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Medication Discussion Questions (MedDQ): Developing a guide to facilitate patient-clinician communication about heart medications

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Abstract

Background and Research Objective—Adherence to evidence-based therapies has emerged as one of the great challenges of translating discoveries to clinical care to optimize patient outcomes. In particular, nonadherence to life-saving medications continues to trouble health care systems. We conducted a series of studies to investigate why cardiac patients stop life-sustaining medications and to develop a tool to proactively address medication adherence issues. We could find no available preventive tools for communicating with patients about their medications in the clinical setting. In this paper, we summarize the process of developing such a tool.

Subjects and Methods—We utilized a mixed-methods approach in a series of studies which included examining quantitative data from a large patient registry, conducting in-depth qualitative patient interviews, creating items representative of the qualitative findings, pilot testing items with heart patients, surveying an expert panel to establish content validity, and conducting in-depth interviews with health-care providers to assess implementation opportunities.

Results and Conclusions—Patient interviews revealed that patients' values and beliefs, barriers to treatment, and prior medication taking behavior were of primary importance in understanding medication discontinuance. Pilot testing, expert panel review, and an implementation feasibility evaluation resulted in an 11-item communication guide to be used in a variety of health care settings. Clinicians need an efficient way of systematically communicating with patients about heart medications to identify barriers and to initiate preventive interventions when patients report barriers or challenges to medication adherence.

Keywords

Prevention; Risk Factors; Patients; Medication Adherence

Background

Prevention of nonadherence could have tremendous impact on the US healthcare system where this single act alone contributes to hospitalization costs of approximately \$100 billion dollars a year.¹ Advances in the treatment of cardiovascular disease and hospital accountability have led to marked improvements in patient care and documented reductions in mortality after acute myocardial infarction (AMI).² Despite this progress, the ability to ensure persistent use of life-saving medications after hospital discharge has lagged far behind. Munger, Van Tassell, and LaFleur³ estimate that 33 – 66% of medication-related hospital admissions are due to medication non-adherence. Extensive prior research documents the prevalence of this problem⁴ with recent reports indicating nonadherence rates of 31–39%.⁵ Nonadherence encompasses a variety of behaviors, including discontinuance, a particularly serious form of nonadherence in which the patient prematurely stops prescribed medication. Paradoxically, studies using the Duke Database for Cardiovascular Disease indicate that consistent use of medications is lowest among those heart patients at highest risk of poor outcomes and who would derive the greatest benefit from continued therapy.^{6, 7}

An important underlying issue is communication with patients about their medications.⁸ A few assumptions are common in medication nonadherence research and may contribute to communication problems. First, the patient is frequently assumed to be a passive, obedient and unquestioning recipient of medical instructions.^{9, 10} Second, many studies focus on what was wrong with the patient that led to nonadherence¹¹ with little attention to the patients' perspective regarding adherence.¹² Third, nonadherence is frequently conceptualized as a problem in decision making, ignoring the role of patients' values and beliefs.¹³ However, non-adherence is more likely the result of a complex set of factors that detract from a health-promoting medication regimen. We sought to address these limitations in prior research by first seeking to understand the patients' perspective of medication persistence. We identified the Health Belief Model (HBM)¹⁴, which focuses on the role of patients' values and beliefs in health behaviors, such as medication taking, for an organizing framework. We could find no structured tools for communicating with patients about their medications in the clinical setting; therefore, the focus of this research has been the development of such a communication tool. In addition, prior research indicates that educational and compliance interventions targeting groups at high risk for underuse of medications might include both patient interventions and interventions through pharmacists and other health care providers.⁶ Therefore, we also investigated the feasibility of implementing the communication tool in a variety of health care settings.

Methods and Outcomes

We conducted a series of studies (see Figure 1) between April 2006 and December 2008 using a mixed-methodology. Institutional review approval was received prior to the initiation of any patient contact. Findings from each study informed the development of the next step.

