



Published in final edited form as:

*J Cardiovasc Nurs.* 2009 ; 24(5): 371–379. doi:10.1097/JCN.0b013e3181ae7b2a.

## Exploring Patients' Reasons for Discontinuance of Heart Medications

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### Abstract

**Background**—Despite the importance of secondary prevention, non-adherence rates for myocardial infarction (MI) patients range from 13-60% for prescribed, evidence-based medicines. Although rates and consequences of discontinuance vary for different medications, the existing literature provides little insight into reasons for discontinuance.

**Objective**—To address this gap, we explored clopidogrel and cholesterol lowering therapy (CLT) discontinuance after an MI to understand patients' reasons for stopping these two medications.

**Methods**—In this qualitative descriptive study, two groups of patients who stopped a heart medication – either clopidogrel or CLT – were recruited from a prospective MI registry. Patients who discontinued CLT (n=29) or clopidogrel (n=11) were interviewed within 18 months of hospitalization. Patients were recruited and interviewed until data saturation was achieved. The Health Belief Model (HBM) was used as an organizing framework in analyzing and coding the narrative data. The codes were then summarized for each group and compared to identify similarities and differences in reasons for CLT and clopidogrel discontinuance.

**Results and Conclusions**—The most common reason for CLT discontinuance was adverse side effects that were painful and interfered with daily life. Less common reasons for discontinuance were prescription confusion, cost, mistrust of medicines/health care system, and preference for alternative therapies. Reasons for clopidogrel discontinuance were duration confusion, side effects, and cost. Although doctors stopped patients' clopidogrel in preparation for surgery, doctors conceded to discontinuance of CLT for patients who experienced side effects after trying 2 to 3 different CLTs. Patients who discontinued CLT were more likely to believe they did not need the treatment than patients who discontinued clopidogrel. Clinicians should be aware that reasons may vary across patients and medication class for prematurely stopping therapy; thus, proactive interventions should be targeted to address these differences. Identifying at-risk patients for targeted interventions to *prevent* premature cardiac medication discontinuation is vital.

### Keywords

Adherence; heart medications; secondary prevention; qualitative research

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Funding: Research grants were provided by Schering-Plough and Sanofi-Aventis for components of these studies.

## Introduction

The prevalence of heart medication discontinuance is a significant and potentially fatal problem for cardiac patients. ACC/AHA guidelines for treatment and secondary prevention following acute coronary syndrome (ACS) identify medication strategies designed to optimize care.<sup>1-3</sup> These guidelines suggest that myocardial infarction (MI) patients be discharged on five medications in 4 essential classes – beta blockers (BB), Angiotensin Converting Enzyme Inhibitors (ACEI), cholesterol lowering therapies (CLT, e.g. bile acid sequestrant, cholesterol absorption inhibitor, HMG CoA Reductase inhibitor, fibric acid, or nicotinic acid), and antiplatelet agents.<sup>1,3</sup> However, while guidelines exist, research indicates patients are frequently noncompliant with prescribed heart medications.

Data from the Duke Databank for Cardiovascular Disease indicates that patients with coronary artery disease ranged in noncompliance from 17% to 61% for aspirin, lipid-lowering agents, BB, and the combination of all three.<sup>4</sup> Noncompliance with these and other heart medications varies in other studies from 13 – 58%.<sup>5,6</sup>

Of greatest concern are those patients who not only fail to comply, but are discontinuing an essential medication. For example, CLTs are especially important with regard to reducing the risk of stroke and death in coronary disease.<sup>7,8</sup> And yet, 1-year discontinuation rates of CLTs range from 15% to 60%, depending on the population, setting or year studied.<sup>6,9-11</sup> A recent Canadian study found that up to 54% of CLT users discontinued for a period of 90 days or more during the first year of use.<sup>12</sup> Studies with U.S. patients report similar findings.<sup>13,14</sup> In the GRACE registry, 13% of outpatients with coronary artery disease were no longer taking CLTs 6 months after MI hospitalization.<sup>15</sup> Earlier work from our group demonstrated that among patients discharged on CLTs, those discontinuing the medication at 1-month had lower 1-year survival (91.2% vs. 97.8%; log-rank  $p < 0.01$ ).<sup>9</sup>

