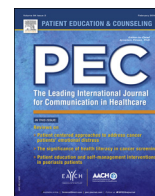




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Does physician communication style impact patient report of decision quality for breast cancer treatment?

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ABSTRACT

Objective: Provider communication that supports patient autonomy has been associated with numerous positive patient outcomes. However, to date, no research has examined the relationship between perceived provider communication style and patient-assessed decision quality in breast cancer.

Methods: Using a population-based sample of women with localized breast cancer, we assessed patient perceptions of autonomy-supportive communication from their surgeons and medical oncologists, as well as patient-reported decision quality. We used multivariable linear regression to examine the association between autonomy-supportive communication and subjective decision quality for surgery and chemotherapy decisions, controlling for sociodemographic and clinical factors, as well as patient-reported communication preference (non-directive or directive).

Results: Among the 1690 women included in the overall sample, patient-reported decision quality scores were positively associated with higher levels of perceived autonomy-supportive communication from surgeons ($\beta = 0.30$; $p < 0.001$) and medical oncologists ($\beta = 0.26$; $p < 0.001$). Patient communication style preference moderated the association between physician communication style received and perceived decision quality.

Conclusion: Autonomy-supportive communication by physicians was associated with higher subjective decision quality among women with localized breast cancer. These results support future efforts to design interventions that enhance autonomy-supportive communication.

Practice implications: Autonomy-supportive communication by cancer doctors can improve patients' perceived decision quality.

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1. Introduction

A patient-centered approach is increasingly recognized as a central component of delivering high quality medical care [1,2]. A distinguishing feature of patient-centered care, in contrast to the

more traditional physician-dominated paradigm, involves engaging patients as active participants in decision-making [3]. Several key components of patient-centered physician communication have been identified [4,5], such as eliciting patient input, shared agenda-setting, offering choices, providing a meaningful rationale for treatment options, minimizing pressure and coercion, acknowledging patient feelings and perspectives [4–6], and supporting patient autonomy [7,8]. This style of communication overlaps with key elements of shared decision making [9–11], and motivational interviewing [6], and is consistent with autonomy-supportive health care [1,2,7,8].

The centrality of autonomy support in patient-centeredness is rooted in the principles of Self-Determination Theory (SDT)

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[12–14]. According to SDT, autonomy support refers to the interpersonal sentiment and behavior one person provides to enhance another's perceived locus of causality, volition, and perceived choice regarding a certain action [15]. Based on this theory, patients should more often perceive themselves to be autonomous when their provider supports their sense of volition and choice [12–14]. Findings from a recent meta-analysis demonstrated that autonomy-supportive communication by physicians has been associated with a variety of positive patient outcomes, and this positive association is generally consistent across different study designs, health behaviors, treatment settings and contexts across cultures [13].

Specifically, numerous studies have shown that a perceived higher level of practitioner autonomy support is positively associated with health behaviors such as smoking cessation [16–18], weight loss, glucose control [19–21], and medication adherence [22,23]. Only one study to date has examined the association of perceived autonomy-support and patient satisfaction [24], which demonstrated a positive association between the two.

Autonomy-supportive communication by clinicians may be particularly important for breast cancer patients [25] since after diagnosis, breast cancer patients quickly encounter numerous complex decisions that add to their emotional burden of anxiety, uncertainty, and fear. For example, for newly diagnosed women facing surgical decisions, the surgeon's approach to exchanging information and making decisions can significantly impact their cancer experience. Specifically, patients given more decisional control in the choice of mastectomy versus breast conserving surgery report less depression, anxiety, and psychological morbidity, as well as higher levels of quality of life [26–30]. Patient satisfaction and recall of information has also been shown to relate to the quality of doctor-patient communication during the initial oncology consultation [31,32].

The aim of this study was to explore the association between patients' perceptions of autonomy-supportive communication by surgeons and medical oncologists and patient-appraised quality of their breast cancer surgery and chemotherapy decisions. We hypothesized that those patients who reported higher levels of autonomy-supportive communication from their physicians would report better decision quality for these key breast cancer treatment decisions.

2. Methods

2.1. Survey and study population

Data for this analysis come from the *iCanCare Study*, a large diverse population-based study of women newly diagnosed with localized breast cancer. Potentially eligible women aged 20–79 years and with Stage 0–II breast cancer, were identified via rapid case ascertainment approximately two months after surgical treatment via the Surveillance Epidemiology and End Results (SEER) registries of Georgia and Los Angeles County in 2013–2014. Eligible women were mailed survey packets approximately nine months post diagnosis. Surveys inquired about numerous aspects of women's treatment experiences including appraisal of decision making and physician communication, as well as knowledge, attitudes, and quality of life. To encourage participation, survey packets included a \$20 cash incentive. Women were excluded if they could not complete a survey in English or Spanish. We oversampled Latinas in Los Angeles using an approach described in detail previously [33].

This study was approved by the Institutional Review boards of University of Michigan, University of Southern California, and Emory University.

2.2. Measures

2.2.1. Subjective decision quality

Decision quality, our primary dependent variable, was measured via a five-item instrument we recently developed called the *Brief Subjective Decision Quality Measure* [34]. This patient-reported measure covers five domains of decision making: (1) decision regret and (2) satisfaction, (3) perceived adequacy of information to make the decision, (4) sufficient time to make the decision, and (5) level of decisional involvement.

