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Title

Discordance between advanced cancer patients' perceived and preferred roles in decision making and its association with psychological distress and perceived quality of care

Brief title: Discordance in Decision Making Roles

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ABSTRACT

Objective

We investigated patient-reported roles of families, physicians and themselves in treatment decision-making, and whether discordance between perceived and preferred roles is associated with psychological distress and perceived quality of care among cancer patients.

Methods

We analyzed cross-sectional survey data from 599 adults with Stage IV solid malignancy in Singapore. Stuart-Maxwell tests were used to compare patients' perceived and preferred roles in decision-making. Types of discordance were categorized as "involvement at a lesser level than preferred", "involvement at a greater level than preferred", and "no change in patient involvement". Ordinary least squares regressions examined the associations between types of discordance and patient outcomes, controlling for patient characteristics.

Results

Discordance between perceived and preferred roles was observed in 16% of patients. Amongst patients with discordance, 33% reported being involved at a lesser level than they preferred, 47% reported being involved at a greater level than they preferred, and 19% reported discordance where level of patient involvement did not change. Multivariable analyses show that lesser involvement than preferred and discordance with no change in patient involvement were associated with poorer quality of physician communication ($\beta=-9.478$; CI=-16.303,-2.653 and $\beta=-9.184$; CI=-18.066,-0.301) and poorer care coordination ($\beta=-11.658$; CI=-17.718,-5.597 and $\beta=-8.856$; CI=-16.744,-0.968) compared to concordance.

Conclusions

Most patients reported participating at their desired level. Despite this finding, our results suggest that involving patients at a lesser level than they prefer can lead to poorer perceived quality of physician communication and care coordination, and that encouraging patient participation is a safe approach to minimizing poor outcomes.

Keywords: decision making, discordance, psychological distress, perceived quality of care

Key Points for Decision Makers

- Only 16% of patients reported discordance in perceived and preferred roles, suggesting that current clinical practice in Singapore seems to provide an environment for most patients to participate in decision making at their desired level.
- Patients who were involved at a greater level than they preferred reported no different outcomes as those who reported concordance. This finding is very reassuring for the advocates of shared decision making in Asian countries where patients, especially elderly patients, tend to take a backseat in decision making.
- Being involved in decision making less than desired was significantly associated with poorer quality of physician communication and care coordination compared to concordance. Our findings suggest that encouraging patient participation is a safer approach to minimizing poor outcomes.

Declarations

Conflict of interest

The authors do not have any conflicts of interests to declare.

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Data availability

Data used in this study is available from the corresponding author upon reasonable request.

Code availability

Code used in this study is available from the corresponding author upon reasonable request.

Authors' contributions

SO identified the research questions and designed the questions used in the study. SO and YT analysed the data. All authors contributed to the writing and/or critical review of this manuscript.

Authors' Note

Findings from this study were presented at the 41st Annual North American Meeting of Society for Medical Decision Making in Portland, OR and at an invited seminar at the Department of Population Health Sciences at Duke University, NC, in October 2019.

1. INTRODUCTION

Shared decision making (SDM) is now widely accepted as the gold standard to promote patient empowerment and care pathways that align with a patient's values and preferences [1]. Previous studies show evidence that SDM, in particular active patient participation, is associated with better psychological health outcomes and higher satisfaction with care. However, SDM or an active role in decision making is not desired by all cancer patients.[2-5] Some patients may not want to take the responsibility of making important decisions at this vulnerable time in their lives [6]. They may lean on their family caregivers [7, 8] and/or physicians [2, 9] to make the decisions for themselves. Other patients, on the other hand, want

to be the ones making the final call on their care plans [10]. If patients are involved in decision making more [11] or less than [9, 12] what they desire, they may experience anxiety and stress, and perceive quality of care to be poor. In particular, if they do not participate as much as they desire, they may lose their confidence or be dissatisfied with care as they may end up with a treatment that they do not desire [13].

