things	18 (8)	8 (7)	10 (8)	
You are having difficulty paying the bills, no matter what you do	12 (5)	6 (5)	6 (5)	
Prefer not to answer	17 (7)	13 (11)	4 (3)	
Missing	7 (3)	4 (3)	3 (3)	

Abbreviations: GED, General Educational Development; NA, not applicable.

[a] *P* value represents high school degree vs greater than high school degree comparison between arms.

[b] *P* value represents enough money for special things vs all other responses comparison between arms.

value of 5.0 (most positive) on "elicited concerns," "explained results," "decision making," and "compassionate respectful," respectively. Finally, the median score on the Trust in Physician scale was 21 (maximum 25) in both the intervention and control arms (158 [68%] patients had a score of 21).

Cardiologist Burnout

We found no arm differences in preintervention to postintervention change in cardiologist burnout for any of the 3 subscales (emotional exhaustion, depersonalization, or personal accomplishment) (data not shown).

Table 3. Physician Communication Behaviors in Postintervention Patients (WISER)

Behavior	Intervention (n = 117)	Control (n = 113)	Intervention vs control, IRR (95% CI)	*P* value
Reflective statements, mean (SD)[a]	13.15 (9.96)	11.95 (8.81)	1.07 (0.81-1.42)	.63
Open-ended questions, mean (SD)[a]	3.28 (2.89)	3.41 (2.84)	1.03 (0.75-1.42)	.85
Empathic statements [>0 vs 0], No. (%)[a,b]	52 (44)	31 (27)	OR (95% CI): 2.10 (1.00-4.42)	.05
What questions do you have? [>0 vs 0], No. (%)[a,b]	26 (22)	6 (5)	OR (95% CI): 4.89 (1.81-13.20)	.002
Ratio of empathic responses to empathic opportunities, mean (SD) [No.][c,d]	0.50 (0.47) [48]	0.20 (0.36) [35]	NA	.004

	Black patients (n = 112)				White patients (n = 118)				Black vs White patients (n = 230)	
	Intervention (n = 56)	Control (n = 56)	Intervention vs control, adjusted IRR (95% CI)[e]	*P* value	Intervention (n = 61)	Control (n = 57)	Intervention vs control, adjusted IRR (95% CI)[e]	*P* value	Intervention vs control, adjusted IRR (95% CI)[f]	*P* value for interaction
Reflective statements, mean (SD)	11.9 (9.5)	11.5 (9.0)	1.0 (0.7-1.51)	.91	14.3 (10.3)	12.4 (8.7)	1.1 (0.8-1.5)	.50	1.0 (0.7-1.3)	.75
Open-ended questions, mean (SD)	3.5 (3.1)	3.7 (3.1)	1.1 (0.8-1.5)	.80	3.1 (2.7)	3.1 (2.6)	1.1 (0.8-1.6)	.58	1.1 (0.7-1.7)	.73
Empathic statements [>0 vs 0], No. (%)	24 (43)	15 (27)	Adjusted OR (95% CI): 2.0 (0.8-5.3)[e]	.16	28 (46)	16 (28)	Adjusted OR (95% CI): 2.4 (0.9-6.5)[e]	.09	Adjusted OR (95% CI): 0.9 (0.3-2.8)[f]	.85
What questions do you have? [>0 vs 0], No. (%)[g]	20 (36)	4 (7)	Unadjusted OR (95% CI): 7.2 (2.1-31.0)	<.001	6 (10)	2 (4)	Unadjusted OR (95% CI): 3.0 (0.5-31.4)	.27	NA	NA
Ratio of empathic responses to empathic opportunities, mean (SD) [No.][h]	0.54 (0.48) [27]	0.36 (0.44) [15]	NA	.25	0.45 (0.46) [21]	0.09 (0.24) [20]	NA	.006	NA	NA