Clopidogrel, an essential anti-platelet therapy, is also recommended for a large percentage of heart patients for 12 months post-treatment with a drug-eluting stent (DES).<sup>16</sup> In an earlier study, we found that 14% of patients in a national registry of MI patients who had received a DES after an MI stopped thienopyridines within one month of treatment, far short of the recommended length of therapy.<sup>17</sup> This premature discontinuation was associated with twice the rate of rehospitalization and nine times the risk of death over the next 11 months.<sup>17</sup>

Prior research indicates that discontinuance rates vary by class of heart medication, suggesting that different reasons may underlie patients' premature discontinuation of particular medications. Discontinuance reasons are likely multifaceted (costs, contraindications, knowledge), and the characteristics of patients who discontinue the medications prematurely are diverse.<sup>18</sup> Prior research has most frequently sought to quantify the problem while focusing on sociodemographic and clinical variables, as opposed to the patient's perspective and values.<sup>6,17,19-24</sup>

The aim of the present study was to explore MI patients' perspectives regarding discontinuance of heart medications with a focus on understanding the barriers to persistence and the personal beliefs that contribute to the problem. Patients' beliefs can be explored with a variety of conceptual models. We chose the Health Belief Model (HBM) because it is one of the oldest and most widely used models in health psychology, and it emphasizes the patient's desire to get well while considering barriers to that process.<sup>25</sup> The model integrates constructs that represent the patient's perspective and lead to a cost/benefit analysis that may modify the patients' decisions regarding the actions taken for a particular health issue.<sup>25</sup> Four of the distinct HBM domains of influence on patient behavior were explored in this study (barriers, susceptibility, severity, and benefits to health enhancing action).<sup>26,27</sup> Data were collected for two groups of patients who discontinued two different

types of heart medications (CLT and clopidogrel) to compare and contrast reasons patients gave for discontinuance across these medications.

## Methods

We used a qualitative, descriptive methodology to explore patients' reasons for medication discontinuance. We asked patients to describe their experience with medication discontinuance and these data were then analyzed and categorized using the lens of the Health Belief Model (HBM). Our goal was to understand the aggregated experience of patients for two classes of medication –CLTs and anti-platelet agents (clopidogrel).

## Sample and Subjects

Patients were drawn from a multi-center, prospective registry, TRIUMPH (Translational Research Investigating Underlying disparities in acute Myocardial infarction Patients' Health status), funded by NIH as part of a SCCOR project (P50 HL077113). This recent registry drew patients from 26 U.S. centers, ultimately enrolling over 4,500 acute myocardial infarction patients. A purposive sampling technique was used to identify patients who had discontinued one of two life sustaining heart medications – CLT or clopidogrel. Inclusion criteria were 1) the patient experienced an MI, was enrolled in TRIUMPH and was discharged on CLT or clopidogrel; 2) patient reported discontinuing CLT or clopidogrel in a follow-up interview at 1, 6, or 12 months after the MI; and 3) patient could be contacted by phone and consented to a telephone interview.

Of the 17 patients who discontinued clopidogrel during the study time period, 11 could be contacted by phone and consented to be interviewed. Patients were geographically dispersed across the U.S. (MO, NC, CT, and IL) and were 45-77 years of age with 18% being minority and 36% female. For the CLT group, the registry database indicated that 86 patients met the inclusion criteria; however, when we contacted the 86 patients by telephone, only 29 patients had actually discontinued CLT. The remaining patients had temporarily stopped, but later restarted CLT. The 29 patients who consented to an interview were also geographically dispersed across the U.S. (MO, IA, VA, NC, CT, DE, CO, NY, GA, and IL) and were aged 44-78 with 19% being minority and 56% female.