Study 1: *Understanding the patients' perspective: Qualitative data collection and analysis*

Initially we were interested specifically in why patients discontinue clopidogrel after receiving a drug-eluting stent. This question followed from an earlier quantitative study by our group indicating that approximately 1 in 7 patients who were treated with a drug eluting stent (DES patients) discontinue clopidogrel at 1-month follow-up, despite the potentially fatal consequences associated with early stopping.¹⁵ We also became interested in the extent to which discontinuance occurred in another class of commonly prescribed heart medications, cholesterol lowering therapies (CLTs). An important distinction between the

two medications is the potential immediacy of consequences. Patients who experienced an AMI and received a DES could experience severe consequences within as few as 7 days of stopping clopidogrel, whereas the consequences of stopping CLTs are longer term. Therefore, we used qualitative descriptive methods to understand the reasons patients prematurely stop essential heart medications and to determine if those reasons are stable across these two medication classes.^{16, 17}

In-depth interviews were conducted with AMI patients drawn between April 2006 and October 2007 from the TRIUMPH (Translational Research Investigating Underlying disparities in acute Myocardial infarction Patients' Health status) registry, an AMI registry funded by the National Institutes of Health (NIH) that draws patients from 26 medical centers across the U.S. A purposive sampling technique was used to identify patients with experience relevant to our research question. Patients who discontinued one of two essential heart medications (either clopidogrel or CLT) at their 1-month interview (n=40) were selected to be interviewed. An additional 11 patients who continued these medications were interviewed to examine any contrast between patients who continue and discontinue. Twenty-six of the 51 patients were male. Patients ranged in age from 41–78 years and had all experienced a myocardial infarction within 12 months of being interviewed.

A goal of qualitative data collection is to reach a level of saturation with the topic under study such that the information gained from participants becomes redundant, providing no new insights into the phenomenon.¹⁸ Data analyses conducted concurrently with the interviews indicated we had reached saturation and were not uncovering new information in the later interviews; therefore, we determined that our sample size (n=51) was adequate for our research question.

We used the HBM as a framework in developing the patient interview guide. A review of 17 studies utilizing the HBM found that 'perceived barriers' was the most powerful dimension of the model.¹⁴ Therefore, several questions in the interview guide focused on barriers to medication continuance, although all four explanatory factors within the HBM (severity, threat, barriers, and cues) guided question development. The patients were interviewed by telephone and the transcripts were analyzed by three PhD researchers using a qualitative descriptive approach. A coding scheme of the rich narrative interviews was established that integrated well with the HBM domains, such as barriers, communication, transitions of care, etc. Methodological rigor was assured through credibility and trustworthiness techniques consistent with qualitative research.

We examined how patients who continued differed from those who discontinued clopidogrel¹⁶ and how patients' reasons for discontinuance varied for clopidogrel and CLT.¹⁷ The main difference between patients who continued and discontinued clopidogrel was knowledge of prescription duration with discontinuers being unaware of the intended duration of the medication. When exploring whether the reasons for stopping clopidogrel held for another class of heart medications (CLTs), we found some distinctions. Perceived and real adverse side effects that were painful and/or interfered with daily life and physician discontinuance were the primary reasons for CLT discontinuance. This finding of 'intentional discontinuance' of CLT differed from the 'unintentional discontinuance' that was found with patients who stopped clopidogrel (lack of duration awareness or stopping by other specialists without subsequent resumption). Other reported barriers included cost (both cohorts); prescription confusion (both); gaps in transitions of care from the inpatient to outpatient setting (both); unclear follow-up (both); mistrust of doctors, medications, or the health care system (CLT cohort); and preference for alternative therapies (CLT).

Other studies have reported that forgetfulness and not thinking the medication is necessary are primary reasons for noncompliance¹³; however, neither the CLT nor the clopidogrel patients described these two reasons.¹⁷ We speculate that the difference may be attributed to the nature of the noncompliance being assessed. In our studies, patients were asked to tell us why they discontinued a medication, whereas in other studies patients may have been asked to identify reasons for occasionally missing a medication.

