



The role of patient-physician relationship on health-related quality of life and pain in cancer patients

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Abstract

Purpose Health-related quality of life (HRQOL) and pain are important supportive cancer care outcomes. The patient-provider relationship, a modifiable care experience, has been linked to healthcare outcomes; however, less is known about associations between patient-provider relationship and supportive care outcomes in cancer patients. We examined the role of multiple aspects of the patient-provider relationship in explaining patterns of HRQOL and pain among breast and lung cancer patients.

Methods Our analysis included 283 breast and lung cancer patients from two cancer centers. Clinical data and survey data on patient sociodemographic factors, physical and mental HRQOL, pain, and patient-physician relationship (i.e., doctor's respectfulness, time spent with doctors, patient involvement in decision-making, satisfaction with care, and following doctor's advice/treatment plan) were collected at baseline and during treatment. We estimated adjusted modified Poisson regression models to assess associations between patient-physician relationship factors and physical and mental HRQOL and pain.

Results Compared with patients reporting suboptimal respect from doctors, patients reporting optimal respect were less likely to report below average physical HRQOL (adjusted risk ratio (ARR), 0.73; 95%CI, 0.62–0.86), below average mental HRQOL (ARR, 0.71; 95%CI, 0.54–0.93), and moderate-to-severe pain (ARR, 0.53; 95%CI, 0.35–0.79). Patients reporting optimal involvement in care decision-making and patients who reported following their doctor's advice/treatment plan were less likely to report below average mental HRQOL than their respective counterparts (ARR, 0.64; 95%CI, 0.50–0.83; ARR, 0.65; 95%CI, 0.48–0.86).

Conclusion Multiple patient-physician relationship factors account for variations in HRQOL and pain in cancer patients. These findings provide insight into potential targets for improving the patient-provider relationship and supportive cancer care outcomes.

Keywords Quality of life · Pain · Patient-physician relationship · Symptom management · Equity

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Background

Health-related quality of life (HRQOL) and pain are important patient-reported outcomes of supportive cancer care [1]. Compared with the general population, cancer patients report significantly poorer physical and mental HRQOL [2]. Moreover, pain is one of the most commonly reported symptoms among cancer patients undergoing treatment [1]. Poor HRQOL and inadequate pain control have been linked to greater risk for developing other symptoms (e.g., insomnia, depression), early discontinuation of cancer treatment [1, 3–6], and worse progression-free survival [7]. Thus, identifying the modifiable contributors to HRQOL and pain outcomes in cancer patients is critical to enhancing cancer care quality.

The patient-provider relationship plays an important role in care processes and patient outcomes [8–11]. For example, in a study of rehabilitation patients with lower back pain, higher patient satisfaction with care and trust in the physician were associated with reductions in pain severity 6 months post-rehabilitation [12]. In another study of veteran patients, patient perceptions of provider communication were associated with patient-reported pain interference and intensity [13]. In the context of HRQOL, a study examining the relationship between patient-provider communication and HRQOL among cancer patients showed that patients experiencing more challenges in interpersonal communication reported lower physical and mental HRQOL [10]. One possible explanation for these associations is that positive patient-provider relationships enhance patient-centered care, including symptom management and supportive care services that more strongly align with patient values and preferences [14–16].

While most prior studies examining the role of the patient-provider relationship on patient treatment outcomes have primarily focused on patient-provider communication in non-cancer settings, less is known about the role of other aspects of the patient-provider relationship (e.g., patient perceptions of respect from doctors, shared decision-making, time spent with doctors) in explaining HRQOL and pain outcomes among cancer patients. In this study, we assessed associations between the patient-provider relationship and HRQOL and pain burden in cancer patients.

Methods

Study objective

The primary objective of the study was to evaluate the role of the patient-provider relationship in explaining variations in patient-reported outcomes among cancer patients. Specifically, we examined statistical associations between

five patient-provider relationship factors (i.e., doctor's respectfulness, time spent with doctors, patient involvement in decision-making, satisfaction with care, following doctor's advice/treatment plan) and three patient-reported outcomes (i.e., mental HRQOL, physical HRQOL, and pain) in a cohort of breast and lung cancer patients undergoing treatment.

Study design

This study was a secondary analysis of survey data from the Accountability for Cancer Care through Undoing Racism and Equity (ACCURE) study. ACCURE is a National Cancer Institute funded systems change intervention study (1R01CA150980-01A1) aimed at addressing longstanding racial disparities in treatment completion and quality among breast and lung cancer patients [17, 18]. The ACCURE study is informed by a community-based participatory research (CBPR) approach and grounded in the anti-racism principles of transparency (e.g., monitoring race-specific data on clinical performance) and accountability (e.g., "audit and feedback" to clinicians regarding patient clinical milestones) [19] for mitigating racial inequities in cancer care. Research partners include the University of North Carolina at Chapel Hill (UNC-CH), Greensboro Health Disparities Collaborative (GHDC), University of Pittsburgh Medical Center-Hillman Cancer Center (UPMC-HCC), and Cone Health Cancer Center (CHCC). The ACCURE study protocol was reviewed and approved by the Institutional Review Boards at UNC-CH and the University of Pittsburgh.