## Procedure

An individualized introductory recruitment letter was mailed to patients explaining the purpose of the study, asking for participation, and providing a brief biography of the interviewer to enhance patients' comfort level in speaking with the interviewer. The letter also included instructions on how to decline participation in the study. The second researcher (BG) conducted the telephone interviews and used interview guides to insure that each patient answered the same broad questions. A sufficient number of patients were interviewed in each group to achieve saturation, such that information gained from participants became redundant and additional patient interviews provided no new insights. Institutional Review Board approval was obtained from St. Luke's Hospital in Kansas City as a supplement to the original approval for the TRIUMPH registry, sufficient for the conduct of this study.

## Interviews

The interview guides were developed to assess patients' perceptions of their disease in the context of the HBM. Because the purpose of the study was to ascertain patients' reasons for medication discontinuance, the barrier domain was emphasized and the other three domains were addressed to a lesser extent (susceptibility, severity, benefits of taking preventive action). After ascertaining that the patient was no longer taking the medication and allowing

the patient to describe their heart attack or event that led to hospitalization, the following guiding questions were asked: (a) “Please tell me more about why you are no longer taking [clopidogrel/CLT].” (b) “Can you tell me what the medication is supposed to do?” (c) “At this point, what do you think about your heart disease or do you think your heart disease is a serious matter?” (d) “What changes have you made to your lifestyle as a result of your heart disease/attack?” and (e) “How do you think your heart disease affects your life or may change your future?” The interview guide questions were reviewed by a physician, research assistants, and heart patients prior to any interviews. Interviews ranged from 10 – 40 minutes in length. Coding of earlier interviews guided later interviews and allowed researchers to determine when saturation occurred. All interviews were recorded and transcribed verbatim. Transcription accuracy was checked by the interviewer, who read each transcript while listening to the recorded interview.

## Analysis

Qualitative descriptive analysis is an iterative process, typically involving several stages of analysis. Three coders reviewed all of the transcripts independently, first to gain a holistic understanding of the patients’ perception of their experience, and then again to make notes regarding patients’ perceptions using the lens of the HBM as an interpretive framework. To illustrate how the HBM was applied: a patient described family history of heart related health problems (susceptibility) or not being able to travel to the clinic to get a prescription (barrier). Coders compared their analyses and agreed upon codes and categories. These analyses informed future interviews by allowing modifications of the initial interview questions, such as eliciting more details about their understanding of the medication’s purpose. The researchers continuously evaluated the use of the HBM as an appropriate organizational system of the experiences patients’ described.

## Trustworthiness

The credibility and trustworthiness of the data were established in four ways. First, coders compared and agreed upon their categorical coding of the patient interviews (consensual validity).<sup>28</sup> They then separately reviewed the interviews again to summarize the coding of each patient’s experience for each domain of the HBM where appropriate. Coders then compared and agreed upon the summaries to create a consensual interpretation of the patient’s experience. Second, any conclusions drawn from the qualitative data were reviewed in the context of the entire data set with the goal of finding discrepant information. If such information was discovered in the review of data, conclusions were modified. Third, the interdisciplinary team consulted with several clinicians who provided feedback about the conclusions being drawn, and served as a check for researcher bias and faulty logic. Finally, interviews were immediately followed by the data analysis process so that experiences reported by patients informed future interviews and the researchers could ascertain when data saturation had occurred.

The same interviewer (BG) conducted all interviews with both groups of patients to control for interviewer effects.<sup>29</sup> After analyzing each group’s data separately, the 3 researchers (LG, CD, BG) thoroughly discussed similarities and differences in individual and group perceptions across the two groups. Constant comparison within and across interviews and returning to the raw narrative data frequently contributed to the accuracy and consistency of conclusions. The use of the HBM was also evaluated throughout the analyses to assure consistency as well as maximally organizing the data from the two groups.

## Findings

The findings are presented using the four HBM domains (barriers, susceptibility, severity, and benefits) to highlight the similarities and differences for the two groups. While patients may have listed more than one reason for discontinuing a medication, each patient was asked to identify the primary reason, which is reported.