In a number of studies, important information was often omitted when patients were given instructions on medication use.^{19, 20} For example, the name of the medication, duration of treatment or purpose of the medication may not have been communicated to the patient. This communication failure was evident in both groups of patients we interviewed. For example, one patient thought a beta blocker medication was a CLT. Another patient thought that an over-the-counter medication (aspirin) accomplished the same goal as clopidogrel.¹⁷ Another cause of poor medication persistence was the belief that they were not actually prescribed the medication(s) under study. Through the TRIUMPH registry, we could verify that patients had indeed been prescribed the medication. We speculate that the prescription confusion may be due to cognitive impairment, miscommunication, or inadequate patient education. A possible explanation is that patients' needs for information changes over the course of their heart event and recovery process.²¹ The majority of patients in our study understood very little about CLT or clopidogrel, other than some reported that CLT lowers cholesterol and clopidogrel "keeps the pipes open".¹⁷ The need for information regarding the importance and purpose of cardiac medications must be reassessed and updated periodically.

Cost as a barrier to continuance may be a much more important issue to address with clopidogrel than CLTs and, because of clopidogrel's relatively greater cost, it should be addressed before the patient leaves the hospital. There are social programs and pharmaceutical companies that offer assistance to patients with medication assistance limitations, but it takes time to request, process, and receive assistance. An important distinction, however, is that CLT patients are likely to escape harm while waiting for medication assistance, and the same is not true for patients who must take clopidogrel on a daily basis post-DES. Prior research indicates that clopidogrel discontinuers are more likely to experience rehospitalization or fail to survive within as little as 7 days of discontinuance.²²

Study 2: Asking the right questions

For these findings regarding patient nonadherence to be clinically useful, clinicians need a tool or a way of systematically communicating with patients about barriers or challenges to medication adherence. A proactive intervention is needed to address nonadherence before it occurs; however, the first step is identification of patients' potential challenges with taking medications. Once problems have been identified, appropriate interventions can be developed and rationally applied to those at greatest risk for nonadherence. To address this need, our team developed the MedDQ (originally the Medication Discontinuance Questionnaire; revised later to Medication Discussion Questions). The HBM domains served as the framework for organizing the initial items. Two of the researchers created the items through an iterative process of drafting and editing over an eight week period. These items focused on the barriers and gaps identified in the patient interviews. For example, "I am at risk of having another heart attack" assesses susceptibility and "I worry about side effects of my medicines" addresses a barrier. The initial survey included 17 items; six items established the patient's risk of discontinuing their heart medications and 11 items asked the patient about specific barriers to medication continuance.

To test the items with patients, a research assistant administered the survey via telephone to 48 cardiac patients over a three-week period. The average administration time was approximately 10 minutes. As a result of the pilot test, several changes were made to the MedDQ including changing the response format to a 5-point Likert scale and adding two items to the risk section that were consistent with the HBM and that reflected findings from the earlier patient interviews. An item was also added to assess recent past medication adherence. The items assessing barriers to persistence were simplified into a list format. An item was added asking the patient about common comorbidities.

Once the survey was modified (version 2 with 13 items), the next step was to evaluate the content validity of the revised MedDQ by asking an expert panel to review the MedDQ items. The 10-member panel was comprised of three heart patients (>62 years old), two nurse practitioners, two experienced patient interviewers and data collectors, and three physicians (1 cardiologist and 2 Primary Care Providers). We used a purposive sampling technique to identify potential expert panelists. The primary inclusion criterion was that panelists had some manner of experience with heart medication discontinuance.