Study sites

Study participants were recruited from a community-based cancer center in Central North Carolina and an academic-based cancer center in Western Pennsylvania.

Participant eligibility

Research assistants (RAs) at each study site reviewed patient schedules embedded in the electronic health record (EHR) to screen eligible patients in the following cancer clinics: breast surgery, thoracic surgery, oncology, and multi-disciplinary specialty. Black and White patients aged 18–85 with a new diagnosis of stage I or II breast or lung cancer were eligible for study participation. Persons who were pregnant, unable to speak English, with cognitive impairment, or returning to clinic for a follow-up visit (i.e., not an initial diagnostic visit) were excluded. The study design flowchart (Fig. 1) details the ACCURE participant screening, eligibility, and inclusion for this analysis. The first row reflects the total number of screened patients, most of whom were ineligible for study participation due to a non-cancer diagnosis, a follow-up care visit, a cancer diagnosis other than breast or

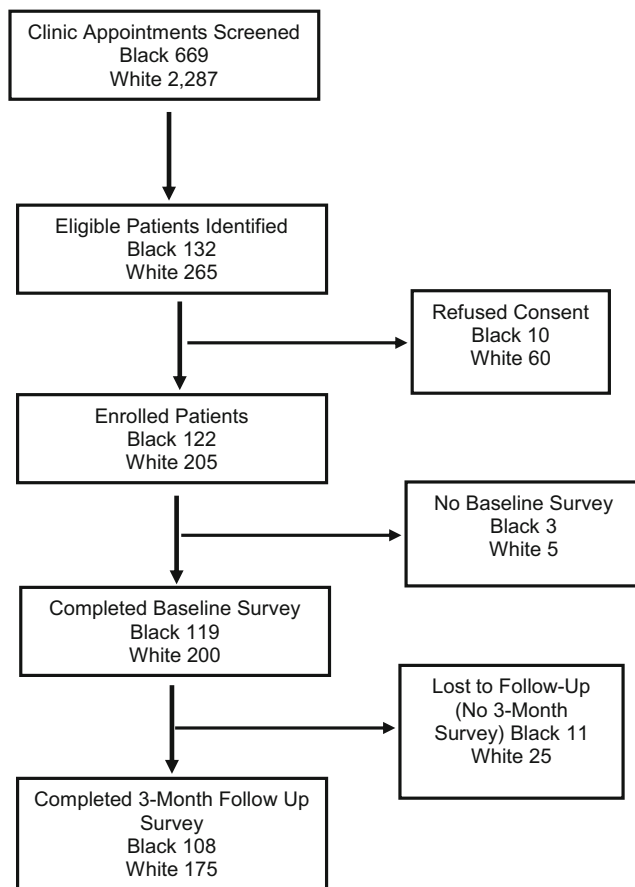


Fig. 1 Study design flow chart. Note: the study design flowchart details ACCURE participant screening, eligibility, and inclusion for this analysis. The first row reflects the total number of screened patients, most of whom were ineligible for study participation due to a non-cancer diagnosis, a follow-up care visit, a cancer diagnosis other than breast or lung, or advanced cancer stage beyond stage II

lung, or advanced cancer stage beyond stage II. Patients were recruited between April 2013 and March 2015. Study participants provided written informed consent at enrollment and received a \$25 enrollment incentive for baseline survey participation, and \$10 for each completed follow-up survey (four 3-month follow-up surveys in year 1 and four 6-month follow-up surveys during years 2 and 3). Given the aims of this secondary data analysis, which are to assess associations between the patient-physician relationship and HRQOL and pain severity during treatment, we limited this analysis to patients who participated in the baseline and the first 3-month follow-up surveys.

Data collection

Patient characteristics Participant sociodemographic data (e.g., race, age, gender, marital status, zip code) were obtained by the RA at enrollment and through EHR chart review. Clinical characteristics (e.g., cancer type, cancer stage, year

of diagnosis, comorbid conditions, and treatments) were obtained from the EHR and cancer registry at each cancer center.

Survey data Community partners from the GHDC were trained to conduct survey interviews with ACCURE participants. Survey items reflected psychosocial and health care experience measures including patient-reported outcomes (e.g., HRQOL, pain severity) and patient-physician relationship factors. Survey data were collected via telephone by trained GHDC interviewers and entered directly into a web-based data management system specifically built for ACCURE. Data were collected at baseline, with follow up at 3, 6, 9, 12, 18, 24, 30, and 36 months, during April 2013 through November 2017. All data were captured, stored, and managed using the ACCURE data management system which is housed on a secure server at the Cecil G. Sheps Center for Health Services Research at UNC-CH.