Previous studies show evidence of discordance between patients' perceived and preferred roles in decision making [14]. Age [15, 16] and education [16] were found to be significant predictors of experiencing discordance. Yet, only a limited number of studies investigated the association between discordance, psychological distress and satisfaction with consultation or care [13, 17-19]. The findings from these studies have been mixed: only one study found a significant association between discordance and anxiety [13], and one other found a significant association between discordance, and depression and satisfaction with the decision making process.[18] Also, these studies have focused exclusively on the patient-physician dyad in decision making. More research is needed to understand the relationship between discordance and patient outcomes when decision making is also influenced by family caregivers [20-22]. This is especially the case in Asian societies where adult children often consider caregiving as part of their duty to their parents, and the elderly expect their family members to take care of them, including making medical decisions on their behalf [23].

The objectives of this study were twofold: (i) to examine discordance between patients' perceived and preferred roles in decision making for themselves, family and physician triad in management of advanced cancer, and (ii) to investigate the associations of discordance with psychological distress and perceived quality of care. We hypothesize that patients with discordance in decision making will have greater anxiety, greater depressive symptoms, and poorer perceived quality of care compared with those who experience concordance between preferred and perceived roles in decision making. We also hypothesize that the type of discordance matters, in a way that participating in treatment decision making at a lesser level than preferred will be associated with worse outcomes compared to being involved at a greater level than preferred. The findings from this study can inform development of interventions to implement SDM models where caregivers are important stakeholders, and to match patients' perceived roles with their preferred roles in decision making.

2. METHODS

2.1 Participants and Study Setting

This cross-sectional study employed baseline data from an ongoing cohort study described elsewhere.[24] From July 2016 to March 2018, patients were recruited from outpatient oncology clinics at National Cancer Centre Singapore and National University Hospital in Singapore. Patients who were Singapore citizens or permanent residents, aged at least 21 years, and diagnosed with stage IV solid cancer were identified from medical records and approached by trained interviewers. They were screened for adequate functional status for participation by scoring an Eastern Cooperative Oncology Group (ECOG) performance status ≤ 2 . The Abbreviated Mental Test was also administered for participants aged 60 and above. The study team approached 1042 eligible patients. Of these, 600 (57%) consented to participate and completed the survey. The main reasons for declining to participate in the study were not being interested in the study followed by feeling tired or ill, not having enough time for the survey and caregiver declining to participate on behalf of the patient. One patient who did not answer questions regarding his/her perceived role in decision making was excluded, resulting in an analysis of 599 patients (Figure 1). The study was approved by SingHealth Centralized Institutional Review Board (2015/2781).

2.2 Survey Development

The survey instrument was first developed in English. Through cognitive interviews, the survey was tested with 10 participants for readability and framing of the questions were finalized based on the feedback from these interviews. The English version was then translated to Mandarin and Malay, and then back translated to English by professional translators to cover the most spoken three languages in Singapore. The Mandarin and Malay versions were also reviewed by the bilingual study team members for readability. The survey was administered by trained interviewers who can speak the language of the patient's choice. The following measures were used in the study:

Perceived and preferred roles in decision making: Participants were first asked who had been responsible for making the most important treatment decisions and presented with the options of “myself”, “my family”, and “my doctor” (*Supplement A*). Participants could select as many of the options as they felt were applicable. A second question elicited the role

and capacity to which the individual(s) selected in the first question were involved in making decisions. These questions were used to identify the perceived roles in decision making. A similar two-step question format was used to assess patient's preferred roles for these parties in treatment decisions. These questions were adopted from the Cancer Care Outcomes Research and Surveillance (CanCORS) study [25], but modified to incorporate family involvement in addition to that of patients and physicians. Decision making options were subsequently grouped into 6 categories: (1) Patient-alone decision making, (2) Patient-led decision making (i.e., patients decide after considering their family's and/or physicians' opinion), (3) Collaborative decision making (i.e., patient decides with their family and/or physicians), (4) Family-led decision making (i.e., patient's family decides after considering patient's and/or physicians' opinion), (5) Physician-led decision making (i.e., patient's physicians decide after considering patient's and/or family's opinion) and (6) No patient involvement (i.e., family and/or physicians decide) (*Supplement B*).