The Delphi technique was used to gain consensus regarding optimal items for the MedDQ. A Delphi technique typically uses a panel of experts who evaluate material in three rounds. In this case, panelists were asked to evaluate the relevance, wording, and content of each MedDQ item in round 1. In round 2, a summary document was circulated to all panelists to elicit comments on the multiple perspectives and suggestions collected in round 1. In round 3, panelists were asked to consider alternative wording for each item with a number of options listed under each original MedDQ item. Panelists rank ordered the original and the alternative options from most to least preferred. Following this review, the MedDQ became an 11-item interviewer- or self-administered tool (version 3).

Study 3: Exploring implementation opportunities

Following the expert panel review, we assessed implementation opportunities by asking health care providers' (HCPs) to review the content of the scale, the feasibility of post-treatment administration, the feasibility of administration in various settings, the perceived 'usability' of the tool, the benefits of the tool, and the use of the MedDQ as a trigger for intervention. We interviewed 50 HCPs, however, one interview was unusable; therefore, our sample consisted of 49 HCPs. Specializations included physicians (4), nurses (16), pharmacists (15), social workers (4), physical therapists (3), and case managers (7). Forty-two were female. Snowball (or network) sampling was used to identify and recruit HCPs from a variety of settings. The researchers identified and contacted the first 7 HCPs who subsequently introduced us to the remaining participants. HCPs had a median of 21 years of experience in health care and came from 12 states across the U.S (MO, TN, LA, KS, AR, IA, TX, NC, IL, FL, OH, CA).

Once an HCP agreed to participate, an information packet was mailed or emailed. The packet included a 1) cover letter explaining the purpose of the study and the types of questions that would be asked in the interview; 2) a copy of the MedDQ; and 3) a draft of the test manual under development for the MedDQ. Interviews were conducted by telephone between July and December 2008. The transcribed interviews were coded by three PhD researchers using established categories that were salient in the responses during repeated review of the transcripts. Codes were compared and consensus was reached among the researchers through discussion. NVivo 8 (QSR International, Victoria, Australia) was used in the analysis and organization of the lengthy interviews. Methodological rigor was established in the same manner as with the earlier patient interviews.

Format—The HCP's commented on the format and almost all believed the MedDQ should remain short, a 1-page document, if possible. Some HCPs asked about the literacy level of the questions which are written at a 6th grade reading level (per Flesch-Kincaid grade level readability statistics). A few HCPs commented on the use of the word "confident" in item 4, expressing that the word might be too vague or ambiguous for some patients. Also, many of the HCPs questioned why items 9 (plans for surgery) and 11 (comorbidities: diabetes, high blood pressure, and high cholesterol) were included.

Administration—Feasibility and the optimal setting were also addressed by the HCPs. The majority of the HCPs affirmed that the tool was short and simple to administer. A number commented specifically that the tool would be very helpful in caring for patients, especially with regard to communicating about medication issues.

The role of the HCP is important to take into account when soliciting the optimal setting for administration. Prior to the interviews, we wondered if HCPs might identify optimal sites that were outside of their purview. We believed HCPs might have a bias against anything that increases the workload in their busy healthcare setting. Although we did hear repeatedly that time is a scarce resource, the HCPs did not relegate the administration of the MedDQ to other HCPs' sites. More frequently, the HCPs believed the optimal setting was their healthcare setting. Physicians were more likely to identify an in-person visit at a health care center (e.g., cardiologist's office or hospital). Likewise, 60% of the pharmacists identified the pharmacy as the optimal setting. Pharmacists, physicians, nurses, and social workers tended to recommend settings in which they practiced. 'Follow-up call' was identified by 45% of the respondents, with the highest percentage of responses. Case managers, nurses, pharmacists, and social workers were among those who believed this was the optimal setting. No physicians believed that a follow-up call was the optimal setting.