Measures

Independent variables: patient-physician relationship

Patient-physician relationship was assessed using five survey questions from the Commonwealth Fund 2001 Health Care Quality Survey [20], which capture key components and standards of high-quality health care. Questions were slightly modified to specifically reference patients' cancer care experiences (Table 1). Three survey questions asked patients to reflect on their last oncology clinic visit in evaluating (1) doctors' respectfulness; (2) amount of time spent with their doctors; and (3) doctors' involvement of patient in decision-making. The fourth question asked patients about (4) their overall satisfaction with the quality of their healthcare; and the fifth question (5) asked whether patients' did not follow a doctor's advice or treatment plan at any time in the past 3 months. Based on participants' responses to each survey question, we generated five binary variables reflecting whether participants reported the "optimal/ideal" response option as follows: (1) respect—a great deal of respect vs. less than a great deal of respect; (2) amount of time spent with doctor—as much time as desired vs. less than as much time as desired; (3) involvement in decision-making—as much involvement as desired vs. less than as much involvement as desired; (4) satisfaction with care—very satisfied vs. not very satisfied; and, (5) did not follow doctor's advice—yes vs. no (ideal response given question framing). All patient-provider relationship measures originated from the 3-month follow-up survey.

Primary outcomes: physical HRQOL, mental HRQOL, and pain severity

HRQOL was assessed using the 10-item patient-reported outcomes measurement information system tool (PROMIS Global 10, Appendix Table 1), which evaluates patients' physical, mental, and social domains of HRQOL/

Table 1 Patient-physician relationship questions

1. Respect (“Respect”)

Think of your last visit with your doctors at the cancer center. Would you say the doctors treated you with a great deal of respect and dignity, a fair amount, not too much, or none at all?

2. Amount of time spent with doctor (“Time Spent with Doctor”)

Would you say that the doctors have spent as much time with you as you have wanted, almost as much as you have wanted, less than you have wanted, or a lot less than you have wanted?

3. Involvement in decision-making (“Involvement in Decisions”)

Would you say that the doctors at the cancer center involve you in decisions about your care as much as you have wanted, almost as much as you have wanted, less than you have wanted, or a lot less than you have wanted?

4. Satisfaction with quality of healthcare (“Satisfaction with Care”)

Overall, how satisfied or dissatisfied are you with the quality of health care you have received at the cancer center? Would you say you are very satisfied, somewhat satisfied, somewhat dissatisfied, or very dissatisfied?

5. Did not follow doctor’s advice or treatment plan (“Did not follow doctor’s advice”)

Has there been a time in the last 3 months when you did not follow the doctors’ advice, or treatment plan, get a recommended test or see a referred doctor? Yes or No

Each measure of patient-physician relationship converted to binary variable reflecting optimal level of satisfaction as follows: 1) Respect: a great deal of respect (a great deal of respect and dignity) vs. less than a great deal of respect (a fair amount, not too much, or none at all); 2) Amount of time spent with doctor: as much time as desired (as much time with you as you have wanted) vs. less than as much time as desired (almost as much as you have wanted, less than you have wanted, or a lot less than you have wanted); 3) Involvement in Decisions: as much involvement as desired (as much as you have wanted) vs. less than as much involvement as desired (less than you have wanted, or a lot less than you have wanted); 4) Satisfaction with quality of healthcare: very satisfied (very satisfied) vs. not very satisfied (somewhat satisfied, somewhat dissatisfied, very dissatisfied); 5) Did not follow doctor’s advice or treatment plan: yes vs. no (optimal response option given question framing)

function [21]. Our analysis focused on the physical and mental HRQOL/function subscale domain scores. Physical and mental HRQOL subscale scores were dichotomized based on raw scores approximating the standard mean T score for the US population (mental = 15 and physical = 16) [22, 23]. Specifically, patients with physical function scores < 16 were categorized as having less than average physical function, while patients with mental HRQOL scores < 15 were classified as having less than average mental function. Moderate-to-severe pain severity was assessed based on patient responses to the following PROMIS item: “In the past 7 days, how would you rate your pain on average (0 = No Pain to 10 = Worst Pain Imaginable)?” Informed by methodologies employed in prior pain-related studies [24], patients with a pain severity of ≥ 5 were grouped into the moderate-to-severe pain category. All outcome measures originated from the 3-month follow-up survey.

Covariates Study covariates included clinical variables (i.e., cancer type, cancer stage, year of diagnosis, Charlson comorbidity, treatment receipt (surgery, chemotherapy, and radiation)), baseline sociodemographic characteristics (i.e., race, age, gender, marital status, education), baseline pain-severity, baseline physical HRQOL, baseline mental HRQOL, and study site.