	Female patients (n = 115)				Male patients (n = 115)				Female vs male patients (n = 230)	
	Intervention (n = 57)	Control (n = 58)	Intervention vs control, adjusted IRR (95% CI)[e]	*P* value	Intervention (n = 60)	Control (n = 55)	Intervention vs control, adjusted IRR (95% CI)[e]	*P* value	Intervention vs control, adjusted IRR (95% CI)[i]	*P* value for interaction
Reflective statements, mean (SD)	13.8 (10.3)	13.7 (10.4)	1.0 (0.7-1.5)	.84	12.5 (9.6)	10.1 (6.3)	1.1 (0.8-1.5)	.53	0.9 (0.7-1.2)	.38
Open-ended questions, mean (SD)	3.6 (3.0)	3.9 (3.3)	1.0 (0.7-1.6)	.88	3.0 (2.8)	2.9 (2.1)	1.0 (0.7-1.5)	.94	1.1 (0.7-1.7)	.80
Empathic statements [>0 vs 0], No. (%)	28 (49)	18 (31)	Adjusted OR (95% CI): 2.1 (0.8-5.1)[e]	.12	24 (40)	13 (24)	Adjusted OR (95% CI): 1.9 (0.7-5.2)[e]	.24	Adjusted OR (95% CI): 0.9 (0.3-2.9)[i]	.88
What questions do you have? [>0 vs 0], No. (%)[g]	16 (28)	3 (5)	Unadjusted OR (95% CI): 7.2 (1.8-40.2)	.001	10 (17)	3 (5)	Unadjusted OR (95% CI): 3.5 (0.8-20.5)	.08	NA	NA
Ratio of empathic responses to empathic opportunities, mean (SD) [No.][h]	0.6 (0.5) [30]	0.3 (0.4) [22]	NA	.02	0.4 (0.5) [18]	0.1 (0.3) [13]	NA	.09	NA	NA

Abbreviations: IRR, incident rate ratio; NA, not applicable; OR, odds ratio.

[a] Models adjusted for cardiologists' mean number of communication behaviors across their preintervention recordings, and the randomization stratification variables: cardiologist sex, practice type, and prior communication training.

[b] Proportion of encounters for which the physician had at least 1 empathic statement or elicit question.

[c] Wilcoxon test used to generate *P* value.

[d] Sample restricted to only those conversations with at least 1 empathic opportunity.

[e] Models fit within each subgroup and adjusted for cardiologists' mean number of communication behaviors across their preintervention recordings, cardiologist sex, practice type, and prior communication training.

[f] Models include main effects for patient race, intervention group, and the race by intervention group interaction and adjusted for cardiologists' mean number of communication behaviors across their preintervention recordings, cardiologist sex, practice type, and prior communication training. An IRR and OR less than 1 indicate that encounters with Black patients have a smaller intervention effect than encounters with White patients. An IRR and OR greater than 1 indicate that encounters with Black patients have a larger intervention effect compared to encounters with White patients.

[g] Adjusted models and interaction model not fit due to low number of events in outcome variable.

[h] Wilcoxon test used to generate *P* value. Sample restricted to only those conversations with at least 1 empathic opportunity. Adjusted models and interaction model not fit due to small sample size.

[i] Models include main effects for patient sex, intervention group, and the sex by intervention group interaction and adjusted for cardiologists' mean number of communication behaviors across their preintervention recordings, cardiologist sex, practice type, and prior communication training. An IRR and OR less than 1 indicate that encounters with female patients have a smaller intervention effect than encounters with male patients. An IRR and OR greater than 1 indicate that encounters with female patients have a larger intervention effect compared with encounters with male patients.

Table 4. Global Rating Scales

Global code	Mean (SD)		Intervention vs control, mean difference (95% CI)[a]	*P* value
	Intervention (n = 117)	Control (n = 113)		
Attentiveness	3.8 (0.9)	3.8 (0.9)	0.02 (−0.20 to 0.30)	.90
Flow	3.3 (1.0)	2.9 (1.1)	0.36 (0.01 to 0.71)	.05
Concern	4.2 (0.7)	4.0 (0.8)	0.16 (−0.03 to 0.34)	.10
Respect	4.0 (0.9)	3.8 (1.0)	0.22 (−0.03 to 0.46)	.08
Warmth	3.6 (0.8)	3.5 (0.9)	0.10 (−0.16 to 0.35)	.45
Factor: warmth, attentiveness, concern, and respect	0.1 (1.0)	−0.1 (1.0)	0.20 (−0.04 to 0.45)	.10

[a] Models adjusted for cardiologists' mean scores across their preintervention recordings, and the randomization stratification variables: cardiologist sex, practice type, and prior communication training.

Cardiologist Process Data

Cardiologists viewed the intervention favorably. Most viewed the coaching intervention as very helpful in improving their skills (scores ranging from 70%-80%): empathic communication, asking open-ended questions, making reflective statements, and eliciting questions. Of the 20 cardiologists in the intervention arm, 20 (95%) said they had changed their clinical practice after the coaching, and 16 (80%) felt it made them more effective communicators. Most (16 [80%]) felt it was worth their time, and 17 (85%) would recommend it to a colleague.