Regret and satisfaction items were rated on five-point scales with three anchors (values of 2 and 4 were unlabeled) (1) "no regret/not at all satisfied," (3) "some regret/somewhat satisfied," and (5) "a lot of regret/totally satisfied." The satisfaction items were scored so that higher scores reflect more satisfaction. The regret item was reverse-coded, so higher scores reflect less regret.

Adequacy of information, time and involvement were also rated on five-point scales with three anchors only: (1) "not enough," (3) "just right," and (5) "too much." For these items, the criterion response representing a "high" quality decision was "just right," which was scored as a 5 for analysis. The responses "not enough" and "too much" were considered equally "low" quality aspects of the decision making process and were recoded so that value of 4 was recoded as 2 and a value of 5 was recoded as 1.

We inquired about each of these five dimensions of decision quality for breast cancer surgery decisions made with the respondent's surgeon as well as chemotherapy decisions made with the respondent's medical oncologist. The psychometric properties of the scale and complete scoring information have been reported in detail previously [34]. For this sample, Cronbach's alpha was 0.77 for surgical decisions and 0.86 for chemotherapy decisions.

We calculated composite subjective decision quality scores for decisions made with the surgeon and medical oncologist separately by summing the ratings of all the decision quality items and dividing by the total number of items completed to generate mean scores for surgery and chemotherapy. Scores range from 1 to 5, with higher scores indicating greater subjective decision quality.

2.2.2. Autonomy-supportive communication

Our primary independent variable was autonomy-supportive communication by surgeons and medical oncologists. The *Modified Health Care Climate Questionnaire* (mHCCQ) measures patients' perceptions of the degree to which their physician(s) provided autonomy-supportive (as opposed to controlling) communication [35]. Shortened from the original *Health Care Climate Questionnaire* [36], the mHCCQ contains six questions designed to assess each specific physician. In the survey, patients responded to six questions about breast cancer-specific interactions with their surgeon followed by the same six questions regarding interactions with their medical oncologist.

Pilot work using the mHCCQ in breast cancer patients [37] revealed variation in patient perceptions of autonomy-supportive communication across provider types. As a result, for this study, we asked patients to evaluate the autonomy supportive communication of surgeons and medical oncologists separately. Cronbach's alpha for the scale in our initial psychometric pilot was 0.94 for questions regarding the surgeon and 0.97 for questions regarding the medical oncologist. Within this study sample alphas were 0.94 for the surgeon and 0.95 for the medical oncologist. In both our

pilot and in this sample, factor analyses demonstrated that the six items form a single factor [37].

The six questions (each answered on a five-point Likert scale from “not at all true” to “very true”) were as follows:

I feel that my (breast cancer surgeon or medical oncologist) . . .

- a . . . provided me with choices and options for my breast cancer treatment.
- b . . . understood how I saw things with respect to my breast cancer.
- c . . . expressed confidence in my ability to make decisions.
- d . . . listened to how I would like to handle my breast cancer treatment.
- e . . . encouraged me to ask questions.
- f . . . tried to understand how I saw things before offering an opinion.

To determine the mHCCQ score for surgeons and medical oncologists, we calculated the average rating across all six items. For analysis, we dichotomized this measure at the mean of the overall sample for communication with surgeons (≥ 4.25 out of 5) and medical oncologists (≥ 4.19 out of 5), and considered scores above the mean to represent high autonomy supportive-communication,

2.2.3. Communication style preference

Prior research shows that not all patients want to participate in treatment decision making to the same extent, and some prefer less autonomy in decision making [38,39]. Thus, we included a measure of patient preference for physician communication style, either directive (e.g. telling the patient what to do) or non-directive (e.g. autonomy-supportive.) This was measured using two survey items (answered on five-point Likert scales from “none of the time” to “all of the time”): (1) “When it came to getting treatment for my breast cancer, I preferred to be told what to do,” and (2) “When it came to getting treatment for breast cancer, I wanted my doctor to tell me what to do.” Scores were combined to form a composite measure of communication preference and dichotomized at the mean for analysis. A strong preference for directive communication was therefore considered a score of 4 or higher out of 5.

2.2.4. Covariates

Our prior work as well as related literature on decision making and decision satisfaction in breast cancer guided selection of covariates. SEER registries provided age (in years), Stage (0, I, or II) and hormone receptor status (hormone positive or hormone negative). Patients provided: race/ethnicity (white, black, Latina, Asian), education (less than high school graduate, high school graduate, some college or more), self-reported health status (excellent, very good, good, fair, or poor), number of comorbid conditions, such as diabetes or heart disease (none, one, or two or more), and surgical breast cancer treatment at diagnosis (none, lumpectomy, unilateral mastectomy, or bilateral mastectomy.) All adjusted models also controlled for data collection site (Atlanta or Los Angeles County.)