### Barriers to persistence

The focus of the interviews was reasons for discontinuing the medication and, as might be expected, patients reported a range of barriers to persistence. Both patient groups similarly cited *side effects*. Fifteen out of 29 of the CLT group attributed their discontinuance to side effects such as muscle spasms/pain most frequently cited side effects followed by cognitive impairment, hot flashes and indigestion. Three of the 11 in the clopidogrel group experienced side effects, and two of those patients were able to tolerate a different medication. Their side effects included itching, a rash, and a bleeding ulcer. One patient with a bleeding ulcer also was erroneously fearful of becoming dependent upon clopidogrel.

Additional similarities included *cost*, which was mentioned by a few patients for both groups of medications, but was not a frequently cited reason. For one woman, Medicaid stopped paying for clopidogrel and she could not afford the medication through her own means so she stopped taking it. Similarly, a CLT discontinuer reported having difficulty travelling to the clinic to obtain low cost medications. A few patients in both groups also reported *distrust of doctors* and a reluctance to take prescription medications. Lastly, *prescription confusion* was a problem for some patients in both groups; several patients did not believe they were discharged on the medication (CLT), even though TRIUMPH records indicated that the medication had, in fact, been prescribed. Three patients in the clopidogrel group were uncertain as to why they were no longer taking the medication, unaware of the intended duration (a minimum of 3 months were medically indicated during the time of their interviews). For both groups of patients, a significant percentage stopped the medication at their *doctor's orders*. Doctors may have discontinued the prescription because of coronary artery bypass surgery or changed the prescription to a different medication within the same class. In both groups, a number of patients were unaware that they were not compliant with that particular prescription.

Communication as a broad barrier was seen. The main difference between the two patient groups seemed to be the level of knowledge regarding purpose or intended duration. Patients' seemed more knowledgeable about the purpose of CLTs and yet had consciously chosen to discontinue the medication. There were several patients who discontinued CLTs in consultation with their doctor. Conversely, patients in the clopidogrel group were not as aware of the serious nature of discontinuing the medication (risk of sub acute thrombosis and death), nor were they aware of the intended duration.

### Perceived susceptibility to heart disease

Patients in both groups ranged in the extent to which they believed they were susceptible to heart disease. A common rationale for high susceptibility was having a family history, having diabetes, being obese, and/or being a smoker. In the CLT group, a number of patients believed that their cholesterol was no longer a problem, whereas patients in the clopidogrel group were more likely to recount conditions that contributed to their MI. The fact that patients in both groups felt better and were not experiencing any pain post-treatment seemed to reduce the sense of threat posed by heart disease. One patient didn't believe she actually had an MI. Only a few patients stated that they were still very concerned about their heart disease.

### Perceived severity of heart disease

Over half of the clopidogrel group still felt that their heart disease was very serious, in contrast to just a few patients in the CLT group. A patient in the clopidogrel group stated, “We’re walking dead men,” referring to himself and other family members with heart disease. Patients in the clopidogrel group who indicated a rather low perception of seriousness were focused more on maintaining a positive attitude - “I’m not going to worry myself into an early grave.” A significant number of the CLT patients believed they did not have a cholesterol problem, which likely contributed to low perceptions of the seriousness of their heart disease. Some patients believed that the standards for acceptable levels of cholesterol changed over time so one can’t be sure when cholesterol is truly problematic. When CLT patients believed their disease was serious, they typically referred to a personal or family history of heart disease. One patient believed that her cholesterol problem was sufficiently serious to “borrow” medications when she could not afford to buy them.

### Perceived benefits to taking preventive action

Many patients in both groups understood the connection between lifestyle factors, such as healthy eating and exercise, and their heart disease. There were patients in both groups who reported attending cardiac rehabilitation, quitting smoking, eating healthier foods, and losing weight as strategies to address their heart disease. Patients in the CLT group more frequently reported preferring a “natural approach”, such as supplements like fish oil, to address their cholesterol problem, whereas no patients in the clopidogrel group made similar comments.

### Use of the Health Belief Model

During the course of analysis, the researchers determined that the HBM was a viable organizational structure for the data. Several case examples were thoroughly mapped to the different domains of the HBM - starting with the reported primary reason for discontinuance through all secondary reasons. To illustrate the appropriateness and robustness of the HBM, one case is described here and a table is provided with patient quotes indicative of each domain (see Table 1).