Statistical analyses

Consistent with the CBPR approach of equitable involvement of all research partners, our team of community (including

cancer survivors), academic, and medical partners collaborated in analyzing and interpreting the data. Additionally, our academic-community partners helped to further contextualize the results in a manner that is consistent with the anti-racism principles of the parent study. We report the overall distribution of patients by demographic and clinical characteristics, as well as the distribution of patient HRQOL and pain outcomes by patient-physician relationship categories and race. We evaluated differences in HRQOL and pain outcomes by patient-physician relationship categories using chi-squared tests. For the outcome analysis, we estimated a series of unadjusted and covariate-adjusted modified Poisson regression models [25] examining associations between each patient-physician relationship measure and (1) physical HRQOL, (2) mental HRQOL, and (3) pain severity. Moreover, given longstanding, well-documented disparities in cancer care outcomes [17, 18] and the racial equity focus of the ACCURE study, as a secondary study objective, we also examined and report on racial differences in our patient-physician relationship measures and primary outcomes.

Results

Among the 327 participants enrolled in the study, 283 (86.5%) completed both, the baseline and first three-month follow-up survey. Table 2 displays clinical and sociodemographic characteristics of the study sample. Participants were predominantly female (85.2%), White (61.8%), educated beyond high school (54.8%), lived alone or were widowed (52.7%), and

Table 2 Baseline demographic and clinical characteristics of study population

Characteristics	Total <i>N</i>	%
Overall	283	100
Sex		
Female	259	85.2
Male	42	14.8
Race		
White	175	61.8
Black	108	38.2
Age, years		
≤ 55	75	26.5
56 to 65	71	25.1
66 to 75	90	31.8
≥ 76	47	16.6
Education		
HS or less	126	45.2
More than HS	153	54.8
Marital status		
Living alone or widowed	147	52.7
Living with significant other	132	47.3
Charlson Comorbidity Index (CCI)		
≤ 1	204	73.1
≥ 2	75	26.9
Cancer type		
Breast	178	62.9
Lung	105	37.1
Cancer stage		
I	206	73.8
II	73	26.2
Surgery		
No	70	24.7
Yes	213	75.3
Chemotherapy		
No	209	24.7
Yes	74	75.3
Radiation		
No	182	64.3
Yes	101	35.7
Pain severity		
Low/no pain	197	69.6
Moderate/severe	86	30.4
Physical function		
Average or better	119	42.4
Less than average	162	57.6
Mental function		
Average or better	142	50.9
Less than average	137	49.1
Year of diagnosis		
2013	99	35.0
2014	148	52.3

Table 2 (continued)

Characteristics	Total <i>N</i>	%
2015	36	12.7
Study location/site		
Academic CC	130	45.9
Community CC	153	54.1

Numbers may not always add up to 100% due to missing data. *Marital status: living with significant other includes marriage or any other cohabitation. CC, cancer center; HS, high school

had one or no comorbidities (73.1%). Most participants were breast cancer patients (62.9%).

Table 3 shows unadjusted comparisons of outcomes by patient-physician relationship measures. Compared with patients reporting the highest level of respect from their provider, patients who reported less than a great deal of respect were more likely to report less than average physical HRQOL (89.7% vs. 67.1%, $p < 0.05$) and mental HRQOL (76.9% vs. 44.9%, $p < 0.05$). Similarly, patients who perceived less than a great deal of respect from their doctor were also more likely to report moderate-to-severe pain (59.0% vs. 31.3%, $p < 0.05$). Physical HRQOL and pain severity did not differ across the remaining patient-physician relationship measures. In terms of mental HRQOL, compared with their respective counterparts, patients reporting spending less time than desired with their doctor (65.7% vs. 47.5%), less than desired involvement in decision making (72.3% vs. 44.3%), and those indicating that they did not follow doctor's advice (82.4% vs. 46.9%) were more likely to report less than average mental HRQOL ($p < 0.05$ for comparison with their counterparts reporting "optimal/ideal" patient-physician relationship scores).

Regarding our secondary objective of examining racial differences in patient-physician relationship and our primary outcomes, we did not observe statistically significant unadjusted racial differences in most patient-physician relationship measures, with the exception of not following the doctor's advice (Appendix Table 2). Compared with White patients, Blacks were more likely to report not following doctor's advice (10.4% vs. 3.4%, $p < .05$). In unadjusted analyses, Black patients were also more likely to report less than average physical function (79.6% vs. 63.9%, $p < .05$), mental function (57.9% vs. 44.2%, $p < 0.05$), and moderate-to-severe pain (49.1% vs. 26.9%, $p < .05$) than their White counterparts (Appendix Table 2).