2.3. Statistical approach

We first report demographic characteristics of the sample. We then used multivariable linear regression to examine the association between perceived autonomy-supportive communication and subjective decision quality, adjusting for sociodemographic and clinical characteristics, as well as patient communication style preference (non-directive versus directive.) We did this separately for decisions made with surgeons and decisions made with medical oncologists. Because women with Stage 0 disease are

typically ineligible for chemotherapy, the model for chemotherapy decision quality only included women with Stage I–II disease. As we hypothesized that individuals who preferred a non-directive style might report higher decision quality when exposed to more autonomy-supportive physician communication, we also included an interaction between perceived autonomy-supportive communication and communication style preference in both of the adjusted regression models. Finally, we stratified analyses by patient communication style preference (directive or non-directive) in order to estimate mean decision quality scores by congruence or non-congruence of communication style preferred (directive versus non-directive) and communication style received (autonomy-supportive versus not autonomy-supportive). All analyses were performed using Stata 14 [40] and incorporated sampling weights to account for differential probabilities of sampling and non-response.

The earliest iteration of the survey included a three-item version of the subjective decision quality measure instead of the five-item measure presented here. All subsequent survey versions included the full five-item scale. To reduce potential bias due to missing data, we imputed missing values for all analytic measures [41], including the two missing items from those who completed only the three-item subjective decision quality scale. However, decision quality items marked as N/A by the respondent were not imputed. Estimates and their variances from the multiple imputation results were combined according to the Rubin method [42]. Regression models presented use imputed data. We also performed sensitivity analyses using non-imputed data.

3. Results

Of the 3631 eligible women who were mailed an *iCanCare Study* survey, 2578 completed and returned the survey resulting in an overall response rate of 71%. Of these, 1690 completed the five-item subjective decision quality measure for surgery and 1266 completed the five-item subjective decision quality measure for chemotherapy. We report sample characteristics for those who completed the five-item measure for surgery, as it is the larger of the samples and includes all women who completed the five-item measure for chemotherapy decisions. As noted above, multiple imputation techniques were used to account for missing decision quality data from women who completed the three-item measures, providing an analytic sample of 2286 observations in the regression model for surgery decisions and 1507 observations for chemotherapy decisions.

Of the 1690 women who completed the decision quality scale for surgery, 55% ($n = 930$) were white, 17% ($n = 287$) were black, 17% ($n = 279$) were Latina, and 9% ($n = 156$) were Asian. The mean age of women in the sample was 61.5 years, ranging from 25 to 83 years, and the majority (72%) had completed some college or more. More than half had a lumpectomy as their primary breast cancer treatment surgery (59%), while 21% had a unilateral mastectomy and 20% underwent bilateral mastectomy. Complete sample characteristics, including those for women who also completed the decision quality scale for chemotherapy, are presented in Table 1.

Table 2 presents the multivariable linear regression of patient-reported subjective decision quality for surgical decisions. In this model, the adjusted mean decision quality score for respondents who reported receiving high autonomy-supportive communication was 4.64, compared to 4.34 for patients reporting receipt of low-autonomy-supportive communication ($p < 0.001$). There was no significant association between communication style preference (non-directive versus directive) and subjective decision quality. Subjective surgical decision quality differed significantly by race/ethnicity: Black women reported significantly lower

Table 1
Sample characteristics.

	Surgery N = 1690	Chemotherapy N = 1266
Race/ethnicity		
White	930(55)	651(58)
Black	287(17)	177(16)
Latina	279(17)	179(16)
Asian	156(9)	83(7)
Other/unknown/miss	38(2)	28(3)
Mean age (years)	61.5(SD:10.8)	60.6(SD:10.7)
Education		
<High school	168(10)	115(10)
High school grad	293(17)	190(17)
Some college or more	1215(72)	805(73)
Treatment		
Lumpectomy	991(59)	643(58)
Unilateral mastectomy	340(20)	232(21)
Bilateral mastectomy	342(20)	231(21)
No treatment	8(0.5)	6(1)
Comorbidities		
None	996(59)	667(60)
One	468(28)	304(27)
Two or more	226(13)	147(13)
Self-reported health status		
Excellent	174(10)	110(10)
Very good	601(36)	404(36)
Good	656(39)	415(37)
Fair	230(14)	172(15)
Poor	24(1)	14(1)
Stage		
0	324(20)	–
I	886(55)	677(64)
II	412(25)	386(36)
Hormone receptor status		
Positive	1400(87)	904(85)
Negative	202(13)	159(15)
Site		
USC	797(47)	487(44)
Emory	893(53)	631(56)
Communication style preference		
Non-directive	830(49)	565(51)
Directive	860(51)	553(49)
Autonomy-supportive communication		
Low	714(42)	554(50)
High	976(58)	564(50)

decision quality than whites ($\beta = -0.14$, $p < 0.002$), as did Latinas ($\beta = -0.34$, $p < 0.001$). Compared to those with excellent self-reported health, individuals in all categories of lesser self-reported health reported worse surgical decision quality. Older age was positively associated with decision quality ($\beta = 0.006$, $p < 0.001$).

The interaction between perceived autonomy-supportive care and communication style preference on decision quality was statistically significant ($\beta = -0.25$; $p = 0.001$) and demonstrated that patients who preferred a non-directive style of communication and received it from their surgeon reported significantly higher levels of decision quality than those who preferred a more directive style and received autonomy-supportive communication (data not shown).