A 51 year old, white-female patient was struggling to continue taking her CLT. She and her doctor had been working together to resolve the problem. As this patient weighed the disadvantages of discontinuation, she acknowledged a substantial history of heart disease in her family (high perceived susceptibility to illness). She acknowledged that she is diabetic and has been since her 30s. She also explained that she has been overweight since childhood (high perceived susceptibility to illness). She says she has high cholesterol and that she thinks cholesterol is fat in the blood that clogs arteries and is “bad news” (high perceived severity of potential illness). In addition, she says she has a sister who has had coronary artery bypass surgery (CABG), and who was told by the cardiologist that she has the arteries of an old woman (high perceived severity of potential illness). The patient may be thinking that this could be true for her as well some day.

Most recently, she has not tolerated the CLT well and has experienced “bad leg cramps” (high perceived barriers or costs to taking a CLT). She has tried different CLTs and says that she is not currently taking a CLT because her doctor has a 2-month backlog on appointments and she has been unable to get an appointment (high perceived barriers or costs to taking a CLT). This whole process has been going on for some time, and the patient has been working with her doctor to address the side effects (high perceived benefits to taking preventive action). In addition, she has made lifestyle changes (i.e., exercise) to help lower her cholesterol level. The patient sees the connection between her exercise and heart disease (high perceived benefits to taking preventive action). As she talks, it is evident that she is conducting her own “cost/benefit analysis.” She considers her own health history; her family

heart disease history; her understanding of high cholesterol as “bad news;” her inability to get a timely appointment with her doctor; her efforts to consult with her doctor even as she is discontinuing her CLT; and her attempts to address her cholesterol level through lifestyle modification.

## Discussion

A purpose of qualitative research is to delve more deeply into the factors that contribute to a condition or problem. In this case, understanding patient discontinuance of heart medications may hinge on variables not collected in traditional patient registries. The Health Belief Model (HBM) allows us to view the patient’s storyline. In the HBM, four questions prevail: What is the patient’s perceived susceptibility to the illness? What is the patient’s perceived severity of the potential illness? What are the patient’s perceived barriers or costs to taking appropriate action to avoid the potential illness? What is the patient’s perceived benefit to taking preventative action to avoid the potential illness?

The Health Belief Model allows us to interpret the patient’s experience as a complex set of factors that contribute to the ultimate decision to discontinue an essential heart medication. We believe the HBM was an appropriate model to use for eliciting and then organizing the data for understanding patients’ medication discontinuance of clopidogrel and CLT. The HBM could work well for nurses and physicians in the clinical setting as an explanatory framework as they interact daily with cardiac patients and seek to understand patient challenges. For example, patients tended to report a reduced sense of susceptibility to heart disease when they were not feeling any related pain or symptoms that they associated with heart disease; perhaps, the squeaky wheel gets the grease. Only when symptoms were evident were patients worried about their heart disease. Many reported feeling very vulnerable during the acute event, but that fear relaxed as time went by and symptoms, such as pain, were no longer frequent. The barrier domain, both actual and potential, would obviously be the most clinically relevant HBM domain to explore with each patient prior to prescribing clopidogrel or CLT.

We found that heart patients’ reasons for discontinuance vary somewhat for CLT and clopidogrel. Similar to Sud et al, we found that key reasons for stopping heart medication(s) were physician discontinuation or adverse effects.<sup>6</sup> Even though patients were discontinuing in consultation with their doctor, it does not mean that discontinuance was the optimal treatment strategy. More likely, the doctor conceded to the patient refusing to take the medication after trying a few alternatives. Adverse side effects were cited by both CLT and clopidogrel patients, however, a greater proportion of patients discontinued CLT because of side effects. The perceived side effects were different and also more varied for CLT (e.g. indigestion, muscle aches and pains, weakness, lethargy, cognitive impairment) than for clopidogrel (bleeding, rash, and itching).