Usability—The majority of HCPs believed the MedDQ could serve an important role as a communication aid between care providers and patients. During routine visits or follow-up calls, the MedDQ could focus the conversation and provide direction for more in-depth discussion than usually occurs around medication taking behaviors and beliefs. One HCP noted that, "this is a tool for really making a connection and having them (the patient) put down on paper some of the stuff that may be worrisome to them." Other HCPs noted that the MedDQ could provide a link in the transition of care from the inpatient to the outpatient setting. Another noted that the tool could encourage patient accountability if the patient were responsible for carrying the completed tool between specialists and primary care physicians.

Benefits—Aside from general usability of the MedDQ, many HCPs described benefits of using a tool like the MedDQ. Some benefits were very pragmatic, such as the pharmacists who noted the MedDQ could be a way to fill the patient's time while the pharmacist filled the prescriptions. Pharmacists also noted that it could make pharmacists a more significant part of the health care team, allowing the patient to see that they "are very concerned about their medication." A number of HCPs noted that the MedDQ could be a valuable communication tool. One HCP said, "The questions seem like great launching points for further discussion." Another said, "We've got to continue to just work on the health professions and help them understand how important these questions are to ask, and, you know, I don't even get asked these questions when I go see my cardiologist..."

What to do with the information?—We asked the HCPs a final question: What would they do with the information if they found that a patient was possibly at-risk for discontinuance or indicated problems associated with any of the MedDQ items? Many clinicians believed that the MedDQ could be viewed as an intervention in and of itself. HCP comments about possible interventions fell into two broad categories. First were process-

type issues related to intervention: “who,” “what,” “when,” “where,” and “why.” The second category involved “how” statements, as in, how to intervene in a particular setting or situation. Several quotes were:

- There will need to be a system and set of resources to manage this.
- The intervention process could be very time consuming and that may be a big issue for busy clinicians.
- Does the clinician need the patient records to use the tool effectively—counsel patient effectively—knowing the medications patients are/have/supposed to have taken in order to adequately intervene?
- The MedDQ opens up different avenues for interventions, not just an academic exercise.
- The good thing about the MedDQ is that it addresses different implications about medication adherence
- A good point of intervention is just after the script (prescription) is filled.

Revisions were once again made to the MedDQ. Several HCPs suggested that titling the survey as “Medication Discontinuation Questionnaire” created the impression that an HCP may suspect the patient will not take the medications as prescribed. Moreover, with the numerous suggestions to use this as a shared communication tool and not necessarily as a predictive screening tool, the title was changed. The MedDQ is now titled the *Medication Discussion Questions*. In addition, the item, ‘how often do you take your medications’ was refined into two separate items, ‘how often do you forget your medications’ and ‘how often do you skip your medications’. ^{23, 24} This was done to reflect our increased understanding related to unintentional medication adherence issues compared to intentional medication adherence issues. This fifth version of the MedDQ is presented in Table 1.

Conclusions

This series of studies was initiated after our research group found that 1 in 7 (14%) AMI patients treated with a DES discontinued clopidogrel, a life sustaining anti-platelet drug, well before the recommended duration of therapy.¹⁵ A limitation of the quantitative data, however, was its inability to provide in-depth explanations for this perplexing patient behavior. Subsequently, our team conducted qualitative studies exploring discontinuance of clopidogrel and cholesterol lowering therapies, both essential long-term medications for AMI patients. As a result of these interviews, questions were developed to be asked of patients throughout the care continuum to address issues related to discontinuance.

The MedDQ’s role in enhancing communication about patients’ medication taking beliefs and behaviors warrants further exploration. In other studies, focus groups with patients and clinicians found that patients and clinicians differed in how much and what type of information each believed patients wanted.²⁵ In addition to wanting general information about their condition, patients also wanted to know about “side effects and risks, range of treatment options, how long to take medications, cost of medications, and whether the medication was right for them” (p. 106). Clinicians were unaware that patients preferred individualized information and wanted to know, specifically, why a treatment was recommended for them. Clinicians also were reluctant to provide information on side effects for fear it would deter patients from taking medications.