Regression analyses

Results from the covariate unadjusted and adjusted regression models examining associations between patient-physician relationship and physical HRQOL, mental HRQOL, and pain

Table 3 Patient-physician relationship measures by physical HRQOL, mental HRQOL, and pain at 3-month follow-up

	Total <i>N</i>	Average or better physical function <i>N</i> (%)	Less than average physical function <i>N</i> (%)	Average or better mental function <i>N</i> (%)	Less than average mental function <i>N</i> (%)	No-low pain <i>N</i> (%)	Moderate-severe pain <i>N</i> (%)
Respect							
Less than a great deal	39	4 (10.3)	35 (89.7)	9 (23.1)	30 (76.9)	16 (41.0)	23 (59.0)
A great deal	240	78 (32.9)	159 (67.1)	130 (55.1)	106 (44.9)	165 (68.7)	75 (31.3)
Time Spent with doctor							
Less than desired	35	9 (25.7)	26 (74.3)	12 (34.3)	23 (65.7)	20 (57.1)	15 (42.9)
As much as desired	246	73 (30.0)	170 (70.0)	127 (52.5)	115 (47.5)	161 (65.4)	85 (34.6)
Involvement in decisions							
Less than desired	47	10 (21.3)	37 (78.7)	13 (27.7)	34 (72.3)	26 (55.3)	21 (44.7)
As much as desired	232	72 (31.4)	157 (68.6)	127 (55.7)	101 (44.3)	154 (66.4)	78 (33.6)
Satisfaction with care							
Not very satisfied	38	9 (24.3)	28 (75.7)	16 (42.1)	22 (57.9)	22 (57.9)	16 (42.1)
Very satisfied	243	74 (30.7)	167 (69.3)	124 (51.9)	115 (48.1)	159 (65.4)	84 (34.6)
Did not follow doctor's advice							
Yes	17	4 (23.5)	13 (76.5)	3 (17.6)	14 (82.4)	8 (47.1)	9 (52.9)
No	264	80 (30.6)	181 (69.4)	138 (53.1)	122 (46.9)	174 (65.9)	90 (34.1)

% reflect proportion of total *N* for each response category (row) of patient-physician factor italicized values indicate statistical significance at $p < .05$

are shown in Tables 4, 5, and 6 respectively. In terms of physical HRQOL (Table 4), patients who reported a great deal of respect were less likely to report less than average physical HRQOL than patients reporting suboptimal respect—Model 1 (unadjusted risk ratio, 0.72; 95% CI, 0.62–0.84). Respect remained associated with physical HRQOL even after adjusting for patient sociodemographic and clinical factors—Model 2 (adjusted risk ratio (ARR), 0.73; 95% CI, 0.62–0.86). No other patient-physician relationship factors were associated with physical HRQOL. Race and comorbidities were also predictors of physical HRQOL. Black patients had an increased risk of less than average physical HRQOL than their White counterparts (ARR, 1.18; 95% CI, 1.01–1.39); meanwhile, compared with patients with a Charlson comorbidity index of less than two, those with a score of two or more were more likely to have less than average physical HRQOL (ARR, 1.21; 95% CI, 1.04–1.41). Baseline physical HRQOL was also a predictor of physical HRQOL at follow-up (ARR, 1.55; 95% CI, 1.27–1.88).

In unadjusted analyses (Table 5, Model 1), all patient-physician relationship factors except for time spent with doctor were associated with mental HRQOL. Physician respect remained statistically significantly associated with a lower likelihood of reporting below average mental HRQOL after adjusting for patient sociodemographic and clinical factors and the addition of other patient-physician relationship measures—Model 2 (ARR, 0.71; 95% CI, 0.54–0.93). Patient satisfaction with care involvement remained

associated with a lower likelihood of reporting below average mental HRQOL after adjusting for other patient-physician relationship measures—Model 2 (ARR, 0.64; 95% CI, 0.50–0.83). Patients who reported always following their doctor's advice or treatment plan in the past 3 months also had a lower risk of reporting less than average mental HRQOL in adjusted analyses—Model 2 (ARR, 0.65; 95% CI, 0.48–0.86). Satisfaction with care was no longer associated with mental HRQOL in the adjusted model (Model 2). Baseline mental HRQOL was a predictor of mental HRQOL at follow-up (ARR, 2.06; 95% CI, 1.53–2.77). There was no statistically significant association between race and mental HRQOL.

In unadjusted analyses, physician respect was statistically significantly associated with pain severity (Table 6), with patients who reported the highest level of respect from their doctors being at a 50% decreased risk of reporting moderate-to-severe pain relative to patients who did not report optimal respect from their doctors—Model 1 (unadjusted RR, 0.50; 95% CI, 0.34–0.74). Physician respect remained associated with moderate-to-severe pain after adjusting for patient clinical and sociodemographic factors—Model 2 (ARR, 0.53; 95% CI, 0.35–0.79). No other patient-physician relationship factors were associated with pain severity. Our analysis also confirmed racial differences in pain severity (Model 2). In adjusted analyses, Black patients were more likely than their White counterparts to report moderate-to-severe pain (ARR, 1.66; 95% CI, 1.18–2.35). Baseline pain was also associated with pain at follow-up (ARR, 3.21; 95% CI, 2.31–4.46).