Discordance in decision making: Discordance was defined as any discrepancy between preferred and perceived roles in decision making. Discordance may occur within the same category or across categories. We classified discordance into three categories, namely: (1) involvement in decision making at a lesser level than preferred, (2) involvement in decision making at a greater level than they preferred, and (3) no change in patient involvement while there is discordance on the role of family and/or physician (e.g., patient decides with their family while she prefers making decisions with their physicians).

Psychological distress outcomes: Participants completed the Hospital Anxiety and Depression Scale (HADS) that measures anxiety (HADS Anxiety) and depression (HADS Depression). Each subscale had 7 items, resulting in total score of 0 – 21 per subscale. A higher score indicated higher anxiety and depressive symptoms.

Perceived quality of care outcomes. Patients' experience with physicians and care setting was assessed using questions previously used by the CanCORS study. Items are grouped into two domains: physician communication (QoC-PC) (5 items), and health care coordination and responsiveness (QoC-CR) (7 items). Items related to the quality of nursing care was not used in the analysis of this paper since it was deemed to be not related to decision making process. Scores for each domain ranged from 0 – 100. A higher score indicated better perceived quality of care.

Patient characteristics: Participants reported their age, ethnicity, marital status, years of education, current working status and monthly household income. Cancer type was identified through medical records. Symptom burden was measured as the sum of patient reported symptom severities on a Likert scale from 0 to 4 (not at all, a little bit, somewhat, quite a bit, very much). The list of symptoms, taken from FACIT-PAL-14 [26], were constipation, dryness of mouth, lack of energy, nausea, shortness of breath, weight loss, swelling in parts of body, dry throat and vomiting.

2.3 Statistical Analysis

We first presented descriptive statistics on patient characteristics and outcomes, then perceived and preferred roles in decision making. We used the Stuart-Maxwell test, which is the appropriate test for comparing multiple correlated (or within subject) proportions, to compare patients' perceived and preferred roles in decision making.

We also investigated the predictors of discordance between perceived and preferred roles in decision making using multinomial logit model. The dependent variable was the types of discordance: 1) involved at a lesser level than preferred, 2) involved at a greater level than preferred, 3) no change in patient involvement (Reference category: concordance in perceived and preferred levels of involvement in decision making). The independent variables were medical characteristics: symptom burden and cancer type (respiratory cancer, colorectal and gastrointestinal cancer, breast cancer, genitourinary cancer, gynecologic cancer and other (reference)); and socio-demographic characteristics: age, ethnicity (Chinese=1, Malay/Indian/Others = 0), marital status (married=1, otherwise = 0), education (post-high school or higher education=1, high school and below = 0), work status (have part-time or full-time job=1, otherwise 0), and income (income SGD\$4,000 per month or higher =1, otherwise 0). Gender was not included as it was correlated with types of cancer.

In univariable and multivariable regression analyses, we investigated the association of discordance with psychological distress and perceived quality of care. For psychological distress, we employed anxiety and depression (as measured by HADS) as dependent variables. For perceived quality of care, we used physician communication and health care coordination and responsiveness (as measured by QoC) as dependent variables. The independent variables of interest were types of discordance as described above. We first ran univariable analyses with only variables on the type of discordance. We then ran multivariable analyses controlling for

patient medical and socio-demographic characteristics as described above. Assuming linear relationship between the dependent and independent variables, ordinary least squares regressions were used for all univariable and multivariable models. All analyses were conducted using Stata version 14.2.

3. RESULTS

3.1 Patient Characteristics

Table 1 presents patient characteristics. The mean (standard deviation (SD)) age of patients was 60.4 (10.6) years. Less than half of patients were male (46%), had a post-high school education (32%), had part- or full-time jobs (36%) or had a total monthly household income of more than S\$5,000 (US\$3,606) (26%). The majority of patients were married (73%) and ethnically Chinese (79%). The mean (SD) symptom burden was 5.05 (5.05). Respiratory cancer (28%) was the most commonly reported, followed by colorectal and gastrointestinal (26%) and breast (16%) cancers. The mean ($\pm$ SD) scores for anxiety (2.34 ± 2.77) and depression (2.95 ± 2.92) were quite low, while they were quite high for perceived quality of physician communication (90.78 ± 19.12) and care coordination (91.93 ± 17.91).

