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Impact of Cost Conversations During Clinical Encounters Aided by Shared Decision-Making Tools on Medication Adherence

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Abstract

Objective: To investigate the impact of cost conversations occurring with or without the use of encounter shared decision-making (SDM) tools in medication adherence.

Patients and Methods: Using a coding scheme that included the occurrence and characteristics of cost conversation, we analyzed a randomly selected sample of 169 video recordings of clinical encounters. These videos were obtained during the conduct of practice-based randomized clinical trials comparing care with and without SDM tools for patients with diabetes, osteoporosis, and depression. Medication adherence was described in 2 ways: as a binary (yes/no) outcome, in which the patient met at least 80% adherence, or as a continuous variable, which was the percent of days that the patient adhered to their medication. The secondary analysis took place in 2018 from trials that ran between 2007 and 2015.

Results: Most patients were White (155, 93.4%), educated (104, 63.4% completed college), middle-aged (mean age, 58 years), female (104, 61.5%), and from diabetes (86, 50.9%), depression (43, 25.4%), and osteoporosis (40, 23.7%) trials. Cost conversations occurred in 119 clinical encounters (70%) and were more frequent in those encounters in which SDM tools were used ($P=.03$). Furthermore, 97 (57.4%) of the participants reported more than 80% medication adherence and 70.3 ± 29.34 percentage of days with adherent medication of 70 days. In the multiple regression model, the only factor associated with adherence (binary or continuous) was the condition of the trial in which people participated. For the participants who had cost conversations, the use of an SDM tool, their sex, the nature of cost conversation (direct or indirect), the nature of cost concerns (treatment or patient issue), and the clinician-offered strategies (yes or no) were not associated with adherence.

Conclusion: In this videographic analysis of SDM practice-based clinical trials, cost conversations were not associated with the general measures of medication adherence. Future studies should assess whether a tailored cost conversation intervention would impact the cost-related nonadherence among patients.

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Every year, patients see an increase in out-of-pocket spending for care. This growth in spending has increasingly placed a direct burden on patients, either because they are uninsured and must pay out of pocket for all of their care or because insurance plans shift a portion of the costs back to the patients through deductibles, copayments, and coinsurance.[1] As a result, 1 in 3 Americans report difficulties paying for health care, and medical costs remain the leading cause of individuals filing for personal bankruptcy in the United States.[2]

Patients affected by financial burdens (or so-called financial toxicity) often reduce medical costs by taking their medications sporadically, splitting pills, or delaying refills.[3] Surveys report that up to 30% of older adults take less medication than prescribed to reduce costs.[3] Thus, financial toxicity can directly

lead to many patients not achieving the full benefits of therapy and an increased risk of declining health.[4-7] Being unaware of costs may put patients at risk of financial toxicity; when clinicians fail to discuss potential costs before ordering diagnostic tests or making treatment decisions, patients may unknowingly face daunting and potentially avoidable health care bills.

Cost conversations at the point of care have the potential to result in cost-sensitive care plans that the patients can feasibly implement and adhere to.[8-10] Yet, cost conversations rarely occur in practice. A recent systematic review[11] reported that encounter tools are one of the few interventions associated with higher occurrences of cost conversations between patients and clinicians. Indeed, we have previously found that the clinical encounters supported by shared decision-making (SDM) tools that incorporate cost information increased the incidence of cost conversations compared with encounters not supported by SDM tools.[12,13] What is unclear is whether cost conversations with and without the use of SDM tools impact medication adherence.

To investigate the impact of cost conversations occurring with or without the use of SDM tools in medication adherence, we performed a secondary analysis of video-recorded clinical encounters from practice-based randomized trials that used SDM tools developed by our team.

PATIENTS AND METHODS

Population and Data Source
We used a random sample of 169 video recordings of clinical encounters obtained during the conduct of 6 practice-based randomized trials. This study series aimed to assess the impact of SDM tools on encounter conversations between clinicians and patients for the management of a variety of conditions, including diabetes (TRICEP, Diabetes, and DAD trials), depression (iADAPT trial), and osteoporosis (Osteo I and Osteo II trials), as seen in Supplemental Table 1 (available online at http://www.mcpiqojournal.org). From these trials, we obtained patient demographic data and data from patients' postencounter surveys.

