Patient and Physician Satisfaction with a Telephone-based Anticoagulation Service

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OBJECTIVES: To compare the satisfaction and knowledge of patients who have their warfarin managed by their physician or by a multidisciplinary, telephone-based anticoagulation service (ACS) and to assess referring physicians' satisfaction with the ACS.

DESIGN AND PARTICIPANTS: We surveyed 300 patients taking warfarin (mean age 73 years): 150 at health centers randomized to have access to an ACS, and 150 at control health centers without ACS access. We also surveyed 17 physicians who refer patients to the ACS.

SETTING: Eight outpatient health centers in Missouri and Southern Illinois.

MEASUREMENTS: We asked patients about the timeliness of international normalized ratio (INR) monitoring, perceived safety of warfarin, overall satisfaction with their warfarin management, and knowledge of what a high INR meant. We asked physicians at ACS-available health centers how many minutes they saved per INR by referring patients to the ACS, their satisfaction with the ACS, and their willingness to recommend the ACS to a colleague.

MAIN RESULTS: As compared with patients at control health centers, patients at ACS-available health centers were more satisfied with the timeliness of getting blood test results (mean 4.31 vs 4.03, $P = .02$), were more likely to know what a safe INR value was (45% vs 15%, $P = .001$), and felt safer taking warfarin (mean 5.7 vs 5.2, $P = .04$). Physicians reported that using the ACS saved, on average, four minutes of their time and 13 minutes of their staff's time, per INR. All physicians recommended use of the ACS to a colleague and were highly satisfied with the ACS.

CONCLUSIONS: A telephone-based ACS can be endorsed by primary-care physicians and improve patients' satisfaction with and knowledge about their antithrombotic therapy.

KEY WORDS: patient satisfaction; physician satisfaction; anticoagulation; disease-state management; warfarin.

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Over two million North Americans currently take warfarin and as the population ages, this number will increase.¹ Because of warfarin's narrow therapeutic index and its many drug and dietary interactions, patients who take warfarin must have their international normalized ratio (INR) monitored and their warfarin dose adjusted on a regular basis. Traditionally, physicians provided these services. However, with the rise of health management organizations (HMOs) over the past decade, non-physician-based clinical management programs such as telephone-based, anticoagulation services (ACS) have become more popular.² In an ACS, physicians turn over the warfarin-related care of their anticoagulated patients to a multidisciplinary team of health-care providers who monitor patients' INRs, prescribe warfarin, and educate patients about their therapy. Research suggests that patients treated in an ACS spend more time in a therapeutic INR range³⁻⁵ and have lower bleeding and thromboembolic rates than patients receiving standard physician care.⁶

When a telephone-based ACS assumes the care of patients taking warfarin, disruption in the doctor-patient relationship may occur.⁷ Referring physicians might become inconvenienced by the paperwork or communication required by the ACS. Patients may dislike the telephone-based nature of the ACS or management by an unfamiliar team of health-care practitioners. Also, the limitations of the telephone might result in patients receiving inadequate warfarin education. Reduced patient satisfaction and knowledge have been shown to lead to lower compliance,^{8,9} poorer health outcomes,⁴ and possibly, patient disenrollment in ACS programs.⁸ Thus, understanding patient and physician satisfaction with telephone-based clinical management programs is important, not only for patients who take warfarin, but also for patients who may benefit from related disease management programs.^{10,11}

No randomized trial has compared patients' satisfaction with outpatient warfarin management by a telephone-based ACS to management by primary-care physicians (PCPs).¹² We assessed the satisfaction of patients taking warfarin who were treated either at a health center randomly selected to have access to a telephone-based ACS or at a control health center without ACS access. We hypothesized that patients who received care at an ACS-available health center would be more satisfied and more knowledgeable about their warfarin therapy than patients who receive traditional physician care at a control health center. Furthermore, we hypothesized that physicians at the ACS-available health centers would be satisfied with the warfarin management provided by the ACS.

METHODS

Participants

Randomization of Health Centers. We established the Barnes-Jewish-Christian (BJC) Health System and Washington University Physicians Network (BJC-WUPN) ACS in December 1998. We used *a priori* matching¹³ to pair up eight health centers in the BJC Health System by geographic location and patients' socioeconomic status, and randomized one site in each pair to receive access to the ACS and the other to serve as a control site.

At each ACS-available health center, physicians could choose to enroll eligible patients in the ACS or could continue to monitor their patients' warfarin. In the ACS-available health centers, 75% of eligible patients received their care through the ACS, with each physician enrolling between 1 and 67 patients (median referred patients 20). Based on pharmacy claims, 576 patients received their care at an ACS-available health center, while 522 patients received their care at a control health center.