Wu et al²⁶ reported that making connections between taking medications and the consequences of failing to do so is also particularly important. Poor communication with health care providers was a substantial barrier to making those connections. Makaryus &

Friedman²⁷ found that less than half of patients at hospital discharge were able to list their diagnoses, names of medications or their medications purposes. Several studies have found that when patients were given instructions on medication use, important information was often omitted, such as the name of the drug, duration of treatment or purpose of the medication.^{19, 20} Moreover, medication reconciliation errors occurring shortly after hospital discharge have been associated with increased risk of re-hospitalization within 30 days of hospital discharge. Sleath et al²⁸ reported that, in the outpatient setting, almost half of the patients did not ask any questions about their medications. In addition, over two-thirds of the patients were not asked any questions about medication barriers or side effects by clinicians. These studies illustrate typical potential communication problems between clinicians and patients about medications.

Clinicians need a way of systematically communicating with patients about heart medications to identify and intervene on barriers to assure that secondary prevention with cardiac medications will be optimized. Through a series of studies, our research group has developed an efficient method of focusing clinicians' and patients' discussion on medication importance, eliciting patient preferences and beliefs while providing the opportunity to intervene before medication discontinuance occurs. We distilled a large amount of narrative data generated by the patient interviews into categorical themes, and then began the development of a tool that would allow clinicians to proactively address medication persistence issues. In developing this tool, we pilot-tested a rudimentary survey with AMI patients via telephone, then modified the tool. Next, an expert panel evaluated the new tool for content validity and structure; additional modifications were made. Additionally, the tool was distributed to a range of health care providers to assess the feasibility of implementing the tool in various clinical settings. The positive feedback led to determining that the tool, with a new name, Medication Discussion Questions, can serve as the communication vehicle for a very focused conversation with cardiac patients. This efficient approach to structuring the clinician-patient discussion around medication knowledge and behavior can increase the persistent use of life-saving medications to address secondary prevention and improve patient outcomes.

However, a tool will only be effective if clinicians utilize it appropriately. Clinicians have the opportunity to promote compliance-enhancing behaviors, but may be reluctant to interact with patients in this way for a variety of reasons. For example, reimbursable time may deter meaningful communication about medications, especially if a problem has not yet occurred. Clinicians may treat the communication guide as another survey for patients to complete without integrating it into a treatment discussion or plan for the patient. Having patients identify compliance difficulties will do little to solve the problem of non-compliance if health care providers associated with the greatest rates of noncompliance are unwilling to take action once they have the information. Future research should explore clinicians' attitudes, prejudices, and motivations to understand why these obviously necessary discussions about medications are not taking place.

Limitations of this series of studies include a narrow population of cardiac patients. Data were collected with patients who experienced an AMI and were admitted to one of 26 medical centers across the U.S. Other heart patients may not experience the same concerns or barriers to medication adherence as AMI patients, who typically leave the hospital on at least 5 different medications. In addition, our studies only reflect the experiences of patients and clinicians within the U.S. health care system. This system is unique and participants may perceive health care and medication issues very differently from government supervised health care systems or other more closed structures. Lastly, the communication tool was not pilot tested with patients in clinical settings. Patients have been asked these questions in follow-up interviews, but not by their health care providers in a physicians'

office, pharmacy, or clinic. Future research should expand the application of the MedDQ to other patient populations and a variety of clinical settings in other cultures and health systems.

Summary and Implications

- Effective communication of medication duration and purpose of the medication may not occur at hospital discharge, thus, contributing to poor medication adherence.
- Reasons for medication discontinuance may vary across medications, so multiple barriers and beliefs may play roles in nonadherence.
- Healthcare providers from a range of settings described the MedDQ as an easy to administer and important communication tool.
- Many healthcare providers believed the MedDQ could be a useful medication adherence intervention in and of itself.