Coding Scheme
We developed an extraction coding scheme a priori. We assessed the occurrence of cost conversations and the number of cost conversations per encounter. Whenever a cost issue was discussed, we assessed the nature (treatment vs patient issues) of the cost-related issues. On the basis of the team members' agreement, we defined treatment issues as cost issues related to the treatment options discussed that affected the decision-making process (eg, "insurance will not cover treatment and as a consequence, the treatment has changed"). Patient issues were defined as cost issues or conditions that stemmed from elements of a patient's life (eg, "the patient is depressed because they lost their job and now lack income"). We also collected data about the nature (direct vs indirect) of cost-related issues discussed. Direct costs refer to the health care expenses directly affecting patients' finances (eg, drug costs, insurance-related costs, travel costs, future costs of care). Indirect costs refer to the effects on patients' finances as a result of disease and treatment burdens in patients' work, personal, and social lives (eg, patient productivity and lost wages, administrative burden costs, basic need costs, required lifestyle/behavioral change costs, family impacts, child/elder care). We also noted whether the cost issue was addressed (ie, some action was taken), and from these actions, which strategies to reduce the burden of cost on care were used.

Coding Scheme Calibration
Two researchers (N.E. and M.U.) were trained to use the coding scheme and then coded an initial set of 10 videos for calibration. Both coders met to check coding results for accordance, resolve disagreements, and refine their use of the coding scheme. After 2 rounds of calibration on the first 10 videos, the coders coded 5 additional videos to ensure that both coders were able to identify the cost conversations and describe its characteristics; after confirming calibration, the coders began coding the full data set independently. During the analysis, a duplicate set of 7 videos (unknown by the coders) was used to both monitor agreement and estimate an overall kappa statistic (kappa=0.7).

TABLE 1. Descriptive Characteristics[a]

Characteristics	No cost conversation (N=50)	Had cost conversation (N=119)	Total (N=169)	P value
Name of the study, n (%)				.3605[b]
Diabetes (Diabetes, TRICEP, DAD trials)	25 (50.0%)	61 (51.3%)	86 (50.9%)	
Depression (iADAPT trial)	10 (20.0%)	33 (27.7%)	43 (25.4%)	
Osteoporosis (Osteo I and Osteo II trials)	15 (30.0%)	25 (21.0%)	40 (23.7%)	
Age (y)				.4381[c]
Mean (SD)	59.0±14.60	57.2±14.63	57.8±14.60	
Median (range)	60.5 (21.0, 83.0)	60.0 (19.0, 86.0)	60.0 (19.0, 86.0)	
Sex, n (%)				.2631[b]
Female	34 (68.0%)	70 (58.8%)	104 (61.5%)	
Male	16 (32.0%)	49 (41.2%)	65 (38.5%)	
Race, n (%)				.8819[b]
White/Caucasian	45 (93.8%)	110 (93.2%)	155 (93.4%)	
Black/African American	2 (4.2%)	4 (3.4%)	6 (3.6%)	
Other	1 (2.1%)	4 (3.4%)	5 (3.0%)	
Missing	2	1	3	
Ethnicity, n (%)				.4253[b]
Hispanic or Latino	0 (0.0%)	2 (6.1%)	2 (4.7%)	
Not Hispanic or Latino	10 (100.0%)	31 (93.9%)	41 (95.3%)	
Missing	40	86	126	
Education, n (%)				.3404[b]
Less than college education	21 (42.0%)	39 (34.2%)	60 (36.6%)	
Some college or more	29 (58.0%)	75 (65.8%)	104 (63.4%)	
Missing	0	5	5	
Income, n (%)				.1014[b]
<$40,000	22 (52.4%)	26 (36.6%)	48 (42.5%)	
≥$40,000	20 (47.6%)	45 (63.4%)	65 (57.5%)	
Missing	8	48	56	
Marital status, n (%)				.9483[b]
Married	26 (70.3%)	69 (69.7%)	95 (69.9%)	
Other	11 (29.7%)	30 (30.3%)	41 (30.1%)	
Missing	13	20	33	
Health insurance, n (%)				.8883[b]
Private	19 (54.3%)	45 (58.4%)	64 (57.1%)	
Medicare	14 (40.0%)	26 (33.8%)	40 (35.7%)	
Medicaid	1 (2.9%)	4 (5.2%)	5 (4.5%)	
Not reported	1 (2.9%)	2 (2.6%)	3 (2.7%)	
Missing	15	42	57	
Arm, n (%)				.0333[b]
Control	26 (52.0%)	41 (34.5%)	67 (39.6%)	
SDM tool	24 (48.0%)	78 (65.5%)	102 (60.4%)	

[a]SDM tool, shared decision-making tool.
[b]Chi-square P value.
[c]Kruskal-Wallis P value.