Moreover, the side effects barrier for CLT appeared to interfere with daily living to a greater extent than the side effects associated with clopidogrel. In prior studies, patient characteristics, such as age, small body mass index, and others, have been described as predictors of potential adverse effects<sup>30</sup> and thus might be used to screen and proactively counsel at risk patients. Berra reports on other approaches to managing the cardiovascular patient on cholesterol/lipid lowering therapy such as nurse case management.<sup>31</sup>

Other studies have reported that forgetfulness and not thinking the medication is necessary are primary reasons for noncompliance;<sup>32</sup> however, neither the CLT nor the clopidogrel patients described these two reasons. We speculate that the difference may be attributed to the nature of the noncompliance being assessed. In our study, patients were asked to tell us

why they discontinued a medication, whereas in the Cheng et al study, patients were asked to identify reasons for missing a medication sometimes. Though several clopidogrel patients were unaware of why they were no longer taking the medication.

Several studies have found that when patients were given instructions on medication use, important information was often omitted, such as the name of the medication, duration of treatment or purpose of the medication.<sup>19, 20</sup> This confusion was evident in both groups. For example, a 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. And finally, believing they were not actually prescribed the medication(s) under study. The cause of this type of barrier or confusion should be explored in future research. Is this a cognitive impairment problem, a communication problem between patients and clinicians, or a patient education problem? In earlier work, we found that patients' information needs change over the course of their heart event and recovery process and thus require periodic assessments and education updates.<sup>33</sup> 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." This problem may be evidence of changing information needs over time, requiring emphasis on the importance and purpose of cardiac medications by nurses.

Cost as a barrier was an issue for a few patients in each medication group. Although social programs and pharmaceutical companies offer assistance to patients with financial need, it takes time to request, process, and receive assistance. For CLT, patients are likely to escape harm while waiting for assistance to pay for medications, but the same is not true for patients who need to 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.<sup>34</sup> Therefore, cost as a barrier to continuance may be a much more important issue to address with clopidogrel.

Limitations of this study should be considered when interpreting the findings. First, qualitative findings are generally exploratory in nature and are not intended to generalize to other populations or contexts. Findings are most useful in developing an in-depth perspective of problems and exploring potential solutions. Future research might use our findings as a foundation for a tool to quantitatively assess the prevalence of the issues the patients in our study revealed or to develop interventions to prevent discontinuance. Future research should also continue to explore similarities and differences in patients' challenges to persistence with other heart medications. Another limitation of the study is the relatively small sample size and narrow patient population. This study was limited to patients who had experienced an acute MI and the findings may not be reflective of other diseases.

In addition, screening patients for discontinuance was challenging, because many patients temporarily stopped a medication and later resumed, unbeknownst to the data collectors. Our interviews with the patients who discontinued CLT revealed an inconsistency in the number of patients actually discontinuing. When the interviewer contacted the 86 patients identified in the database as discontinuers, only 34% had actually discontinued CLT. The other 66% had temporarily stopped CLT, but then subsequently resumed therapy. The same was not true for the clopidogrel group. Some of those patients were discontinued by a physician for legitimate medical reasons (surgery, bleeding). This challenge should be considered by any researchers working with observational registries, which provides only a cross-sectional snapshot of a patient for any given time point.

In summary, the findings reflect similarities and differences in reasons for discontinuance for the two patient groups. The most common reason for CLT discontinuance was adverse



side effects that were painful and interfered with daily life. Less common reasons for discontinuance were prescription confusion, cost, mistrust of medicines/health care system, and preference for alternative therapies. Reasons for clopidogrel discontinuance were duration confusion, side effects, and cost. Although doctors stopped patients' clopidogrel in preparation for surgery, doctors conceded to discontinuance of CLT for patients who experienced side effects after trying 2 to 3 different CLTs. Patients who discontinued CLT were more likely to believe they did not need the treatment than patients who discontinued clopidogrel. Clinicians should be aware that reasons may vary across patients and medication class for prematurely stopping therapy; thus, proactive interventions should be targeted to address these differences. Identifying at-risk patients for targeted interventions to *prevent* premature cardiac medication discontinuation is vital.