Selection of Study Participants. To select potential study participants, we used pharmacy claims to identify all patients who had warfarin prescribed within a specific 45-day period. We excluded 20 patients because they had previously participated in our pilot study. From the eligible patients we randomly selected 300 participants—150 patients each at the ACS-available and the control Health Centers. The selected participants at the ACS-available Health Centers included patients who were treated by the ACS and patients who received care through their regular physicians.

ACS Function

A multidisciplinary team consisting of a physician (BG), nurse (GB), pharmacist (PM), research associate (AW), and administrative assistant comprise the ACS staff. The medical staff communicates with the enrollees primarily by telephone. To help monitor the referred patients, the ACS staff tracks enrollees using a computerized medical record, CoumaCare (CoumaCare 5.1; DuPont Pharmaceuticals, Wilmington, Del), that is maintained on a dedicated Windows NT server. The staff completes the initial patient education over the telephone, holds face-to-face group educational sessions, and issues quarterly anticoagulation newsletters.

Survey Method

In October and November, 1999, we mailed the satisfaction questionnaires to the 300 patients. After two weeks, an interviewer blinded to the hypotheses of the study called patients who had not returned their questionnaire and asked them to complete the questionnaire by phone.

In December 1999, we faxed the physician-surveys to the 17 health-care providers at the ACS-available health centers, all of whom referred patients to the ACS. After two weeks, the interviewer reminded physicians to fax in their questionnaires.

Measures

The 20-question patient satisfaction questionnaire combined questions from a validated, anticoagulation clinic questionnaire designed for face-to-face ACSs¹⁴ with new questions focused on a telephone-based ACS. Questions about patients' perceptions of the ease of obtaining regular INR monitoring, how timely their INR results were returned, the availability of the staff, and the overall quality of care were assessed using a 5-point Likert scale ranging from "poor" to "excellent." Questions about patients' knowledge of what number indicates a safe INR for them and what a high INR means (e.g., "my blood is too thin or thin") were also asked.

The physician satisfaction questionnaire included 17 questions that assessed attitudes about the quality of care that their patients receive through the ACS. We asked if they agreed that the ACS improved patient health and the delivery of anticoagulation care using a five-point Likert scale from "strongly agree" to "strongly disagree." In addition, physicians estimated how many minutes the ACS saved them and their staff, per INR. Finally, they rated their overall satisfaction with the ACS on a scale from "not at all" to "very much," on a seven-point Likert scale and reported whether they would recommend this program to a colleague. The two surveys are available from the authors by request.

Statistical Analyses. We used a nonparametric statistic, the Mann-Whitney *U* test,¹⁵ to compare patient satisfaction and knowledge differences of patients at the ACS-available and control health centers. The intent-to-treat analyses compared the satisfaction and knowledge of all patients at the ACS-available and the control health centers. The on-treatment patient analyses compared only those patients who were actually enrolled in the ACS with the control health center patients. We calculated basic descriptive statistics for the physician satisfaction questionnaire. We used two-sided tests for all comparisons and considered a *P* value less than .05 to be significant.

RESULTS

Patient Demographics

Of the 300 patient surveys that were mailed, 12 could not be completed because the patient had died or could not be located. Of the 288 surveys that were delivered, 185 (75%) were completed (168 by mail and 18 by telephone follow up). The questionnaire return rate by mail (90% vs 94%) and telephone (10% vs 6%) was similar for patients at the ACS-available and control health centers.

There were no significant demographic differences between patients at the ACS-available and control sites (Table 1), or between the telephone or mail respondents. Most participants were Caucasian (91%) with a mean age of 73 years (SD, 9.4). Respondents had been on warfarin for a median of 4.8 years, and 66% reported having had three or four INRs drawn during the past three months.

Table 1. Participant Demographics*

	Control Site (N = 106)	ACS-Available Site (N = 109)
Mean age, y (SD)	72 (10)	73 (9)
Gender		
Male, %	60 (57)	62 (57)
Ethnicity, n		
Caucasian (%)	98 (93)	96 (90)
African American (%)	6 (6)	10 (9)
Average blood tests/3 months, N (%)		
0–2 tests	6 (6)	3 (3)
3–4 tests	73 (69)	68 (63)
5–6 tests	15 (14)	25 (23)
>7 tests	12 (11)	12 (11)
Median time on warfarin, y	4.8	4.7

* There were no significant demographic differences between patients at the ACS-available or control health centers.

Patient Satisfaction and Knowledge

Intent-to-Treat Analyses. Patients at the ACS-available health centers reported that they were more satisfied with the timeliness of their blood test results than control health center patients (mean, 4.31 vs 4.03, $P = .02$) (Table 2). On a scale from 0 (not safe at all) to 7 (very safe), ACS-available health center patients also reported feeling safer taking warfarin as compared to control patients (mean, 5.7 vs 5.2, $P = .04$). There were no statistically significant differences in the responses to the other six satisfaction questions, but patients at the ACS-available health centers reported greater satisfaction than control health center patients for every question. Finally, patients randomized to the ACS-available health centers were more likely to know what a safe INR value was for them compared with patients at control health centers (45% vs 15%, respectively, $P = .001$).