Study Outcomes

We examined the impact of cost conversations between patients and clinicians on patients' treatment adherence. Supplemental Table 2 (available online at http://www. mcpiqojournal.org) describes the technique used to assess adherence in each of the 6 original trials. Medication adherence was described in 2 different ways: a binary yes/no outcome for whether the patient met at least

TABLE 2. Outcomes of Interest by Whether or Not They Had a Cost Conversation[a]				
Endpoints	No cost conversation (N=50)	Had cost conversation (N=119)	Total (N=169)	P value
>80% adherent medication class 1, n (%)				.8119[a]
No	22 (44.0%)	50 (42.0%)	72 (42.6%)	
Yes	28 (56.0%)	69 (58.0%)	97 (57.4%)	
Percentage of days with adherent medication				.9190[b]
N	50	119	169	
Mean (SD)	68.6±32.51	70.9±28.01	70.3±29.34	
Median	84.7	82.2	83.8	
Range	2.2, 100.0	0.0, 100.0	0.0, 100.0	

[a]Chi-square P value.
[b]Kruskal-Wallis P value.

80% adherence and a continuous variable, which was the percent of days that the patient adhered to their medication

Statistical Analyses

We calculated descriptive statistics for patients' baseline characteristics. We reported continuous variables using mean and SD, whereas categorical variables were reported as frequencies. The univariate differences between encounters with and without cost conversations were tested using chi-square tests for categorical variables and Kruskal-Wallis tests for continuous variables. A multiple linear regression model was used to analyze the impact of cost conversation factors on the percentage of days that the patient met the medication adherence criteria. A multiple logistic regression model with a binary outcome of whether or not the patient met the 80% medication criteria was also used to evaluate the impact of the independent variables. Regression results are reported using point estimates and their 95% CIs for each covariate. The covariates used in every model were age, sex, whether an SDM tool was used, and the nature of the cost conversation (direct or indirect). We further conducted a separate analysis in the cohort of encounters where cost conversation occurred to assess the effect of several covariates that were associated with medication adherence. Covariates in the model for the subgroup analysis included age, sex, whether or not an SDM tool was used, and characteristics determined a priori

to be associated with high-quality cost conversation: those included the nature of the cost conversation (direct or indirect), the nature of the cost concern (treatment or patient issue), and whether the clinician-offered strategies to reduce costs (yes or no). Analyses were performed in SAS Statistical Software (SAS version 9.4, SAS Institute Inc.). $P<.05$ was considered statistically significant.

RESULTS

Of the 169 participants, most were women (62%), were White (93.4%), were part of a diabetes trial (50.9%), had a mean (SD) age of 57.8 (14.6) years, had at least some college education (63.4%), had an income $40,000 or more per year (57.5%), had private insurance (57.1%), and participated in an encounter that was supported by an SDM tool (60.4%). Cost conversations occurred in 119 (70%) of the clinical encounters; these conversations were more frequent in those encounters where SDM tools were used ($P=.03$) and within each trial type ($P=.02$). Additional descriptive characteristics are displayed in Table 1.

Overall, most of the participants reported more than 80% medication adherence (57.4%) and a mean (SD) percentage of days with adherent medication of 70 days. Cost conversations were not associated with more than 80% adherence or the percentage of days with adherent medication (Table 2). In the multiple regression model, the only factor associated with more than 80% adherence was the condition of the trial in which people participated.