3.2 Patients' Perceived and Preferred Role in Decision Making

Table 2 shows descriptive statistics on patients' perceived and preferred roles in decision making, and Stuart-Maxwell test results for discordance in decision making. The most common perceived role in decision making was collaborative, where patients made decisions together with their family and/or physicians (32%), followed by patient-led decision making (29%). About 15% of patients reported no involvement in decision making, while 13% reported making decisions alone. Only 8% of the patients reported that decisions were led by their physicians. Although 4% of the patients reported that decisions were led by their family, 65% of all patients reported family involvement (to some extent). A similar pattern was observed for patients' preferred roles in decision making, where 32% of patients preferred collaborative decision making and 26% preferred patient-led decision making.

The proportion of patients reporting patient-led decisions was larger than the proportion of patients who preferred this style (29% vs 26% for perceived and preferred, respectively;

p=0.009) and the proportion of patients reporting no involvement in decision making was smaller than the proportion of those who preferred this style of decision making (15% vs 17% for perceived and preferred roles, respectively; p=0.040).

3.3 Discordance in Perceived and Preferred Roles in Decision Making

Overall, 93 (16%) patients reported discordance in decision making (*Table 3*). Among patients with discordance, 31 (33%) reported being involved in decision making at a lesser level than they preferred, 44 (47%) reported being involved at a greater level than they preferred, and 18 (19%) reported discordance where patient involvement did not change. The multinomial logit regression results show that, compared to experiencing concordance, older patients were less likely to be involved in decision making at a lesser level than they preferred ($\beta=-0.041$; 95% Confidence Interval (CI)=-0.079,-0.003), and patients with higher education ($\beta= 0.735$; CI=0.005, 1.466) were more likely to be involved at a greater level than they preferred (*Supplement C*). Ethnicity, marital status, work status, income, and symptom burden were not significant predictors of discordance.

3.4 Association of Discordance with Psychological Distress and Perceived Quality of Care

Table 4 presents the results from eight univariable and multivariable regressions, respectively. Univariable regressions reveal that patients who were involved in decision making at a lesser level than they preferred reported greater anxiety ($\beta=0.906$; CI=-0.010,1.911), poorer quality of physician communication ($\beta=-10.251$; CI=-17.146,-3.356), and poorer quality of care coordination ($\beta=-14.107$; CI=-20.509,-7.706), as compared to those who experienced decision making concordance. Univariable regressions also reveal that patients who reported discordance with no change in patient role reported poorer quality of physician communication ($\beta=-9.319$; CI=-18.258,-0.381) and poorer quality of care coordination ($\beta=-9.610$; CI=-17.909,-1.311) as compared to those who experienced concordance.

Multivariable analyses which control for patient characteristics found that involvement at a lesser level than preferred and discordance with no change in patient role were associated with poorer quality of physician communication ($\beta=-9.478$; CI=-16.303,-2.653 and $\beta=-9.184$; CI=-18.066,-0.301) and poorer care coordination ($\beta=-11.658$; CI=-17.718,-5.597 and $\beta=-8.856$; CI=-16.744,-0.968) compared to concordance. Compared to patients who experienced

concordance, patients who were involved less than they preferred reported 9.48 (about half standard deviation) and 11.66 (about two thirds of standard deviation) lower scores for the quality of physician communication and care coordination, respectively. Similarly, patients who reported discordance with no change in patient role reported 9.18 and 8.86 (about half standard deviation) lower scores for the quality of physician communication and care coordination, respectively. Full multivariable regression model outputs are shown in *Supplement D*.