Table 3 presents the results of the multivariable linear regression model of subjective decision quality for chemotherapy decisions made with the respondent's medical oncologist. The adjusted mean decision quality score for respondents who reported receiving high autonomy-supportive communication from their medical oncologists was 4.67 compared to 4.41 for patients reporting receipt of low-autonomy-supportive communication ($p < 0.001$). There was no significant association between communication style preference and subjective decision quality

for chemotherapy decisions. Race/ethnicity was significantly associated with subjective decision quality. Compared to white respondents, black women reported significantly worse decision quality ($\beta = -0.14$, $p = 0.018$), as did Latina ($\beta = -0.40$, $p < 0.001$) and Asian ($\beta = -0.20$, $p < 0.024$) women. Compared to those in excellent self-reported health, those in good or fair health reported significantly worse decision quality ($\beta = -0.14$, $p = 0.026$ and $\beta = -0.26$, $p = 0.011$, respectively). Older age was associated with higher decision quality ($\beta = 0.005$, $p = 0.023$), as was having completed high school, compared to those respondents who had not ($\beta = 0.21$, $p = 0.026$).

Similar to the model for surgical decisions, the interaction between perceived autonomy-supportive care and communication style preference on decision quality was statistically significant for chemotherapy decisions ($\beta = -0.22$; $p = 0.001$) and demonstrated that patients who preferred a non-directive style of communication and received it from their medical oncologist reported significantly higher levels of decision quality than those who preferred a more directive style and received autonomy-supportive communication from their medical oncologist (data not shown).

Table 4 presents adjusted mean decision quality scores by surgeon and medical oncologist communication style received (autonomy-supportive or not autonomy-supportive), stratified by patients' communication style preference (directive versus non-directive). Among those who preferred more directive communication from their surgeons, decision quality was higher among those who received autonomy-supportive communication compared to those who received non-autonomy supportive communication (4.59 versus 4.39, $p < 0.001$). Similarly, among those who preferred non-directive communication, decision quality scores were higher among those who received autonomy-supportive communication compared to those who did not (4.71 versus 4.29, $p < 0.001$).

Among those who preferred more directive communication from their medical oncologists, decision quality was higher among those who received autonomy-supportive communication compared to those who received non-autonomy supportive communication (4.61 versus 4.43, $p < 0.001$). Among those who preferred non-directive communication from their medical oncologist, decision quality scores were higher among those who received autonomy-supportive communication compared to those who did not (4.72 versus 4.40, $p < 0.001$).

In the sensitivity analysis using weighted but non-imputed data, the association between autonomy-supportive communication and subjective decision quality was similarly significant for decisions made with surgeons ($\beta = 0.28$; $p < 0.001$) as well as those made with medical oncologists ($\beta = 0.27$; $p < 0.001$).

4. Discussion

In women with localized breast cancer, we found patient perceptions of high levels of autonomy-supportive communication from both surgeons and medical oncologists were significantly associated with higher subjective decision quality for surgery and chemotherapy decisions. However, patients' communication style preference moderated the association between autonomy-supportive communication and decision quality. Women who both preferred and received autonomy-supportive communication reported higher decision quality than those who preferred directive communication but received autonomy-supportive communication nonetheless.

Women are increasingly interested in taking more active roles in their breast cancer treatment decisions [43], and shared decision making has been shown to be positively associated with patient satisfaction in a number of domains [44–47]. Autonomy-

Table 2

Multivariable linear regression of the association between autonomy-supportive communication and subjective decision quality for decisions with surgeon (N = 2286).

	Est.	SE	p-value
Race/ethnicity			
White			
Black	−0.14	0.05	0.002
Latina	−0.34	0.07	<0.001
Asian	−0.11	0.06	0.080
Age (continuous)	0.006	0.002	<0.001
Education			
<High school			
High school grad	0.22	0.07	0.002
Some college or more	0.10	0.07	0.142
Treatment			
Lumpectomy			
Unilateral mastectomy	−0.14	0.05	0.002
Bilateral mastectomy	−0.04	0.04	0.342
No treatment	−0.12	0.27	0.672
Comorbidities			
None			
One	−0.005	0.04	0.905
Two or more	−0.24	0.05	0.646
Self-reported health status			
Excellent			
Very good	−0.03	0.05	0.580
Good	−0.14	0.05	0.007
Fair	−0.22	0.07	0.001
Poor	−0.32	0.15	0.030
Stage			
I			
II	−0.07	0.04	0.071
0	−0.06	0.04	0.154
Hormone receptor status			
Positive			
Negative	−0.10	0.05	0.064
Site			
Emory			
USC	−0.02	0.04	0.538
Communication style preference			
Autonomy-supportive			
Directive	−0.03	0.03	0.430
Autonomy-supportive communication			
Adjusted mean			
Low	4.34		
High	4.64	0.30	0.03
			<0.001

supportive communication facilitates shared decision making by helping the patient feel that they have the volition as well as the support to make medical decisions consistent with their values and preferences. Prior research has examined patient satisfaction with decision making in breast cancer [48,49], however, there is increasing recognition of the need to move beyond satisfaction to measuring the quality of patient decisions [50,51]. There has been some research demonstrating the positive impact of decision interventions, like decision aids, on the quality of women's treatment decisions. [52] Yet ours is the first study to examine the association between patient perceptions of provider communication style and patient-reported decision quality in breast cancer. Our findings suggest that interventions to enhance autonomy-supportive communication practices among surgeons and medical oncologists will likely have a positive impact on patient perceptions of the quality of their cancer treatment decisions for most individuals.