TABLE 3. Logistic and Linear Regression Models

Multiple logistic regression model with >80% adherence as outcome		
Endpoints	Odds ratio (95% CI)	*P* value
Age (Unit = 1)	1.01 (0.98-1.04)	.681
Control vs DA	1.18 (0.57-2.43)	.659
Female vs male	0.77 (0.32-1.82)	.545
No direct cost vs direct cost	0.96 (0.43-2.15)	.915
No indirect cost vs indirect cost	1.63 (0.70-3.82)	.258
Diabetes vs osteoporosis	4.98 (1.86-13.35)	.002
Depression vs osteoporosis	0.61 (0.19-1.96)	.358
Multiple linear regression model with percent days adhered as outcome		
	Estimate (95% CI)	*P* value
Intercept	71.38	
Age (Unit = 1)	−0.06 (−0.41 to 0.29)	.733
No use of SDM tool	−3.93 (−12.37 to 4.51)	.359
Use of SDM tool	Reference	
Female	−6.61 (−16.35 to 3.13)	.182
Male	Reference	
No direct cost	−0.95 (−10.44 to 8.54)	.843
Direct cost	Reference	
No indirect cost	6.20 (−3.74 to 16.15)	.220
Indirect cost	Reference	
Diabetes	14.16 (2.33 to 26.00)	.019
Depression	−14.18 (−28.52 to 0.16)	.053
Osteoporosis	Reference	

DA, decision aid; SDM tool, shared decision-making tool.

The participants in the diabetes trials were more likely to have more than 80% adherence to medication (OR, 4.98 [95% CI, 1.86-13.35; P=.002]) than participants in any of the osteoporosis trials. Similar associations were observed in the multivariate analysis for the percentage of days adhered (Table 3).

Within the encounters with cost conversations, the use of SDM tools, sex, nature of the cost conversation (direct or indirect), nature of the cost concerns (treatment or patient issue), and clinician-offered strategies (yes or no) were not associated with adherence (Supplemental Table 3, available online at http://www.mcpiqojournal.org).

DISCUSSION

Our study found that cost conversations taken as a whole, across several chronic diseases (diabetes, depression, osteoporosis), with or without the help of SDM tools, had no impact on the 2 measures of adherence, ie, whether the patient met at least 80% adherence and the percentage of days the patient adhered to their medication. To our knowledge, this is one of the only studies of its kind examining the impact of cost conversations on patient adherence, albeit using secondary data from the SDM trials. Neither the nature of cost conversations (direct or indirect) nor whether the discussion centered on treatment costs vs patient-impacting cost issues nor whether cost-reducing strategies were offered had any impact on patient adherence.

There may be several reasons for the lack of association between cost conversations and medication adherence. One potential explanation is that the incidence of cost conversations in and of itself may not always suggest that the patients are experiencing financial burdens; ie, it is possible that many cost conversations were triggered by the use of SDM

tools instead of by the patient's concerns about affordability. Therefore, a more cost-relevant measure of adherence, like cost-related nonadherence, could identify patients who may not be able to afford their medications. A future study should examine prospectively whether a cost conversation intervention is impactful for patients who have documented cost-related nonadherence at baseline.

This study follows up on an earlier related study[13] that found that cost conversations were associated with the use of SDM tools, patient education, income levels, and trial characteristics. The inherent value of these conversations is to enable patients to manage financial toxicity and to afford and adhere to the medication regimens. Specifically, by tailoring and addressing patient-specific issues as they relate to the financial burdens associated with out-of-pocket medication costs, cost conversations should potentially enable better medication adherence. This includes helpful physician-initiated cost-cutting strategies[14] as well as helpful financial resource education and tools to enable patient coping behaviors.[15] Although we looked at whether strategies to manage costs were mentioned, we did not examine the quality, co-creation process, and acceptability of these cost-saving strategies to enable patients to manage financial toxicity. Future studies should examine these aspects of the strategizing process to understand the full utility of cost conversations in developing tangible and patient-specific tailored plans to manage financial toxicity, both in the short and long run.

Our study had several limitations. First, our analysis was conducted on the basis of a recording of a single visit per patient, limiting our capacity to examine if cost conversations had occurred during previous or subsequent encounters. Second, our study did not examine the quality of communication between patients and physicians, nor did it engage in content analysis to examine all aspects of cost conversations that could both enable and hinder adherence. A recent study by our group[12] found that cost conversations do in fact motivate patients to consider costs in choosing medications, although cost conversations did not impact the final choice of medication. Although our study found that cost conversations may not be associated with medication adherence, these previous findings point to the broad value of bringing costs to the attention of patients and, moreover, may guide clinicians to consider further aspects of cost conversations that might motivate better patient adherence.