4. DISCUSSION

Our findings suggest that the perceived and preferred degree of involvement in decision making varies across patients with advanced cancer. The most common experience in decision making reported by patients was a collaborative approach, followed by a patient-led approach. We found a similar pattern for preferred roles in decision making. Passive (i.e., family-led, physician-led or no involvement) decision-making was reported and preferred by 27% and 28% of patients, respectively. Families were important stakeholders in making decisions regarding cancer care; yet, the extent to which patients reported their family's involvement in decision making varied substantially. Overall 65% of patients in our sample reported their families being involved in decision making to a certain extent, including 4% reporting that decisions were led by their families with the patients' and physicians' involvement and a further 4% reported decisions solely made by their families. These figures were higher in comparison to the CanCORS study, in which family-led decision making was reported by 1.3% and 2.3% for Caucasian cancer patients and English speaking Asians respectively. On the contrary, it is one-third of the figures found in the CanCORS study for non-English speaking Asians, at 12.8% [20].

Overall, 16% of patients reported discordance between perceived and preferred roles in decision making. This is similar to 20% discordance reported by women with breast cancer in Hong Kong [19], but lower than 66% reported by cancer patients in Australia [13]. However, when comparing studies, differences in the questions to assess roles in decision making should be considered. The low level of discordance in our study may be due to the extent of family involvement in patient's decision making, a factor that has not been investigated in previous studies. Future research should investigate discordance in decision making in other countries and the underlining factors for differences across different cultures.

We also found that among patients with discordance in decision making, more patients reported being involved at a greater level than they preferred compared to those who reported being involved in decision making at a lesser level (47% vs 33%). This finding should be interpreted with a cultural lens. As stated in the introduction, patients in Asian societies in general expect their family members to take care of them and see this as the duty of the family. This may set patients with an expectation of being passive instead of taking charge of their care management. However, this expectation may not be realized for all those who desire as our findings showed.

We also investigated the predictors for types of discordance. Consistent with the previous studies [15, 16], we found that age and education were significant predictors of discordance. Specifically, our findings show that older patients were less likely to be involved at a lesser level than they preferred. This may be due to the authority older individuals have in Asian societies, such that they are not likely to be left out of the decision-making process [27]. We also found that patients with a higher-level education were more likely to be involved at a greater level than they preferred. Individuals with a higher level of education may end up being involved more than desired as they discuss their treatment with their physicians and family caregivers.

Our findings indicate that the type of discordance matters. Being involved in decision making less than desired was significantly associated with poorer quality of physician communication and care coordination compared to concordance and being involved in decision making more than preferred. It is possible that patients who were involved less than they desired may have had unanswered concerns or questions or may have felt that their preferences were disregarded by their physicians. In addition, they may have been placed on a treatment regimen that was not consistent with their preferences and values. Contrarily, patients who participated as much as or more than they desired were more likely to have raised their concerns and questions to their physicians, received a treatment consistent with their preferences and ultimately were more likely to be satisfied with physician communication and care coordination. Interestingly, a small number of patients reported that the roles of the physicians and/or families were not at the preferred levels, and they reported poorer quality of physician communication and care coordination compared to concordance and being involved in decision making more than preferred.

The strengths of the study include its large sample size, inclusion of patients with different types of cancer and the use of customized questions on decision making roles to assess the involvement of families as well as physicians. Most studies in this area were conducted in Western countries and focus on the patient-physician dyad in decision making. Since families are particularly important stakeholders in decision making in Asian countries, it was necessary that we focused on the triad of patients, physicians and family members. This study is also one of the few studies that investigated the association between discordance in perceived and preferred roles with patient outcomes.

Our study has several limitations. Firstly, our data can only indicate associations and cannot investigate causality between discordance and patient outcomes. Secondly, although we recognize that patient's perceived and preferred role in decision making may vary based on the type of decision (e.g. chemotherapy, palliative care), we only asked for role in general decision making. Asking for specific types of decision would have been cumbersome and tiring for the patients, and might be more susceptible to recall bias than asking for treatment decisions in general. Thirdly, reverse causality between discordance, and psychological distress and perceived quality of care outcomes may exist. Finally, patients reported their preferred role in decision making immediately after they reported their perceived role in decision making. This format and timing of survey questions might have led patients to report more concordance in decision making, resulting in the underestimation of the number of patients who may have experienced discordance.