On-treatment Analyses. We also conducted an on-treatment analysis that compared only the ACS-enrolled patients with the control health center patients. In this analysis, ACS-enrollees were more satisfied than control patients with the timeliness of their INR results (mean, 4.44

vs 4.03 respectively, $P = .001$), with the availability of the staff (mean, 4.39 vs 4.10, $P = .028$), and with the overall quality of their anticoagulation care (mean, 4.39 vs 4.13, $P = .02$). ACS-enrollees also felt safer taking warfarin compared with control health center patients (mean, 5.79 vs 5.17, $P = .02$). There were no statistically significant differences in patients' responses to the other four satisfaction questions, but ACS-enrollees reported greater satisfaction than control health center patients for every question. They were also more likely than control health center patients to know what a safe INR value was for them (57% vs 15%, respectively, $P = .0001$), and what a high blood test or INR meant (37% vs 20%, $P = .01$).

Physician Satisfaction

All 17 physicians at the ACS-available health centers enrolled patients into the ACS and completed the questionnaire (100% response rate). On a scale from 0 (very dissatisfied) to 6 (very satisfied), they reported that their satisfaction with the care of their patients by the ACS was very high (5.1). They also reported that the ACS saved four minutes of their time and 13 minutes of their staff's time per INR. On a scale from 1 (strongly disagree) to 5 (strongly agree), physicians, on average, agreed that the triage of patient with high or low INRs and the delivery of care was excellent (4.7 and 4.4, respectively). All physicians would recommend using the ACS to a colleague.

DISCUSSION

Overall, we found that patients at ACS-available health centers had significantly greater patient satisfaction and knowledge about their warfarin therapy and felt safer taking warfarin than patients receiving care through their PCPs at control health centers. Our results agree with the findings of nonrandomized studies that found that most patients received helpful information from an ACS¹⁶; that the convenience, accessibility, and services performed by ACS personnel were "better than expected" (99%)¹⁷; and that patients were satisfied with their experience of having their warfarin therapy managed by the ACS.¹⁴

Table 2. Patient Satisfaction with and Knowledge about Warfarin Therapy

	Control Site (N = 109)	ACS-Available Site* (N = 106)	ACS-Enrollees* (N = 79)
Excellent satisfaction, %			
Timeliness of blood test results	35	48 [†]	56 [‡]
Availability of staff	39	48	53 [†]
Overall quality of care	39	49	53 [†]
Knew correctly, %			
What safe INR value was	15	45 [‡]	57 [†]
What high INR means	20	31	37 [†]

* ACS-Available Site, patients at anticoagulation service-available health centers; ACS-Enrollees, patients at ACS-available health centers who are followed by the ACS.

[†] P value $\leq .05$, as compared with control health center patients.

[‡] P value $\leq .001$, as compared with control health center patients.

Similar to other studies of physician satisfaction with ACSs,¹⁶ we also found that physicians who enrolled patients in the ACS were satisfied with its quality and would recommend the ACS to other physicians. These findings suggest that potential problems with telephone-based ACSs, including disruption of the patient-physician relationship, did not materialize. However, only 75% of eligible patients were referred to the ACS. Informal interviews with physicians revealed that some eligible patients were not referred because they were seen too frequently by the physician, or because the physician wanted to personally explain the ACS to patients before transferring them. Additional research is needed to clarify why some physicians refer fewer patients to the ACS.

Complementary research has shown that anticoagulant education can improve INR control and quality of life for patients taking warfarin.^{4,5} Additional education of patients taking warfarin may be prudent because many patients at the health centers did not understand the meaning of a high INR or what a safe INR would be for them. In our ACS, we offer small-group educational meetings and publish a quarterly newsletter. Other effective educational strategies include use of videotaped warfarin information and one-on-one personalized patient education.¹⁸

There were important limitations to this study and potential barriers to applying its results to other settings. First, we randomized by site rather than by individual patient. Although we found no significant differences between the demographics of ACS-available and control health center patients, differences that we did not control for might be present. Second, there were only 17 physicians at the ACS health centers. Third, because all of the clinical staff at the ACS had previous experience managing patients at an ACS, our findings may not be generalizable to an ACS that is staffed by providers who have relatively little experience managing warfarin therapy. Finally, because telephone contact is not reimbursed in a fee-for-service setting, a telephone-based ACS may not be viable fiscally in a fee-for-service environment.

The proliferation of HMOs provides a financial and organizational incentive to develop ACSs and similar disease management programs. This study demonstrates that a multidisciplinary, telephone-based ACS can improve patient satisfaction and knowledge and can be accepted by physicians practicing in an HMO environment. Additional research is needed to determine how an ACS affects INR control, warfarin-related adverse events, and medical expenditures.

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