Our study nonetheless has several strengths. These conversations happened in real-life encounters without either the patients or physicians being aware of the purpose of the research. As such, our findings were not biased by desirability responses by the participants. Furthermore, we examined the adherence behaviors across different disease states, making our research more generalizable to other chronic conditions while simultaneously highlighting differences that provide insight into what impacts patient adherence.

CONCLUSION

Cost conversations may not be associated with the general measures of medication adherence. Future studies should assess whether a tailored cost conversation intervention would impact adherence among patients with baseline evidence of cost-related nonadherence.

POTENTIAL COMPETING INTERESTS

The authors report no competing interests.

SUPPLEMENTAL ONLINE MATERIAL

Supplemental material can be found online at http://www.mcpiqojournal.org. Supplemental material attached to journal articles has not been edited, and the authors take responsibility for the accuracy of all data.

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REFERENCES

1. Collins SR, Rasmussen PW, Doty MM, Beutel S. Too high a price: out-of-pocket health care costs in the United States. Findings from the Commonwealth Fund Health Care Affordability Tracking Survey. September-October 2014. *Issue Brief (Commonw Fund)*. 2014;29:1-11.

2. Banegas MP, Guy GP, de Moor JS, et al. For working-age cancer survivors, medical debt and bankruptcy create financial hardships. *Health Aff (Millwood)*. 2016;35(1):54-61.

3. Benz J, Titus J, Tompson T, Leitz S. *Americans' views of healthcare costs, coverage, and policy*. NORC at the University of Chicago; 2020. https://www.norc.org/PDFs/WHI%20Healthcare%20Costs%20Coverage%20and%20Policy/WHI%20Healthcare%20Costs%20Coverage%20and%20Policy%20Issue%20Brief.pdf. Accessed June 10, 2022.

4. Ramsey SD, Bansal A, Fedorenko CR, et al. Financial insolvency as a risk factor for early mortality among patients with cancer. *J Clin Oncol*. 2016;34(9):980-986.

5. Care D. Economic costs of diabetes in the U.S. in 2017. *Diabetes Care*. 2018;41(5):917-928.

6. QuickStats: Percentage of persons of all ages who delayed or did not receive medical care during the preceding year because of cost, by US Census Region of Residence*—National Health Interview Survey, 2015. *MMWR Morb Mortal Wkly Rep*. 2017;66(4):121.

7. DiJulio B, Kirzinger A, Wu B, Brodie M. *Data note: Americans' challenges with health care costs*. Kaiser Family Foundation; 2017.

https://www.kff.org/health-costs/issue-brief/americans-challenges-with-health-care-cost/. Accessed June 15, 2022.

8. Alexander GC, Tseng CW. Six strategies to identify and assist patients burdened by out-of-pocket prescription costs. *Cleve Clin J Med*. 2004;71(5):433-437.

9. Gellad WF, Huskamp HA, Li A, Zhang Y, Safran DG, Donohue JM. Use of prescription drug samples and patient assistance programs, and the role of doctor—patient communication. *J Gen Intern Med*. 2011;26(12):1458-1464.

10. Danis M, Sommers R, Logan J, et al. Exploring public attitudes towards approaches to discussing costs in the clinical encounter. *J Gen Intern Med*. 2014;29(1):223-229.

11. Blumenthal-Barby JS, Robinson E, Cantor SB, Naik AD, Russell HV, Volk RJ. The neglected topic: presentation of cost information in patient decision AIDS. *Med Decis Making*. 2015;35(4):412-418.

12. Kamath CC, Giblon R, Kunneman M, et al. Cost conversations about anticoagulation between patients with atrial fibrillation and their clinicians: a secondary analysis of a randomized clinical trial. *JAMA Netw Open*. 2021;4(7). e2116009-e2116009.

13. Espinoza Suarez NRE, LaVecchia CM, Ponce OJ, et al. Using shared decision-making tools and patient-clinician conversations about costs. *Mayo Clin Proc Innov Qual Outcomes*. 2020; 4(4):416-423.

14. Ubel PA, Zhang CJ, Hesson A, et al. Study of physician and patient communication identifies missed opportunities to help reduce patients' out-of-pocket spending. *Health Aff (Millwood)*. 2016;35(4):654-661.

15. Patel MR, Resnicow K, Lang I, Kraus K, Heisler M. Solutions to address diabetes-related financial burden and cost-related non-adherence: results from a pilot study. *Health Educ Behav*. 2018; 45(1):101-111.