Conclusions

In summary, our findings show that current clinical practice in Singapore seems to provide an environment for most patients to participate in decision making at their desired level. Our findings also suggest that patients who were involved at a greater level than they preferred reported no different outcomes as those who reported concordance. This finding is very reassuring for the advocates of SDM in Asian countries where patients, especially elderly patients, tend to take a backseat in decision making. Our findings suggest that involving patients at a lesser level than they prefer can lead to poorer perceived quality of physician communication and care coordination, and that encouraging patient participation is a safer approach to minimizing poor outcomes. Future research should develop tool(s) and strategies that aid healthcare providers to involve patients in decision making.

Supplemental Material

- A. Survey questions used to collect information on participants' perceived and preferred roles in decision making
- B. Classifications of decision-making styles
- C. Multinomial logit model for Predictors of Discordance (N = 599)
- D. Multivariable analyses for Discordance in Decision Making and its Association with Psychological Distress and Perceived Quality of Care – OLS estimates (N = 599)

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Figure 1. Participant Recruitment Flow Diagram

TABLE 1. Patient Medical and Socio-Demographic Characteristics (N=599)

Demographics	Mean (SD^a) / N (%)
Age, mean (SD)	60.4 (10.6)
Male	277 (46.2%)
Ethnicity	
Chinese	473 (79.0%)
Malay/Indians/Others	126 (21.0%)
Married	435 (72.6%)
Education	
High school or below	409 (69.3%)
Above high school	190 (31.7%)
Total monthly household income (SGD)	
< 2000	175 (29.2%)
2000-2999	84 (14.0%)
3000-4999	107 (17.9%)
≥ 5000	156 (26.0%)
Refused to answer	72 (12.0%)
Missing	5 (0.8%)
Work Status	
Full- or part-time	214 (35.7%)
Homemaker/retired/not working	379 (63.3%)
Missing	6 (1.0%)
Symptom Burden, mean (SD)	5.05 (5.05)
Cancer Type	
Respiratory	169 (28.2%)
Colorectal and Gastrointestinal	154 (25.7%)
Breast	96 (16.0%)
Genitourinary	78 (13.0%)
Gynecologic	53 (8.9%)
Others (head and neck, musculoskeletal, neurological, skin and liver)	49 (8.2%)
HADS Total	5.29 (4.96)
Anxiety	2.34 (2.77)
Depression	2.95 (2.92)
QoC Physician communication	90.78 (19.12)
QoC Care coordination	91.93 (17.91)

^a SD indicates Standard Deviation

Table 2. Descriptive Statistics and Stuart-Maxwell Test Findings on Perceived and Preferred Roles in Decision Making (N=599)

Roles in Decision Making	Perceived Role N (%)	Preferred Role N (%)	P-value
Patient Alone			
Patient alone makes decisions	76 (12.7)	81 (13.5)	0.369
Patient Led			
Patient makes decisions after considering family's opinion	11 (1.8)	6 (1.0)	0.096
Patient makes decisions after considering doctors' opinion	54 (9.0)	53 (8.9)	0.782
Patient makes decisions after considering their family's and doctors' opinions	109 (18.2)	99 (16.5)	0.041
Total	174 (29.1)	158 (26.4)	0.009
Collaborative			
Patient and patient's family make decisions together	17 (2.8)	14 (2.3)	0.405
Patient and patient's doctors' make decisions together	24 (4.0)	23 (3.8)	0.706
Patient, patient's family and doctors make decisions together	148 (24.7)	154 (25.7)	0.201
Total	189 (31.6)	191 (31.9)	0.732
Family Led			
Patient's family makes decisions after considering patient's opinion	1 (0.2)	1 (0.2)	1.000
Patient's family makes decisions after considering the patient's and doctors' opinions	25 (4.2)	23 (3.8)	0.480
Total	26 (4.3)	24 (4.0)	0.480
Physician Led			
Patient's doctors make decisions after considering patient's opinion	19 (3.2)	16 (2.7)	0.180
Patient's doctors make decisions after considering the patient's and the family's opinions	27 (4.5)	29 (4.8)	0.414
Total	46 (7.7)	45 (7.5)	0.763
No Patient Involvement			
Family alone makes decisions	21 (3.5)	27 (4.5)	0.134
Patient's family makes decisions after considering doctors' opinions	15 (2.5)	16 (2.7)	0.655
Doctors alone make decisions	39 (6.5)	44 (7.4)	0.251
Patient's doctors make decisions after considering family's opinions	1 (0.2)	1 (0.2)	1.000