### Clinical Implications

An interesting finding was the relationship between the experience of symptoms, such as pain, and the patient's sense of susceptibility to the disease. Less susceptibility (threat) appears to be associated with discontinuance. Clinicians may alleviate some adherence issues by reminding the patient that he or she is still at risk, even though acute symptoms are no longer being experienced. Although costs and side effects contributed to discontinuance, communication issues were primarily evident for both medications. Some patients may not have discontinued if they had speedier access to care or more information about the need to take the medication. A number of patients in the CLT group believed that they no longer needed therapy because their cholesterol had adjusted to an acceptable level. An acceptable cholesterol level may have more likely indicated that the CLT was effective and the patient should remain on treatment. A few patients in the clopidogrel group were uncertain why they had discontinued the medication and were confused about the intended duration of the prescription.

In contrast to clopidogrel, CLT discontinuation was often attributed to side effects. While sometimes the doctor stopped CLT, oftentimes the patient unilaterally made the decision without communicating with their physicians prior to stopping and may have mistakenly attributed a symptom to CLT. To overcome this barrier to persistence, clinicians would likely need to proactively communicate with patients about potential side effects and the need to for patients to report any side effects back to their nurses and physicians. The development of strategies to counteract patient reported side effects to CLT could be effectively developed by the nurse and patient together.

Also, when patients discontinued CLT in consultation with their doctors because they could not tolerate the side effects, the patient usually tried 2 or 3 different CLTs and some tried alternative therapies, such as fish oil and niacin, before discontinuing. These findings suggest that patients who experience side effects that they attribute to CLT have a rather low tolerance for experimentation with alternatives, leaving clinicians with a somewhat narrow window of opportunity to foster persistence. An important implication for clinicians is the need to continue to communicate to patients that the therapy is essential.

These findings also highlight the need for effective patient education regarding essential heart medications. Clearly, emphasizing the intended duration of new prescriptions and helping the patient understand the purpose and importance of medications could assist in overcoming this particular barrier. Nurses and physicians should also be aware of the potential impact of misinformation that patients may receive from other people and the Internet. If patients don't have ready access to information from their own clinicians, they will seek answers elsewhere and those sources may not be reliable.

Since not every patient will discontinue a therapeutic medication, identifying those who are likely to prematurely stop their medicine is important. At the present time, there is no systematic screening to *proactively* identify patients at high risk for medication discontinuance. Such a tool could assist in focusing the clinician's time on the patients most at risk. Medication discontinuance indicates a gap in the health care process that could be alleviated in a number of ways, all of which involve changing the health care system rather than the patient. Strategies designed to *react* to medication discontinuance issues, such as categories of educational, behavioral, or psychosocial interventions have been well reported,<sup>35</sup> but targeting a proactive approach to the highest risk patient are not currently common. The findings from this study identify opportunities for nurses and physicians to intervene to *prevent* heart medication discontinuance, and future research should explore the effectiveness of pro-active interventions that are preventive, rather than reactive.

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**Table 1**

Examples of patient quotes by HBM domain

Domain	Quote
Susceptibility/threat	Family history, fatalism: "Everybody in my family has died from a heart attack or cancer. My parents both died within the last 4 or 5 years so I was taking care of both of them...I'm pretty familiar with it...We're walking deadmen." Male patient, 54 years of age
Severity/threat	Recognition of disease signs and symptoms: "Well, I thought it was just indigestion, and I felt like my heart and my chest...was weighing a ton." Female patient, 51 years of age
Barriers	Continuity of care: "Now when I first got out the doctor, I think it was Plavix, he said I would have to be on it for the rest of my life. And when I went to the [PCP] doctor, you know, on my return visit, he just said it would be 30 days, and at the end of 30 days that was it." Male patient, 53 years of age
Benefits to taking action	"I haven't had any pain or anything like that...I lost a lot of weight. Forty pounds...the doctor insisted that I lose. (Other changes?) Diet completely...and exercise." Male patient, 74-years of age