Table 4 Associations between patient-physician relationship and below average physical HRQOL

	Risk Ratios (95% CI)	
	Unadjusted	Adjusted
Patient-physician relationship measures	Model 1	Model 2
Respect		
(A great deal vs. less than a great deal)	<i>0.72 (0.62–0.84)</i>	<i>0.73 (0.62–0.86)</i>
Time spent with doctor		
(As much as desired vs. less than desired)	1.03 (0.80–1.33)	1.10 (0.89–1.36)
Involvement in decisions		
(As much as desired vs. less than desired)	0.94 (0.76–1.15)	0.92 (0.77–1.10)
Satisfaction with care		
(Very satisfied vs. not very satisfied)	1.14 (0.87–1.48)	1.08 (0.84–1.37)
Did not follow doctor's advice		
(No vs. yes)	0.95 (0.72–1.26)	0.99 (0.78–1.27)
Other measures		
Baseline physical HRQOL (<average vs. ≥average)	–	<i>1.55 (1.27–1.88)</i>
Race (Black vs. White)	–	<i>1.18 (1.01–1.39)</i>
Sex (Male vs. Female)	–	1.01 (0.81–1.25)
Age (ref, ≤ 55)		
56 to 65	–	1.12 (0.89–1.40)
66 to 75	–	1.08 (0.86–1.35)
≥ 76	–	1.08 (0.83–1.40)
Education (>HS vs. HS or less)	–	0.83 (0.72–0.97)
Marital Status (w/other vs. alone)	–	0.97 (0.83–1.14)
Comorbidities (≥ 2 vs. < 2)	–	<i>1.21 (1.04–1.41)</i>
Cancer Type (lung vs. breast)	–	1.07 (0.88–1.31)
Cancer Stage (stage 2 vs. 1)	–	1.04 (0.87–1.25)
Surgery (yes vs. no)	–	0.98 (0.81–1.18)
Chemotherapy (yes vs. no)	–	1.15 (0.95–1.39)
Radiation (yes vs. no)	–	1.00 (0.85–1.19)
Study Site (academic vs. community)	–	1.04 (0.89–1.23)
Year of diagnosis	–	1.04 (0.93–1.16)

Italicized values indicate statistical significance at $p < .05$. HS, high school

Model 1: Covariate unadjusted model that includes only patient-physician relationship measures—respect, time spent with doctor, involvement in decisions, satisfaction with care, and did not follow doctor's advice

Model 2: Adjusted model that includes all patient-physician relationship measures and adjusts for race gender, age, education, marital status, baseline pain, cancer type, stage and treatment modality, comorbidity, study intervention, and study site

Discussion

We examined the association between multiple aspects of the patient-physician relationship and physical HRQOL, mental HRQOL, and pain severity among cancer patients. We observed that patients perceiving the highest levels of respect from their doctors were less likely, than those perceiving sub-optimal respect, to report below average physical and mental HRQOL and moderate-to-severe pain severity. These associations held strong even after adjusting for sociodemographic,

clinical, and other patient-physician relationship measures. Additionally, optimal patient involvement in shared decision making and following advice from one's doctor were associated with better mental HRQOL. We also observed racial disparities in pain severity and physical functioning, with Blacks reporting worse pain severity and physical HRQOL than their White counterparts.

Prior studies have documented associations between the patient-provider relationship, particularly patient-provider communication and health outcomes [9, 10]. However, to

Table 5 Associations between patient-physician relationship and below average mental HRQOL

	Risk ratios (95% CI)	
	Unadjusted	Adjusted
Patient-physician relationship measures	Model 1	Model 2
Respect (A Great Deal vs. Less than a Great Deal)	<i>0.61 (0.46–0.82)</i>	<i>0.71 (0.54–0.93)</i>
Time spent with doctor (As much as desired vs. less than desired)	1.04 (0.74–1.44)	1.10 (0.83–1.45)
Involvement in decisions (As Much as Desired vs. Less than Desired)	<i>0.65 (0.48–0.86)</i>	<i>0.64 (0.50–0.83)</i>
Satisfaction with care (Very satisfied vs. not very satisfied)	<i>1.48 (1.02–2.15)</i>	1.19 (0.82–1.73)
Did not follow doctor's advice (No vs. Yes)	<i>0.58 (0.43–0.78)</i>	<i>0.65 (0.48–0.86)</i>
Other measures		
Baseline Mental HRQOL (<average vs. ≥average)	–	2.06 (1.53–2.77)
Race (Black vs. White)	–	1.00 (0.77–1.30)
Sex (Male vs. Female)	–	0.89 (0.58–1.35)
Age (ref, ≤ 55)		
56 to 65	–	1.04 (0.76–1.43)
66 to 75	–	0.66 (0.46–0.95)
≥ 76	–	0.72 (0.46–1.06)
Education (>HS vs. HS or less)	–	0.58 (0.46–0.74)
Marital Status (w/other vs. alone)	–	1.06 (0.83–1.36)
Comorbidities (≥ 2 vs. < 2)	–	1.12 (0.84–1.49)
Cancer Type (lung vs. breast)	–	1.06 (0.78–1.44)
Cancer Stage (stage 2 vs. 1)	–	0.95 (0.72–1.25)
Surgery (yes vs. no)	–	0.87 (0.67–1.14)
Chemotherapy (yes vs. no)	–	1.28 (0.98–1.67)
Radiation (yes vs. no)	–	1.06 (0.83–1.36)
Study site (academic vs. community)	–	1.06 (0.84–1.34)
Year of diagnosis	–	1.01 (0.85–1.21)

Italicized values indicate statistical significance at $p < .05$. HS, high school

Model 1: Covariate unadjusted model that includes only patient-physician relationship measures—respect, time spent with doctor, involvement in decisions, satisfaction with care, and did not follow doctor's advice

Model 2: Adjusted model that includes all patient-physician relationship measures and adjusts for race gender, age, education, marital status, baseline pain, cancer type, stage and treatment modality, comorbidity, study intervention, and study site

our knowledge, this is the first study to examine associations between multiple aspects of the patient-provider relationship and supportive care outcomes (e.g., pain, physical HRQOL, mental HRQOL) in a racially diverse cohort of cancer patients in active treatment. Our observation of an association between patients' perceived respect from physicians (i.e., reflects both verbal and non-verbal patient-provider communication) and HRQOL/pain severity suggests that worse HRQOL/pain severity may be linked to physicians' failure to validate and adequately address patients' symptom reports. In a recent qualitative study of symptom management experiences among breast cancer survivors, our research team also

identified clinician disregard of patient symptom concerns as a commonly reported barrier to symptom management [26]. In addition to negatively impacting symptom resolution, it is possible that clinician failure to validate and act upon patients' symptoms may engender patient perceptions of clinician disrespect. Similarly, the observed association between inadequate patient involvement in medical decision-making (i.e., reflects verbal patient-provider communication) and worse mental HRQOL may reflect incompatibility between a patients' perceived need for involvement in care decision-making and a clinician's judgment of patient need for involvement in care [27, 28], with clinicians placing greater weight on

Table 6 Associations between patient-physician relationship and moderate-to-severe pain

	Risk ratios (95% CI)	
	Unadjusted	Adjusted
Patient-physician relationship measures	Model 1	Model 2
Respect (A great deal vs. less than a great deal)	<i>0.50 (0.34–0.74)</i>	<i>0.53 (0.35–0.79)</i>
Time spent with doctor (As much as desired vs. less than desired)	1.05 (0.64–1.74)	1.30 (0.83–2.05)
Involvement in decisions (As much as desired vs. less than desired)	0.90 (0.55–1.47)	1.00 (0.69–1.45)
Satisfaction with care (Very satisfied vs. not very satisfied)	1.41 (0.83–2.39)	1.14 (0.71–1.83)
Did not follow doctor's advice (no vs. yes)	0.69 (0.40–1.19)	0.92 (0.59–1.42)
Other measures		
Baseline pain (mod-severe vs. no-low)	–	<i>3.21 (2.31–4.46)</i>
Race (Black vs. White)	–	<i>1.66 (1.18–2.35)</i>
Sex (male vs. female)	–	0.65 (0.38–1.13)
Age (ref, ≤ 55)		
56 to 65	–	1.08 (0.71–1.67)
66 to 75	–	1.18 (0.77–1.78)
≥ 76	–	1.54 (0.97–2.46)
Education (>HS vs. HS or less)	–	0.83 (0.60–1.15)
Marital status (w/other vs. alone)	–	0.99 (0.71–1.38)
Comorbidities (≥ 2 vs. < 2)	–	1.20 (0.85–1.71)
Cancer type (lung vs. breast)	–	1.25 (0.83–1.87)
Cancer stage (stage 2 vs. 1)	–	1.32 (0.90–1.95)
Surgery (yes vs. no)	–	0.91 (0.61–1.36)
Chemotherapy (yes vs. no)	–	1.13 (0.74–1.71)
Radiation (yes vs. no)	–	1.06 (0.77–1.47)
Study site (academic vs. community)	–	1.34 (0.97–1.84)
Year of diagnosis	–	1.06 (0.83–1.36)

Italicized values indicate statistical significance at $p < .05$. *HS*, high school

Model 1: Covariate unadjusted model that includes only patient-physician relationship measures—respect, time spent with doctor, involvement in decisions, satisfaction with care, and did not follow doctor's advice

Model 2: Adjusted model that includes all patient-physician relationship measures and adjusts for race gender, age, education, marital status, baseline pain, cancer type, stage and treatment modality, comorbidity, study intervention, and study site

his/her professional autonomy, rather than patient autonomy, in the clinical decision-making process [15]. Additionally, the association between patient failure to follow doctors' instructions and worse mental HRQOL may reflect underlying challenges in the patient-provider relationship and/or patient care experience that impact a patients' willingness to follow their doctors' advice. For example, we observed moderate correlations between patient compliance with doctor's treatment plan/advice, and patient perceived respect from their doctor and overall satisfaction with care (data not shown), suggesting that the decision to follow the advice of one's doctor is partly explained by patient perceived experiences with care. Interestingly, the amount of time spent with doctors was not

associated with HRQOL or pain outcomes in this study, which underscores that the quality, rather than the quantity, of time spent with a clinician is most critical to enhancing patient supportive care outcomes [29].