Discussion

This study represents, to our knowledge, the first relatively large, randomized clinical trial testing a communication coaching intervention for cardiologists. There are 3 key findings. First, communication coaching improved 2 of the 4 assessable skills. Second, we were unable to identify any effects of the coaching intervention on patient perceptions of communication. And third, cardiologists viewed the intervention very favorably.

Communication coaching improved the skill that might have the greatest impact and arguably represents a high-level communication skill: empathic communication. Even more powerful than reflecting back what patients say, making empathic statements (eg, "I cannot imagine how hard this is to hear.") represents a powerful way to show patients that cardiologists are trying to understand them. The intervention more than doubled how often cardiologists responded with empathy to patients. The level of empathic response among those in the control arm was comparable to that of untrained clinicians in other specialties.[48] Further, cardiologists in the intervention arm spontaneously made more empathic statements. Therefore, the coaching intervention had a significant and potentially sustainable effect on the amount of empathy that cardiologists expressed, which has been shown to have an impact on both patient distress and comprehension.[27-29]

The intervention also increased how frequently cardiologists asked, "What questions do you have?" and the odds of the effect was 4 times higher in the intervention arm than the control arm. Phrasing the question that way assumes the default is that patients have questions. This might increase the number of questions patients ask and reduce barriers to question asking, including concerns about physician time or how that may be perceived, especially for those with low literacy.[16,49] We found these effects for those for whom we collected the data more quickly vs those for whom it took longer with no depreciation in skills.

Further, the intervention led to differences in global codes of the encounter. Coders rated cardiologists in the intervention arm as having better flow. Patients spoke more and cardiologists interrupted less in the intervention arm than in the control arm. When patients talk more, they report higher patient satisfaction.[50,51] Although it did not reach statistical significance, coders also rated intervention cardiologists more favorably on warmth, addressing patient concerns, respect, and attentiveness. These global ratings may represent areas of effective communication that address domains of patient-centered communication or areas that facilitate patient satisfaction with communication and are not easily captured with behavior counts.[52]

There were no differences in cardiologists' use of open-ended questions or reflective statements in coaching vs control arms. Asking open-ended questions and making reflective statements serve as the cornerstone for patient-centered communication, allowing patients to talk more and direct the conversation. Cardiologists in both arms had relatively high rates of both behaviors, making improving challenging. Indeed, almost a third had reported receiving communication training in the past. There also were no differences of the intervention based on patient or clinician race or sex. We likely were underpowered to detect differences in post hoc analyses.

We were unable to assess arm differences in patient ratings of cardiologist communication or trust due mostly to even higher than expected ceiling effects on the measures.[53,54] Our prior work in oncology showed that when oncologist empathy improved, patients gave higher ratings of trust as well as greater satisfaction.[11,18,55] We also were unable to assess an effect of the coaching on burnout, as cardiologists in this study had low levels of burnout at baseline.[46]

Finally, cardiologists who received the coaching viewed it favorably. They thought it improved their skills, changed their practice, and was worth their and possibly their colleagues' time. When cardiologists agreed to be coached, they agreed to be vulnerable and have a coach view their communication. Some had not been observed in 20 years. The coach's positive approach, noting strengths more than "tweaks," might have improved both learning and the experience of the cardiologists. Physicians often feel they hear what they are doing

wrong. Hearing what they are doing right made their learning experience ideal.

Limitations

These results should be viewed with some limitations. Most of the cardiologists were White males practicing in an academic medical center; nearly one-third reported prior communication training, making these results less generalizable to more diverse samples of cardiologists who practice in nonacademic settings. We also have not assessed how to scale this intervention more broadly. We also conducted the study amid the COVID-19 pandemic and were unable to assess the effects of the pandemic on communication (eg, wearing masks, providing/receiving care via telemedicine).

Conclusions

Despite these limitations, findings of this randomized clinical trial show robust effects for improving cardiologist communication via a coaching intervention. Most importantly, cardiologists learned how to recognize and respond to emotion, a challenging skill that might be best taught in a 1:1 fashion. Future studies should attempt to develop or identify measures that may better capture patient perceptions of cardiologist communication in response to coaching, test strategies to scale communication coaching, and assess the potential effect of coaching on health care outcomes.

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