Patient's family and doctors make decisions together	12 (2.0)	12 (2.0)	1.000
Total	88 (14.7)	100 (16.7)	0.040

Table 3. Discordance and Types of Discordance (N=599)

	N (%)	95% Confidence Interval
Concordance	506 (84%)	81%, 87%
Discordance	93 (16%)	13%, 19%
Types of Discordance		
Involved less than preferred	31 (33%)	24%, 44%
Involved more than preferred	44 (47%)	37%, 58%
No change in patient involvement	18 (19%)	12%, 29%

Table 4. Univariable and Multivariable Estimates for Discordance in Decision Making and its Association with Psychological Well-being and Perceived Quality of Care – OLS estimates

Independent Variables	Anxiety		Depressive Symptoms		Physician Communication		Care coordination and responsiveness	
	Coefficient (SE ^a)	95% CI ^b	Coefficient (SE)	95% CI	Coefficient (SE)	95% CI	Coefficient (SE)	95% CI
Univariable Analyses (N = 599)								
Involved less than preferred	0.906* ^c (0.512)	-.0997 1.911	0.857 (0.540)	-0.204 1.918	-10.251*** (3.511)	-17.146 -3.356	-14.107*** (3.260)	-20.509 -7.706
Involved more than preferred	0.663 (0.435)	-0.191 1.517	-0.372 (0.459)	-1.273 0.530	0.731 (2.982)	-5.126 6.588	-2.755 (2.769)	-8.193 2.683
No change in patient involvement	0.832 (0.664)	-0.471 2.136	0.472 (0.700)	-0.903 1.847	-9.319** (4.551)	-18.258 -0.381	-9.610** (4.226)	-17.909 -1.311
Constant	2.223*** (0.123)	1.982 2.465	2.917*** (0.130)	2.662 3.172	91.542*** (0.844)	89.885 93.198	93.155*** (0.783)	91.617 94.693
Adjusted R-squared	0.0056		0.0013		0.0156		0.0330	
Multivariable Analyses^d (N = 599)^e								
Involved less than preferred	0.514 (0.473)	-0.415 1.444	0.666 (0.490)	-0.297 1.629	-9.478*** (3.475)	-16.303 -2.653	-11.658*** (3.086)	-17.718 -5.597
Involved more than preferred	0.394 (0.403)	-0.398 1.187	-0.446 (0.418)	-1.267 0.374	2.186 (2.961)	-3.629 8.001	-0.489 (2.629)	-5.653 4.675
No change in patient involvement	0.908 (0.616)	-0.302 2.118	0.675 (0.638)	-0.578 1.928	-9.184** (4.523)	-18.066 -0.301	-8.856** (4.016)	-16.744 -0.968
Constant	3.643*** (0.834)	2.005 5.282	2.423*** (0.864)	0.726 4.120	99.226*** (6.122)	87.202 111.250	82.531*** (5.437)	71.853 93.209
Adjusted R-squared	0.1676		0.1947		0.0562		0.1517	

^a SE indicates standard error.

^b CI indicates confidence interval.

^c * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

^d Multivariable analyses adjust for sociodemographic characteristics, symptom burden and cancer type.

^e In the multivariable analyses, we included dummy variables for missing data for the income variable (77 missing data) and working status (6 missing data).

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