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References

1. Osterberg L, Blaschke T. Adherence to medication. *N Engl J Med*. 2005; 353 (5):487–497. [PubMed: 16079372]
2. Masoudi FA, Foody JM, Havranek EP, et al. Trends in acute myocardial infarction in 4 US states between 1992 and 2001: clinical characteristics, quality of care, and outcomes. *Circulation*. 2006; 114 (25):2806–2814. [PubMed: 17145994]
3. Munger MA, Van Tassell BW, LaFleur J. Medication nonadherence: an unrecognized cardiovascular risk factor. *Med Gen Med*. 2007; 9 (3):58.
4. DiMatteo MR, Giordani PJ, Lepper HS, Croghan TW. Patient adherence and medical treatment outcomes: a meta-analysis. *Med Care*. 2002; 40 (9):794–811. [PubMed: 12218770]
5. Lee JK, Grace KA, Taylor AJ. FAME(The Federal Study of Adherence to Medications in the Elderly): A Randomized controlled trial on the impact of a medication adherence program on control of lipids and blood pressure [abstract]. *Circulation*. 2006; 114:2424.
6. Newby LK, LaPointe NM, Chen AY, et al. Long-term adherence to evidence-based secondary prevention therapies in coronary artery disease. *Circulation*. 2006; 113 (2):203–212. [PubMed: 16401776]
7. Califf RM, DeLong ER, Ostbye T, et al. Underuse of aspirin in a referral population with documented coronary artery disease. *Am J Cardiol*. 2002; 89 (6):653–661. [PubMed: 11897205]
8. Baroletti S, Dell’Orfano H. Medication adherence in cardiovascular disease. *Circulation*. 2010; 121 (12):1455–1458. [PubMed: 20351303]
9. Conrad P. The meaning of medications: another look at compliance. *Soc Sci Med*. 1985; 20 (1):29–37. [PubMed: 3975668]
10. Stimson GV. Obeying doctor’s orders: a view from the other side. *Soc Sci Med*. 1974; 8 (2):97–104. [PubMed: 4821252]
11. Bebbington PE. The content and context of compliance. *Int Clin Psychopharmacol*. 1995; 9 (Suppl 5):41–50. [PubMed: 7622833]