As demonstrated in this study and prior research, the patient-physician relationship is an important and multifaceted driver of patient outcomes. Within the medical profession, there is a moral obligation of health care professionals to respect their patients [30]. Furthermore, shared decision-making is considered a critical component of the patient care experience [31, 32]. While there are several tools available to help guide providers in engaging their patients in shared decision-making [32, 33], few have been developed and

disseminated within the context of supportive cancer care. Furthermore, there is limited evidence on effective strategies for enhancing respect for patients among medical providers in a manner that is palpable for the patient [34]. Future research should further examine the mechanisms underlying the linkages between clinician respect for patients, patient involvement in medical decision-making, treatment compliance, and supportive care outcomes in oncology, as well as best practices for fostering respect for patients and shared decision-making in supportive cancer care.

Given the overarching goals of the ACCURE study, the data source for the current study, it is worth noting that the race-specific findings from this analysis are consistent with evidence from prior studies documenting racial disparities in physical functioning and pain severity both within and outside the oncology care setting [35–37]. Considering the potential impact of symptom burden on cancer treatment completion [6] and longstanding racial disparities in cancer treatment and survival, identifying, and addressing the drivers of inequitable supportive cancer care is critical. One potential contributor to racial disparities in physical HRQOL and pain severity is implicit bias among clinicians [38–40]. Prior studies have reported that clinicians are less likely to screen racial/ethnic minorities for pain and HRQOL, but are more likely to underestimate pain severity and HRQOL needs in patients of color relative to Whites [41–44]. Additional research is needed to shed further light on the contribution of implicit bias to racial disparities in HRQOL and pain outcomes among cancer patients; however, the existing evidence suggests that routine monitoring of patient-reported symptom needs may be beneficial to achieving equity in supportive care outcomes. Specifically, recent studies have shown that integrating patient-reported outcomes (PROs) into routine oncology care facilitates more timely and patient-centered symptom management by enabling oncology providers to track patient symptoms, particularly worsening symptoms, over time [45–47]. Such system-based and patient-centered approaches to improving symptom management can help mitigate the influence of implicit bias in HRQOL and pain assessments and increase transparency and accountability for racial equity in supportive cancer care through race-specific symptom monitoring.

This study has some limitations worth noting. Given the focus on Blacks and Whites with early-stage breast or lung cancer, findings may not generalize to patients of other racial/ethnic backgrounds, those with later stage disease, or other cancer types. Also, we only assessed the physical and mental domains of HRQOL which may not be representative of overall HRQOL or other aspects of HRQOL (e.g., financial burden, spiritual wellbeing). We also did not collect data on supportive care services received by patients, which may help shed further light on the causal link between patient-provider relationships and HRQOL/pain outcomes. Additionally, we

were unable to account for variations in the number and types of physicians/clinicians providing care to each patient (e.g., patient followed by the same oncologist over time vs. patient followed by multiple oncologists over time) or racial concordance/discordance between patient and physician, which may, collectively and individually, impact a patient's perception of the patient-physician relationship. With regard to patient-physician concordance/discordance, national data reveal that less than 3% of US oncologists identify as Black/African-American, thus it is very likely that more Black participants were in race discordant patient-physician pairs than White participants [48]. Moreover, as this was an observational, cross-sectional analysis, we are unable to confirm causality in our models; though, the existing literature supports causality leading from patient care experiences to outcomes [9, 12, 13, 49]. Future research should include intervention studies that assess the impact of improving the patient-physician relationship (e.g., through physician trainings) on supportive care outcomes in cancer patients. Strengths of this study include our multi-site study design which included patient recruitment from a community-based cancer center and an academic-based comprehensive cancer center. We also examined five aspects of the patient-physician relationship—respect, decision making, time spent with doctors, satisfaction with care, and following the doctor's advice—in order to capture the breadth of patient-physician interactions. Additionally, our use of a CBPR approach to study racial disparities in pain management is a novel and important contribution to the supportive cancer care literature, as this approach enabled us to glean perspectives from a diverse group of stakeholders in analyzing and interpreting our findings.

Conclusions

To our knowledge, this is the first study to examine the role of multiple aspects of the patient-physician relationship on HRQOL and pain severity within a diverse cohort of early-stage breast and lung cancer patients in active treatment. Physician respect for patients, shared decision-making, and following the advice of one's physician emerged as strong predictors of physical and mental HRQOL and pain severity. Additionally, racial disparities were observed in pain and physical well-being. Future research should explore strategies for improving the quality of multiple aspects of the patient-provider relationship, as well as equity, in the context of supportive cancer care.

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Compliance with ethical standards

Conflicts of interest Jennifer Schaal, MD, has stock or other ownership in Abbvie, Inc.; BristolMyers Squibb; Pfizer; United Health Group; Merck&Co; Walgreens Boots; Johnson&Johnson, and Abbott Labs. All other authors have no conflicts of interests to report.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

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