While shared decision making is acknowledged as a central component of patient-centered care, not all individuals want to participate in treatment decision making to the same extent [24,38,39]. Indeed, some patients have reported not wanting to be involved in decision making at all, instead leaving decision making

up to the doctor. In our study, we found that patient preference for communication style moderated the effect of physician communication on decision quality for both surgical and chemotherapy decisions. Specifically, women who preferred more input into their decisions and received high autonomy support from their physician reported better decision quality than those who preferred more directive communication, such as specific treatment recommendations, yet received high autonomy-supportive communication from their surgeon. It may be that women who want more direction from their physician regarding the right course of action lack confidence to make the decisions themselves, and as a result may also feel anxious or distressed at the time of decision making [53]. These same patients may therefore seek advice (or recommendation) from a trained professional such as their physician, and feel dissatisfied if they do not receive it.

It is important to note that patients in our study who preferred directive communication and received it from physicians reported worse decision quality than those who preferred directive communication and received autonomy-supportive communication. This is consistent with recent research in colorectal and lung cancer which found physician-controlled decision making was associated with worse patient-rated quality of care and physician communication, even among those patients who had expressed a preference for physician-controlled decisions [54]. Together, these findings suggest that autonomy-supportive communication may result in better patient-centered outcomes for all patients, even those with stated preferences for less autonomy in decision making.

In addition to differences in subjective decision quality by surgeon and medical oncologist communication style, we found significant differences in patient-appraised subjective decision quality by race/ethnicity. Specifically, Latina respondents reported lower subjective decision quality than white respondents for decisions about surgery and chemotherapy. This is consistent with prior literature in the domain of decision regret, which has shown Latina breast cancer patients express significantly higher regret about their treatment decisions than whites [55]. Similarly, we found that black patients reported worse decision quality than whites. Worse appraisal of decision quality by black and Latina patients in our study sample, despite accounting for preferred communication style and perceived autonomy-supportive communication, suggests that other issues related to decision making may be suboptimal for non-white breast cancer patients.

Consistent with our findings related to age, some prior research has shown decision satisfaction to be positively associated with age [56,57]. There is some evidence that older adults make decisions differently than younger patients, tending to focus more on the positive aspects of decision making [58], thereby feeling more satisfied with their decisions. While beyond the scope of this study, research evaluating the association between autonomy-supportive communication and subjective decision quality in different age groups may elucidate important differences in the role of provider communication in decisional outcomes between older and younger patients.

The results of this study are limited by being entirely dependent on patient self-report, as we were not able to observe provider-patient interactions. Thus, the association between decision satisfaction and physician communication style may be inflated given the common informant. Reverse causality may be considered an alternative hypothesis for our data. That is, it may be that patients who were more satisfied with their decisions were more likely to recall or rate better communication practices by their physicians. Yet as this was a cross sectional survey, caution about inferring causal associations between autonomy-supportive communication and subjective decision quality is warranted. To confirm our findings, longitudinal studies as well as research

Table 3

Multivariable linear regression of the association between autonomy-supportive communication and subjective decision quality for decisions with medical oncologist (N = 1507).

	Est.	SE	p-value
Race/ethnicity			
White			
Black	−0.14	0.06	0.018
Latina	−0.40	0.08	<0.001
Asian	−0.20	0.09	0.024
Age (continuous)	0.005	0.002	0.023
Education			
<High school			
High school grad	0.21	0.09	0.026
Some college or more	0.07	0.10	0.453
Treatment			
Lumpectomy			
Unilateral mastectomy	0.03	0.05	0.518
Bilateral mastectomy	−0.03	0.06	0.602
No treatment	−0.30	0.44	0.497
Comorbidities			
None			
One	−0.02	0.05	0.722
Two or more	−0.08	0.07	0.244
Self-reported health status			
Excellent			
Very good	−0.06	0.06	0.246
Good	−0.14	0.06	0.026
Fair	−0.26	0.08	0.001
Poor	−0.42	0.25	0.097
Stage			
I			
II	−0.07	0.05	0.110
Hormone receptor status			
Positive			
Negative	−0.02	0.05	0.756
Site			
Emory			
USC	0.007	0.05	0.884
Communication style preference			
Non-directive			
Directive	−0.04	0.04	0.327
Autonomy-supportive communication			
Adjusted mean			
Low	4.41		
High	4.67	0.26	0.04
			<0.001

including objective observation and coding of clinical encounters are encouraged. Because we used a brief measure of autonomy-supportive communication, we were unable to measure some important aspects of communication, such as the role of assessing the patient's emotional status, which is typically assessed using the full version of the HCCQ. Patients were recruited from two distinct geographic areas so our findings may not be generalizable to breast cancer patients from other geographic areas. Additionally, individuals who agreed to participate in our survey study may differ in important ways from individuals who chose not to

participate or who could not be contacted. Thus, our findings may not be generalizable to all patients. Finally, we acknowledge that patients can have communication style preferences beyond the dichotomy of directive or autonomy-supportive [59]. While we were unable to address an array of such preferences in our study, this is an important area for future research in patient-centered decision making.

5. Conclusions

Among women with early stage breast cancer, autonomy-supportive communication by surgeons and medical oncologists is associated with better subjective decision quality. Our primary findings suggest that cancer-care providers should be encouraged to utilize an autonomy-supportive communication style with their patients. Eliciting women's preferences for non-directive versus directive counseling may improve physicians' ability to support women's communication needs.

6. Practice implications

Overall satisfaction with the breast cancer treatment decision process may be improved when breast cancer clinicians utilize more patient-centered care techniques, including listening to and addressing patient needs and concerns, seeking their input, and supporting their autonomy in treatment decision making.

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Table 4

Adjusted mean decision quality scores by communication style preference and communication style received (Scale: 0–5).

Communication style preference	Surgeon communication style			Medical oncologist communication style		
	Non-autonomy supportive	Autonomy-supportive	p-value	Non-autonomy supportive	Autonomy-supportive	p-value
Directive	4.39	4.59	<0.001	4.43	4.61	<0.001
Non-directive	4.29	4.71	<0.001	4.40	4.72	<0.001

and Prevention or their Contractors and Subcontractors is not intended nor should be inferred. We acknowledge with gratitude the breast cancer patients who responded to our survey.

References

- [1] Institute of Medicine. Delivering High-Quality Cancer Care: Charting a New Course for a System in Crisis. Washington D.C.: 2013.
- [2] Committee on Quality of Health Care in America. Institute of Medicine Crossing the Quality Chasm: A New Health System for the 21st Century. Washington D.C.: 2001.
- [3] R.M. Epstein, R.L. Street, The values and value of patient-centered care, *Ann. Fam. Med.* 9 (2016) 100–103, doi:http://dx.doi.org/10.1370/afm.1239.
- [4] M.K. Constand, J.C. MacDermid, V. Dal Bello-Haas, M. Law, Scoping review of patient-centered care approaches in healthcare, *BMC Health Serv. Res.* 4 (2014) 271, doi:http://dx.doi.org/10.1186/1472-6963-14-271.
- [5] A. King, R.B. Hoppe, Best practice for patient-centered communication: a narrative review, *J. Grad. Med. Educ.* 5 (2013) 385–393, doi:http://dx.doi.org/10.4300/JGME-D-13-00072.1.
- [6] K. Resnicow, F. McMaster, Motivational interviewing: moving from why to how with autonomy support, *Int. J. Behav. Nutr. Phys. Act* 9 (2012) 19, doi:http://dx.doi.org/10.1186/1479-5868-9-19.
- [7] G.C. Williams, E.L. Deci, Activating patients for smoking cessation through physician autonomy support, *Med. Care* 39 (2001) 813–823.
- [8] M. Vansteenkiste, G.C. Williams, K. Resnicow, Toward systematic integration between self-determination theory and motivational interviewing as examples of top-down and bottom-up intervention development: autonomy or volition as a fundamental theoretical principle, *Int. J. Behav. Nutr. Phys. Act.* 9 (2012) 23, doi:http://dx.doi.org/10.1186/1479-5868-9-23.
- [9] D.L. Frosch, R.M. Kaplan, Shared decision making in clinical medicine: past research and future directions, *Am. J. Prev. Med.* 17 (1999) 285–294.
- [10] S.J. Katz, J. Belkora, G. Elwyn, Shared decision making for treatment of cancer: challenges and opportunities, *J. Oncol. Pract.* 10 (2014) 206–208, doi:http://dx.doi.org/10.1200/JOP.2014.001434.
- [11] L.F. Degner, J.A. Sloan, Decision making during serious illness: what role do patients really want to play? *J. Clin. Epidemiol.* 45 (1992) 941–950.
- [12] E. Deci, R. Ryan, The what and why of goal pursuits: human needs and the self-determination of behavior, *Psychol. Inq.* 45 (2000) 227–268.
- [13] J. Ng, N. Ntoumanis, E. Thøgersen-Ntoumani, E. Deci, R. Ryan, J. Duda, et al., Self-determination theory applied to health contexts: a meta-analysis, *Perspect. Psychol. Sci.* 7 (2012) 325–340.
- [14] R. Ryan, E. Deci, Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being, *Am. Psychol.* 55 (2000) 68–78.
- [15] Y.-L. Su, J. Reeve, A meta-analysis of the effectiveness of intervention programs designed to support autonomy, *Educ. Psychol. Rev.* 23 (2011) 159–188.
- [16] G.C. Williams, C.P. Niemiec, H. Patrick, R.M. Ryan, E.L. Deci, The importance of supporting autonomy and perceived competence in facilitating long-term tobacco abstinence, *Ann. Behav. Med.* 37 (2009) 315–324, doi:http://dx.doi.org/10.1007/s12160-009-9090-y.
- [17] G.C. Williams, M. Gagné, R.M. Ryan, E.L. Deci, Facilitating autonomous motivation for smoking cessation, *Health Psychol.* 21 (2002) 40–50.
- [18] G.C. Williams, H.A. McGregor, D. Sharp, C. Levesque, R.W. Kouides, R.M. Ryan, et al., Testing a self-determination theory intervention for motivating tobacco cessation: supporting autonomy and competence in a clinical trial, *Health Psychol.* 25 (2006) 91–101, doi:http://dx.doi.org/10.1037/0278-6133.25.1.91.
- [19] G.C. Williams, Z.R. Freedman, E.L. Deci, Supporting autonomy to motivate patients with diabetes for glucose control, *Diabetes Care* 21 (1998) 1644–1651.
- [20] G.C. Williams, H.A. McGregor, D. King, C.C. Nelson, R.E. Glasgow, Variation in perceived competence, glycemic control, and patient satisfaction: relationship to autonomy support from physicians, *Patient Educ. Couns.* 57 (2005) 39–45, doi:http://dx.doi.org/10.1016/j.pec.2004.04.001.
- [21] G.C. Williams, H.A. McGregor, A. Zeldman, Z.R. Freedman, E.L. Deci, Testing a self-determination theory process model for promoting glycemic control through diabetes self-management, *Health Psychol.* 23 (2004) 58–66, doi:http://dx.doi.org/10.1037/0278-6133.23.1.58.
- [22] G.C. Williams, G.C. Rodin, R.M. Ryan, W.S. Grolnick, E.L. Deci, Autonomous regulation and long-term medication adherence in adult outpatients, *Health Psychol.* 17 (1998) 269–276.
- [23] G.C. Williams, C.P. Niemiec, Positive affect and self-affirmation are beneficial, but do they facilitate maintenance of health-behavior change? A self-determination theory perspective: comment on a randomized controlled trial of positive-affect intervention and medication adherence, *Arch. Intern. Med.* 172 (2012) 327–328, doi:http://dx.doi.org/10.1001/archinternmed.2011.1830.
- [24] A.E. Hill, C.V. Smith, B.W. Hadden, Autonomy in the obstetrician/gynecologist-patient relationship as a predictor of patient satisfaction, *Yale J. Biol. Med.* 86 (2013) 179–188.
- [25] R. Epstein, R. Street, Patient-Centered Communication in Cancer Care: Promoting Healing and Reducing Suffering, Bethesda, MD, 2007.
- [26] L.J. Fallowfield, A. Hall, G.P. Maguire, M. Baum, Psychological outcomes of different treatment policies in women with early breast cancer outside a clinical trial, *BMJ* 301 (1990) 575–580.
- [27] L.J. Fallowfield, A. Hall, P. Maguire, M. Baum, R.P. A'Hern, Psychological effects of being offered choice of surgery for breast cancer, *BMJ* 309 (1994) 448.
- [28] J. Morris, G.T. Royle, Offering patients a choice of surgery for early breast cancer: a reduction in anxiety and depression in patients and their husbands, *Soc. Sci. Med.* 26 (1988) 583–585.
- [29] J.M. Deadman, S.J. Leinster, R.G. Owens, M.E. Dewey, P.D. Slade, Taking responsibility for cancer treatment, *Soc. Sci. Med.* 53 (2001) 669–677.
- [30] N.K. Arora, Interacting with cancer patients: the significance of physicians' communication behavior, *Soc. Sci. Med.* 57 (2003) 791–806.
- [31] L.M. Ong, J.C. de Haes, A.M. Hoos, F.B. Lammes, Doctor-patient communication: a review of the literature, *Soc. Sci. Med.* 40 (1995) 903–918.
- [32] L.M. Ong, M.R. Visser, F.B. Lammes, J.C. de Haes, Doctor-patient communication and cancer patients' quality of life and satisfaction, *Patient Educ. Couns.* 41 (2000) 145–156.
- [33] A.S. Hamilton, T.P. Hofer, S.T. Hawley, D. Morrell, M. Leventhal, D. Deapen, et al., Latinas and breast cancer outcomes: population-based sampling, ethnic identity, and acculturation assessment, *Cancer Epidemiol. Biomarkers Prev.* 18 (2009) 2022–2029, doi:http://dx.doi.org/10.1158/1055-9965.EPI-09-0238.
- [34] K. Resnicow, P. Abrahamse, R.S. Tocco, S. Hawley, J. Griggs, N. Janz, et al., Development and psychometric properties of a brief measure of subjective decision quality for breast cancer treatment, *BMC Med. Inf. Decis. Making* 14 (2014) 110, doi:http://dx.doi.org/10.1186/s12911-014-0110-x.
- [35] G.C. Williams, M. Lynch, R.E. Glasgow, Computer-assisted intervention improves patient-centered diabetes care by increasing autonomy support, *Health Psychol.* 26 (2007) 728–734, doi:http://dx.doi.org/10.1037/0278-6133.26.6.728.
- [36] G. Williams, M. Lynch, H. McGregor, R. Ryan, D. Sharp, E. Deci, Validation of the "Important other" climate questionnaire: assessing autonomy support for health-related change, *Families Syst. Health* (2006) 24.
- [37] D. Shumway, K.A. Griffith, R. Jagasi, S.G. Gabram, G.C. Williams, K. Resnicow, Psychometric properties of a brief measure of autonomy support in breast cancer patients, *BMC Med. Inf. Decis. Making* 15 (2015) 51, doi:http://dx.doi.org/10.1186/s12911-015-0172-4.
- [38] W. Levinson, A. Kao, A. Kuby, R.A. Thisted, Not all patients want to participate in decision making. A national study of public preferences, *J. Gen. Int. Med.* 20 (2005) 531–535, doi:http://dx.doi.org/10.1111/j.1525-1497.2005.04101.x.
- [39] N.K. Arora, C.A. McHorney, Patient preferences for medical decision making: who really wants to participate? *Med. Care* 38 (2000) 335–341.
- [40] StataCorp. 2015. Stata Statistical Software: Release 14 College Station, TX: StataCorp LP n.d.
- [41] D.B. Rubin, R.J.A. Little, Statistical Analysis with Missing Data, 2nd ed., Wiley, New York, NY, 2002.
- [42] D.B. Rubin, Multiple Imputation for Nonresponse in Surveys, Wiley, New York, NY, 2016, pp. 1987.
- [43] L.J.M. Caldon, S.J. Walters, M.W.R. Reed, Changing trends in the decision-making preferences of women with early breast cancer, *Br. J. Surg.* 95 (2008) 312–318, doi:http://dx.doi.org/10.1002/bjs.5964.
- [44] K.E. Glass, C.E. Wills, C. Holloman, J. Olson, C. Hechmer, C.K. Miller, et al., Shared decision making and other variables as correlates of satisfaction with health care decisions in a United States national survey, *Patient Educ. Couns.* 88 (2012) 100–105, doi:http://dx.doi.org/10.1016/j.pec.2012.02.010.
- [45] C. Temple-Oberle, O. Ayeni, C. Webb, M. Bettger-Hahn, O. Ayeni, N. Mychailiushyn, Shared decision-making: applying a person-centered approach to tailored breast reconstruction information provides high satisfaction across a variety of breast reconstruction options, *J. Surg. Oncol.* 110 (2014) 796–800, doi:http://dx.doi.org/10.1002/jso.23721.
- [46] J.E. Shabason, J.J. Mao, E.S. Frankel, N. Vapiwala, Shared decision-making and patient control in radiation oncology: implications for patient satisfaction, *Cancer* 120 (2014) 1863–1870, doi:http://dx.doi.org/10.1002/cnrc.28665.
- [47] L.A. Shay, J.E. Lafata, Where is the evidence? A systematic review of shared decision making and patient outcomes, *Med. Decis. Making* 35 (2015) 114–131, doi:http://dx.doi.org/10.1177/0272989X14551638.
- [48] P.M. Lantz, M.K. Janz, A. Fagerlin, K. Schwartz, L. Liu, I. Lakhani, et al., Satisfaction with surgery outcomes and the decision process in a population-based sample of women with breast cancer, *Health. Serv. Res.* 40 (2005) 745–767, doi:http://dx.doi.org/10.1111/j.1475-6773.2005.00383.x.
- [49] S.T. Hawley, S.E. Lillie, A. Morris, J.J. Graff, A. Hamilton, S.J. Katz, Surgeon-level variation in patients' appraisals of their breast cancer treatment experiences, *Ann. Surg. Oncol.* 20 (2013) 7–14, doi:http://dx.doi.org/10.1245/s10434-012-2582-1.
- [50] K.R. Sepucha, F.J. Fowler, A.G. Mulley, Policy support for patient-centered care: the need for measurable improvements in decision quality, *Health Aff. (2004) VAR54–VAR62*, doi:http://dx.doi.org/10.1377/hlthaff.var.54 Suppl Vari.
- [51] K. Sepucha, E. Ozanne, K. Silvia, A. Partridge, A.G. Mulley, An approach to measuring the quality of breast cancer decisions, *Patient Educ. Couns.* 65 (2007) 261–269, doi:http://dx.doi.org/10.1016/j.pec.2006.08.007.
- [52] P. Butow, S. Tesson, F. Boyle, A systematic review of decision aids for patients making a decision about treatment for early breast cancer, *The Breast* 26 (2016) 31–45, doi:http://dx.doi.org/10.1016/j.breast.2015.12.007.
- [53] K. Witte, M. Allen, A meta-analysis of fear appeals: implications for effective public health campaigns, *Heal Educ Behav* 27 (2000) 591–615.
- [54] K.L. Kehl, M.B. Landrum, N.K. Arora, P.A. Ganz, M. van Ryn, J.W. Mack, et al., Association of actual and preferred decision roles with patient-reported quality of care: shared decision making in cancer care, *JAMA Oncol.* 1 (2015) 50–58, doi:http://dx.doi.org/10.1001/jamaoncol.2014.112.
- [55] S.T. Hawley, N.K. Janz, A. Hamilton, J.J. Griggs, A.K. Alderman, M. Mujahid, et al., Latina patient perspectives about informed treatment decision making for

- breast cancer, *Patient Educ. Couns.* 73 (2008) 363–370, doi:<http://dx.doi.org/10.1016/j.pec.2008.07.036>.
- [56] J.L. Krok-Schoen, A.L. Palmer-Wackerly, P.M. Dailey, J.C. Wojno, J.L. Krieger, Age differences in cancer treatment decision making and social support, *J. Aging Health* (2016), doi:<http://dx.doi.org/10.1177/0898264316628488>.
- [57] S. Kim, M.K. Healey, D. Goldstein, L. Hasher, U.J. Wiprzycka, Age differences in choice satisfaction: a positivity effect in decision making, *Psychol. Aging* 23 (2008) 33–38, doi:<http://dx.doi.org/10.1037/0882-7974.23.1.33>.
- [58] M. Mather, M. Knight, M. McCaffrey, The allure of the alignable: younger and older adults' false memories of choice features, *J. Exp. Psychol. Gen.* 134 (2005) 38–51, doi:<http://dx.doi.org/10.1037/0096-3445.134.1.38>.
- [59] L. Sparks, M.M. Villagran, J. Parker-Raley, C.B. Cunningham, A patient-centered approach to Breaking bad news: communication guidelines for health care providers, *J. Appl. Commun. Res.* 35 (2007) 177–196.