12. George J, Kong DC, Thoman R, Stewart K. Factors associated with medication nonadherence in patients with COPD. *Chest*. 2005; 128 (5):3198–3204. [PubMed: 16304262]
13. Morris S, Schulz RM. Patient Compliance - An Overview. *Journal of Clinical Pharmacy and Therapeutics*. 1992; 17:283–295. [PubMed: 1464632]
14. Janz NK, Becker MH. The Health Belief Model: a decade later. *Health Educ Q*. 1984; 11 (1):1–47. [PubMed: 6392204]
15. Spertus JA, Kettelkamp R, Vance C, et al. Prevalence, predictors, and outcomes of premature discontinuation of thienopyridine therapy after drug-eluting stent placement: results from the PREMIER registry. *Circulation*. 2006; 113 (24):2803–2809. [PubMed: 16769908]
16. Decker C, Garavalia L, Garavalia B, Spertus JA. Clopidogre-taking behavior by drug-eluting stent patients: Discontinuers versus continuers. *Patient Preferences and Adherence*. 2008; 2:167–175.
17. Garavalia L, Garavalia B, Spertus JA, Decker C. Exploring patients' reasons for discontinuance of heart medications. *J Cardiovasc Nurs*. 2009; 24 (5):371–379. [PubMed: 19707097]
18. Marshall MN. Sampling for qualitative research. *Fam Pract*. 1996; 13 (6):522–525. [PubMed: 9023528]
19. Tarn DM, Heritage J, Paterniti DA, Hays RD, Kravitz RL, Wenger NS. Physician communication when prescribing new medications. *Arch Intern Med*. 2006; 166 (17):1855–1862. [PubMed: 17000942]
20. Kripalani S, LeFevre F, Phillips CO, Williams MV, Basaviah P, Baker DW. Deficits in communication and information transfer between hospital-based and primary care physicians: implications for patient safety and continuity of care. *JAMA*. 2007; 297 (8):831–841. [PubMed: 17327525]
21. Decker C, Garavalia L, Chen C, et al. Acute myocardial infarction patients' information needs over the course of treatment and recovery. *J Cardiovasc Nurs*. 2007; 22 (6):459–465. [PubMed: 18090186]
22. Rhee SJ, Yun KH, Lee SR, et al. Drug-eluting stent thrombosis during perioperative period. *Int Heart J*. 2008; 49 (2):135–142. [PubMed: 18475013]
23. Morisky DE, Green LW, Levine DM. Concurrent and predictive validity of a self-reported measure of medication adherence. *Med Care*. 1986; 24 (1):67–74. [PubMed: 3945130]
24. Gehi A, Haas D, Pipkin S, Whooley MA. Depression and medication adherence in outpatients with coronary heart disease: findings from the Heart and Soul Study. *Arch Intern Med*. 2005; 165 (21):2508–2513. [PubMed: 16314548]
25. Nair K, Dolovich L, Cassels A, et al. What patients want to know about their medications. Focus group study of patient and clinician perspectives. *Can Fam Physician*. 2002; 48:104–110. [PubMed: 11852597]
26. Wu JR, Moser DK, Lennie TA, Peden AR, Chen YC, Heo S. Factors influencing medication adherence in patients with heart failure. *Heart Lung*. 2008; 37(1):8–16. 16, e11. [PubMed: 18206522]
27. Makaryus AN, Friedman EA. Does your patient know your name? An approach to enhancing patients' awareness of their caretaker's name. *J Healthc Qual*. 2005; 27 (4):53–56. [PubMed: 16201491]
28. Sleath B, Roter D, Chewning B, Svarstad B. Asking questions about medication: analysis of physician-patient interactions and physician perceptions. *Med Care*. 1999; 37 (11):1169–1173. [PubMed: 10549619]

Figure 1.
Development of the Medication Discussion Questions (MedDQ)

Table 1

Revised and re-titled MedDQ, version 5

Medicine Discussion Questions (MedDQ)

Dear Patient: Please answer each item the best you can. When finished, give this to your (doctor, nurse, pharmacist, etc.). This will help your (doctor, nurse, pharmacist, etc.) give you the right information and help in taking your medicines.

Please circle your answer	Strongly Agree	Agree	Unsure	Disagree	Strongly disagree
1. My heart problem is serious.	1	2	3	4	5
2. I am at risk of having another heart problem.	1	2	3	4	5
3. Taking medicines helps me avoid another heart problem.	1	2	3	4	5
4. I am confident I can take all my medicines.	1	2	3	4	5
5. I know the reason for each of my heart medicines.	1	2	3	4	5
6. I know how and when to take my medicine.	1	2	3	4	5
7. I worry about side effects of my medicines.	5	4	3	2	1
8. I am afraid to take too many medicines.	5	4	3	2	1
9. Do you have plans for any surgery in the next six months (including dental surgery, such as having a tooth pulled)?	Yes	No			
10a. In the past month, how often did you forget to take one or more of your prescribed medications? (please circle your answer)	Once in the past month	2 to 3 times in the past month	Once per week	Several times per week	Nearly every day
10b. In the past month, how often did you decide to skip one or more of your prescribed medications? (please circle your answer)	Once in the past month	2 to 3 times in the past month	Once per week	Several times per week	Nearly every day
11. If you missed a dose of any of your medicines, was it because ... (circle as many as apply; Interviewer: please ask each item individually, you do not need to repeat the stem)	Once in the past month	2 to 3 times in the past month	Once per week	Several times per week	Nearly every day
Forgot to take it					Had unwanted side effects
Too many medicines					Began feeling worse
Too confusing					Began feeling better
Costs too much					Scared about the medicines
Insurance co-pay is too high					Want natural remedies
Could not get my medicines					other -- please describe: