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Ethnic Differences in Patient Perceptions of Atrial Fibrillation and Anticoagulation Therapy: The West Birmingham Atrial Fibrillation Project * Editorial Comment: The West Birmingham Atrial Fibrillation Project

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Ethnic Differences in Patient Perceptions of Atrial Fibrillation and Anticoagulation Therapy

The West Birmingham Atrial Fibrillation Project

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Background and Purpose**—**We hypothesized that different ethnic groups would have different levels of knowledge and perceptions of atrial fibrillation (AF) and of their antithrombotic therapy. To investigate this further, we conducted a cross-sectional survey of patients with documented chronic AF who were attending the anticoagulation clinic in our city center teaching hospital, serving a multiethnic population.

Methods**—**We surveyed 119 patients (77 male; mean age 69±9 years [mean±SD]); of these, 39 were Indo-Asian (33%), 27 Afro-Caribbean (23%), and 53 white (44%).

Results**—**Only 63% of patients in the overall study cohort were aware of their cardiac condition, with Indo-Asians and Afro-Caribbeans significantly less aware of AF compared with the white patients ($P<0.001$). When questioned about the perception of the severity of the underlying condition, the majority (61%) felt that AF was "not serious." A large proportion were unaware that AF predisposed to thrombosis and stroke; among the ethnic groups, Indo-Asians appeared to be the least aware of the stroke and thromboembolic associations of AF. Only 52% in the whole cohort were aware of the reason(s) for commencing their warfarin, whereas the remainder began warfarin therapy simply because their "doctor told them to." Most patients in the whole cohort were aware of warfarin being used to prevent blood clots (65%) or stroke (66%), but Indo-Asians and Afro-Caribbeans were less so. Only 45% of the study cohort believed that there was some risk associated with warfarin therapy in the form of either "bleeding" or "poisoning." Only a minority of Indo-Asians and Afro-Caribbeans with AF felt that their doctor had given them enough information about their warfarin therapy, and many from these ethnic groups felt that they were careless about taking their warfarin.

Conclusions**—**In conclusion, many patients with AF possess very limited knowledge of AF as well as its consequences and therapy. In particular, our study has highlighted significant differences between different ethnic groups in terms of their knowledge of the risks, actions, and benefits of warfarin as well as of AF itself. **(*Stroke*. 2002;33:238-244.)**

Key Words: atrial fibrillation ■ ethnic groups ■ warfarin

Atrial fibrillation (AF) is the most commonly sustained disorder of cardiac rhythm. With an aging population, it is likely that AF will become an increasingly important public health problem, especially given that clinical trial evidence has established the value of thromboprophylaxis in patients with AF, and the benefit of warfarin therapy in those with additional risk factors.[1] However, warfarin therapy is associated with complications such as bleeding, and the inconvenience of anticoagulation monitoring.

For a therapy to be clinically acceptable, it must not only have proven benefit to individuals but also must be tolerated and accepted by the patients. Helman[2] stated that for a medical treatment to be acceptable to patients, it must make sense in terms of their explanatory models, which represent a patient's set of ideas about illness or an illness episode.[3] The

See Editorial Comment, page 243

views of family, friends, societal pressures, and a patient's own cultural or ethnic background also influence explanatory models.[4] Ethnic groups have been shown to have different general health beliefs, and it is probable that these differences may also occur in their perception and views of different diseases and therapies. Nevertheless, we are not aware of any published evidence on ethnic differences in health perceptions among patients with AF.

We hypothesized that patients with AF from different ethnic groups would have different levels of knowledge and perceptions of AF and the use of antithrombotic therapy. To investigate this further, we conducted a cross-sectional survey of patients with documented chronic AF who were attending

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TABLE 1. Patient Demography

	Total Cohort	Indo-Asian	Afro-Caribbean	White	*P* Value
N	119	39	27	53	
Age, y (mean±SD)	69±9	67±8	68±11	71±9	0.08
Male:female	77:42	21:18	22:5	34:19	0.07
Duration of known AF, months, median (IQR)	48 (24–99)	36 (24–60)	24 (12–36)	75 (36–183)	<0.001
Duration of anticoagulation, months, median (IQR)	36 (12–84)	24 (12–36)	12 (8–36)	60 (24–120)	<0.001
Age on leaving formal education					
≤16 years	101 (85%)	33 (85%)	20 (74%)	48 (91%)	
>16 years	18 (15%)	6 (15%)	7 (26%)	5 (9%)	0.15
Patient beliefs about control of own health					
Patient him- or herself	47 (40%)	4 (9%)	20 (74%)	23 (43%)	
Doctor	26 (22%)	5 (13%)	4 (15%)	17 (32%)	
God/Fate	43 (36%)	30 (78%)	3 (11%)	10 (19%)	
Family	1 (1%)	0	0	1	
Other	2 (1%)	0	0	2	

IQR indicates interquartile range.

the anticoagulation clinic in our city center teaching hospital, serving a multiethnic population.

Patients and Methods

Consecutive patients with AF from the 3 main ethnic groups were recruited from the anticoagulation clinics at City Hospital National Health Service (NHS) Trust (Birmingham, UK) between October 1999 and August 2000. Our hospital serves a patient catchment area of ≈350,000, with the ethnic mix being 25% Indo-Asian (predominantly Punjabi), 11% Afro-Caribbean, and 64% white European. In the catchment area of our hospital, the majority (>90 to 95%) of Indo-Asians are of Punjabi origin and are fairly homogeneous. The Afro-Caribbean and white groups are also fairly homogeneous and indeed, the clinic ethnic population would be typical for west Birmingham. We aimed for a target of ≈50 in each ethnic group, but by the end of the study period, we had not achieved the number in the Indo-Asian and Afro-Caribbean groups, in light of the low prevalence of AF in nonwhite groups.[5] Patients with both rheumatic and nonrheumatic AF who had attended the clinic ≥6 visits (that is, "chronic" attendance) were studied.

First attenders, or new referrals, as well as patients who had additional indications for anticoagulation (for example, venous or pulmonary thromboembolism, etc) were excluded. In our hospital catchment population, the majority (>95%) of patients with AF are monitored by the hospital anticoagulation clinic, and few are managed in primary care. All patients attending the anticoagulation clinic are issued the standard NHS yellow anticoagulant booklet and, in addition, it is usually standard practice in the hospital to inform patients of their illness and treatment at their first attendance. However, apart from what the patients are told by the physician who first referred them to the anticoagulation clinic, no further formal education intervention program is given in the anticoagulation clinic.

A standardized questionnaire was devised that included questions on disease perception and compliance with warfarin therapy. The level of education of these patients was determined, as reflected by the age on leaving formal education, as this would influence the level of understanding of the disease and the therapy. The questionnaire was initially piloted and each patient was interviewed in a similar manner by 2 investigators who were fluent in Indo-Asian dialects (M.J. and A.M.). Specific questions addressed the patient's knowledge of the name of his or her heart condition; perception(s) of the possible sequelae of AF as well as the severity of the medical condition; and the benefits, risks, and rationale for taking warfarin. Ethical committee approval was obtained from the City Hospital NHS Trust Ethics Committee.

Data are quoted as mean±SD, median and interquartile range (IQR), or number and percentage as appropriate. Continuous data were analyzed using 1-way ANOVA or Kruskal-Wallis test, whereas categorical data using the χ^2 test, for the comparisons between the 3 main ethnic groups (white, Afro-Caribbean, and Indo-Asian). A *P* value of <0.05 was considered as statistically significant.

Results

A total of 121 patients were approached over the study period, but 2 patients declined participation; both were white. The study cohort thus comprised 119 patients (77 male; mean age 69±9 years); 39 were Indo-Asian (33%), 27 Afro-Caribbean (23%), and 53 white (44%). There were no statistically significant differences in mean age, gender ratio, and proportion of subjects who left formal education at age ≤16 years between the ethnic groups (Table 1). However, the white group had the longest median duration of known AF and prior anticoagulation.

Most Indo-Asian patients felt that the control of their health was with God or "fate," whereas most Afro-Caribbeans felt the control lay with themselves. Whites tended to consider that control of their health lay with themselves or their doctor.

Patient Perceptions of Atrial Fibrillation

Only 63% of patients in the overall study cohort were aware of their cardiac condition being described as "atrial fibrillation" or "fast/irregular heart rate/rhythm/palpitation," whereas 37% were not aware; in particular, Indo-Asians and Afro-Caribbeans were significantly less aware of AF compared with the white patients (Table 2). When questioned about the perception of the severity of the underlying condition, the majority (61%) of the study cohort felt that AF was "not serious," whereas 33% felt it was "severe" and 6% felt it was a "very severe" condition; there were no statistically significant ethnic differences in perceptions. The majority of patients with AF were aware that AF predisposed to thrombosis and stroke, although a large proportion (37% and 47% respectively) did not; among the ethnic groups, Indo-Asians

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TABLE 2. Patient Perceptions of AF

	All Groups	Indo-Asian	Afro-Caribbean	White	*P* Value
Patient's awareness of the primary diagnosis of AF					
Not aware	44 (37%)	26 (66%)	12 (44%)	6 (11%)	
Aware	75 (63%)	13 (34%)	15 (56%)	47 (89%)	<0.001
Perception of the severity of the underlying illness (that is, AF)					
Not severe	73 (61%)	24 (62%)	20 (74%)	29 (55%)	
Severe	39 (33%)	13 (33%)	6 (22%)	20 (37%)	
Very severe	7 (6%)	2 (5%)	1 (4%)	4 (8%)	0.6
Awareness of AF predisposing to "blood clot"					
Aware	75 (63%)	13 (33%)	24 (89%)	38 (72%)	
Not aware	44 (37%)	26 (66%)	3 (11%)	15 (28%)	<0.001
Awareness of AF predisposing to stroke					
Aware	63 (53%)	10 (26%)	16 (59%)	37 (70%)	
Not aware	56 (47%)	29 (74%)	11 (41%)	16 (30%)	<0.001

appeared to be the least aware of the stroke and thromboembolic associations with AF.

Patient Perceptions of Warfarin

Only about half the patients (52%) in the whole cohort were aware of the reason(s) (such as "heart disease," "thick blood," or "increased risk of stroke") for commencing their warfarin, but 48% commenced warfarin simply because their "doctor told them to" (Table 3); there was no significant difference in response between the ethnic groups. Most patients in the whole cohort were aware of warfarin being used to prevent blood clots (65%) or stroke (66%), but there was a significant difference in the appreciation of the ability of warfarin to prevent stroke and "blood clots" between the ethnic groups, with Indo-Asians and Afro-Caribbeans significantly less aware of the beneficial effect of warfarin compared with their white counterparts.

Only 45% of the study cohort believed that there was some risk associated with warfarin therapy in the form of either "bleeding" or "poisoning," whereas the majority of the patients (55%) were not aware of any specific risks. Indo-Asians were particularly unaware of the adverse effects associated with warfarin therapy. Only a minority of Indo-Asians and Afro-Caribbeans with AF felt that their doctor had given them enough information about their warfarin therapy, and the majority from these ethnic groups felt that they were careless about taking their warfarin (Table 3).

TABLE 3. Patient Perceptions of Warfarin

	All Groups	Indo-Asian	Afro-Caribbean	White	*P* Value
Reasons for commencing warfarin					
Aware of any of the following: heart disease, "thick blood," or risk of stroke	62 (52%)	19 (50%)	14 (50%)	29 (55%)	
Only because "doctor told me to"	57 (48%)	20 (50%)	13 (50%)	24 (45%)	0.85
Awareness of warfarin preventing blood clots					
Aware	79 (66%)	15 (38%)	23 (85%)	41 (77%)	
Not aware	40 (34%)	24 (72%)	4 (15%)	12 (23%)	<0.001
Awareness of warfarin preventing stroke					
Aware	77 (65%)	19 (49%)	16 (59%)	42 (79%)	
Not aware	42 (35%)	20 (51%)	11 (41%)	11 (21%)	0.008
Perception of any risk of warfarin treatment					
Not aware	46 (39%)	22 (56%)	8 (30%)	16 (30%)	
Bleeding	33 (27%)	7 (18%)	9 (33%)	17 (33%)	
Poisoning	21 (18%)	2 (5%)	8 (30%)	11 (20%)	
None	19 (16%)	8 (21%)	2 (7%)	9 (17%)	0.03
Not aware+None	65 (55%)	30 (77%)	10 (37%)	25 (47%)	
Bleeding+Poison	54 (45%)	9 (23%)	17 (63%)	28 (53%)	0.002
General feelings about warfarin therapy					
My doctor has given me enough information about warfarin	46 (39%)	12 (30%)	3 (11%)	31 (59%)	
I am careless at times about taking warfarin	50 (42%)	23 (59%)	18 (68%)	9 (17%)	
Taking warfarin makes me worry about my health	59 (50%)	29 (75%)	24 (90%)	6 (11%)	

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Subgroup Analyses

In this cohort, 20 patients (17%) had a previous stroke or thromboembolic event. In comparison with those who had not had a stroke, stroke survivors were more aware that AF led to stroke (75% versus 48%, P=0.03), that warfarin prevented stroke (70% versus 64%, P=0.014), and that warfarin has bleeding risks (70% versus 40%, P=0.008). Only 10 patients in the total cohort (2 Indo-Asian and 8 white) had previous rheumatic heart disease. In comparison with those who had no rheumatic heart disease, all 10 patients were aware of this diagnosis (100% versus 60%, P=0.011), but only 1 (white) patient was aware of the risks of warfarin and 1 other patient reported that taking warfarin made him worry about his health.

In the whole cohort, the median duration of known AF was 48 months, and median duration of anticoagulation use was 36 months. When patients with AF for <48 months were compared with those with AF for ≥48 months, there were no significant differences in knowledge scores (data not shown). When patients who had been anticoagulated for <36 months were compared with those who had been anticoagulated for ≥36 months, the latter group were less aware of the diagnosis of AF (54% aware versus 77%, P=0.009) and the fact that warfarin use "prevented clots" (59% aware versus 77%, P=0.042), although other knowledge scores were not significantly different.

The small numbers made statistical comparisons between (and within) ethnic groups unreliable, although no marked differences were apparent for these subgroup analyses (data not shown). (Full tables showing comparisons are available from authors.)

Discussion

This study is limited by its cross-sectional and questionnaire-based interviews, although only 2 patients with AF declined participation over the study period and all patients were interviewed in a standardized manner by 2 investigators who were also fluent in Indo-Asians dialects. Furthermore, the study was based in our hospital anticoagulation clinic, and it could be argued that these patients are selected, having been educated about their underlying disease and the need for warfarin, although this was not apparent from the responses in our survey. Indeed, de novo patients with AF may have even worse knowledge scores, but we chose to investigate chronic AF patients attending our hospital anticoagulation clinic, as we felt that these patients should have been the best informed—perhaps the "best-case" scenario. However, by recruiting people from anticoagulation clinics, we have potentially excluded patients with AF who are poorly motivated to attend anticoagulation clinics (that is, responder bias) and those who were possibly too ill to attend their appointments. Unfortunately, we did not assess symptoms and differentiate knowledge scores between symptomatic and asymptomatic patients in our (already long) questionnaire, which was administered in our busy, congested anticoagulation clinic. Furthermore, symptoms are rather subjective, being different to different patients, and can often be multiple, which makes quantification and comparisons between patient groups of different ethnicity and cultural backgrounds difficult.

To our knowledge, however, the present study is one of the largest surveys of patient attitudes to AF and anticoagulation, and perhaps the first to include patients with AF from different ethnic groups. Indeed, the majority of data on the clinical epidemiology of AF have been based on white populations, and only limited data are available on nonwhites with AF,[5,6] despite recognized ethnic differences in cardiovascular disease and stroke.[7] Previously published studies on individuals' perceptions of AF have failed to include people from diverse cultural backgrounds, with a propensity to focus on the indigenous white population.[6] Furthermore, AF may possibly be less common among the nonwhite population in the United Kingdom[5,8]; thus, given the duration of the present study, our relatively large numbers of patients with AF from the different ethnic groups allow unique insights into their perceptions about AF and anticoagulation.

Patient perceptions of primary prevention of stroke using warfarin in AF have generally been underresearched. Adequate informed consent requires patients to have an understanding of their illness, its sequelae, and the need for therapeutic intervention. A measure of patients' perceptions of AF and the need for treatment with anticoagulation may help to optimize the management of this chronic arrhythmia. For example, Gage et al[9] found that antithrombotic therapy based on patients' preferences was more cost effective in terms of quality-adjusted life years of survival, and improving patients' knowledge and satisfaction improves their compliance. In the BAATAF (Boston Area Anticoagulation Trial for Atrial Fibrillation) study, no significant differences between warfarin-treated patients (almost exclusively white) and controls were found for quality of life as demonstrated by measures of functional status, well-being, and health perceptions, unless complicated by a bleeding episode, which resulted in a decrease in health perceptions.[6] Surprisingly, 76% did not mind regular blood tests.[6]

Although the level of education did not differ significantly between the ethnic groups, the levels of appreciation of the disease and the therapy were fairly different. Furthermore, despite receiving long-term anticoagulation therapy for AF, many patients are unable to recall their actual heart condition, and this is perhaps reflected by the perceived seriousness of the condition among individuals studied. Although no statistically significant difference between the ethnic groups was found, 61% of all individuals believed that their condition was "not very serious." Interestingly, the present survey suggests that neither a longer duration in AF nor a longer duration of anticoagulation significantly improved knowledge scores. Conversely, the proportion of patients who were "aware of the diagnosis of AF" and the fact that "warfarin prevented clots" was even lower among patients who had been anticoagulated ≥36 months (≥median for the total cohort).

This lack of awareness of individuals concerning the seriousness of AF as a risk factor for stroke and thromboembolism is of some concern and may reflect the poor amount of counseling and information given to patients by health care professionals. Indeed, one telephone survey of primary care patients in the United States found that African-American patients thought their physician-patient interactions were less participatory than those of their white counterparts.[10] Communication between the doctor and patient has been shown to be important in chronic medical conditions, and patients who reported their physicians counseled them regarding adherence to therapies were more able

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to recall and adhere to their recommendations.[11,12] In the present survey, only 11% of Afro-Caribbean individuals thought their doctor had given them enough information about taking warfarin, compared with 59% of white and 30% of Indo-Asian patients. Furthermore, 90% of Afro-Caribbean people said that taking warfarin made them worry about their health, compared with 75% of Indo-Asian and 11% of whites. In fact, the language barrier faced by many Indo-Asian patients may further hamper physician-patient interactions. Our findings support the assertions made by Gage et al,[9] as 68% of Afro-Caribbean patients compared with 60% of Asian and 17% of white patients admitted to being careless about taking warfarin.

As many as 77% of Indo-Asians did not know the risks of warfarin, and this may be due to some factors such as language barriers and doctor-patient interactions. However, the patients' perceived locus of control may be a factor, with 78% of Indo-Asians compared with 11% of Afro-Caribbeans and 19% of whites feeling that their locus of control was God/"fate." This may perhaps be one reason why Indo-Asian patients do not know about the risks of warfarin, as they feel that they and their doctors will eventually have little control over their health. In comparison with the Afro-Caribbean and white groups, Indo-Asian patients also knew relatively little about the sequelae of AF in terms of strokes or blood clots. Potentially, these ethnic differences in patient perceptions of the warfarin therapy are important as patients with decreased knowledge of their disease process have generally lower compliance with therapeutic management strategies.[12]

An understanding of how patients feel about warfarin therapy is important as this may be a potential reason for noncompliance to warfarin therapy.[13] In individuals with AF, successful treatment requires the minimization of bleeding complications and the prevention of thromboembolic episodes by maintaining the International Normalized Ratio (INR) within 2.0 to 3.0. Stabilization of INR is dependent on good patient compliance but, as INR levels are "doctor-determined" levels of success, many patients may perhaps not see the monitoring of INR as a success but more of a hindrance. The evidence from clinical trials of warfarin use in AF suggests that compliance could be as low as 10% to 26%.[14] Male patients and nonwhites were also more likely to be noncompliant with warfarin therapy.[12,13] Noncompliant patients were more likely to feel that their doctor was not very concerned about them or was less willing to listen to their concerns, but they were less likely to feel that taking warfarin benefited their health, prevented blood clots, or protected their future health.

This study is unique as it concentrates on the patient's perception of his or her condition and the therapy he/she is receiving for it. Our survey suggests that many patients possess very limited knowledge of AF as well as of its consequences and therapy. In particular, our study has highlighted significant differences between different ethnic groups in terms of their knowledge of the risks, actions, and benefits of warfarin as well as AF itself. We accept that some differences in lifestyle can exist between (for example) various Indo-Asian subgroups, but the primary aim of our study was to compare differences between the 3 ethnic groups (Indo-Asian, Afro-Caribbean, and white) as a whole, rather than between smaller subgroups within each of the 3 main ethnic groups. For clinicians, this study is of interest in 2 main aspects. Firstly, it illustrates the gap between what the patient knows and what the doctor believes he or she knows. Secondly, our survey provides medical staff with information regarding how they may better inform their patients and thus, improve the service(s) provided. The present study echoes the findings of Braddock et al[15] in that physicians rarely involve patients in informed decision-making and only check patients' understanding of the disease process and treatments. Recent evidence also suggests that the use of decision aids may help in improving patient knowledge,[16,17] and these should perhaps be considered in more patients with AF, especially from nonwhite populations.

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Editorial Comment

Atrial Fibrillation, Shared Decision Making, and the Prevention of Stroke

Atrial fibrillation (AF), present in 1% to 2% of adults, is a major risk factor for stroke, with an annual rate approaching 5%.[1] Despite abundant evidence from randomized trials that warfarin, and to a lesser extent acetylsalicylic acid, are highly efficacious in preventing stroke in patients with AF, these therapies are prescribed for only a minority of eligible patients.[1] Although there appears to be incomplete application of this trial evidence in real-world practice, the extent of the gap is uncertain since the decision to initiate anticoagulation depends heavily on individual patient preferences and some patients may well decline proven efficacious therapies.[2,3] In fact, AF is one condition in which active patient involvement in treatment decisions may substantially impact management, and there is mounting evidence that shared decision making (ie, patients and clinicians collaborating in devising management plans) for chronic conditions such as AF improves health outcomes.[4,5]

Given this, the study by Lip et al reported in the current article makes for particularly depressing reading. In a well-conducted study, Lip et al surveyed 119 AF patients regularly attending an anticoagulation clinic at a large teaching hospital; these subjects had been treated with warfarin for a mean of 3 years at the time of the study. They found patient knowledge about AF, its consequences, and the potential benefits and side-effects of warfarin to be strikingly poor: only 53% were aware that AF predisposed to stroke, 48% didn't know why they were taking warfarin, and only 45% were aware of any risks with warfarin treatment. These results are even more surprising given that the selection bias in this study should have led to the enrollment of patients most knowledgeable about AF and warfarin.

Despite the desire of many patients to play a more active role in the management of their health, not to mention the evidence that knowledgeable and actively involved patients fare better, the findings of Lip et al are not surprising. Indeed, patients frequently report difficulties in obtaining information about their condition and its treatment from their health professionals.[5] In the brief, hurried encounters that typify outpatient practice, we are rarely able to provide the quantity or quality of information required for patients to participate in shared decision making. For example, in an observational study of more than 1000 patient-physician encounters, patients were told the benefits and risks of prescribed therapies less than one-sixth of the time, and only 2% of the encounters included a check that the patient had understood whatever information was offered.[6] Further, there may be concerns about the quality of some information that clinicians do offer: a recent survey of Canadian physicians revealed that they substantially overestimated the bleeding risks and underestimated the benefits of warfarin for AF.[7]

Recognizing the time (and occasionally knowledge) constraints busy clinicians function under, how can we better inform patients? Although a plethora of patient information materials are produced by consumer groups, commercial organizations, and professional bodies, a recent comparison of 140 such information pieces from 78 different sources found substantial deficiencies in the information provided.[5] Of most concern, these materials often failed to give a balanced view of the benefits and side-effects of different treatment options and only 2 were based on systematic reviews of the literature. Further, all but 2 were felt by patient focus groups to be prescriptive and not conducive to shared decision making. These same investigators found that patients with chronic diseases wanted access to up-to-date, complete, and evidence-based information on their condition and treatment options, preferably related to their personal situation, and didn't express a preference for any particular presentation format.

Decision aids may well be the missing link for shared decision making. They are available in a variety of formats (audio booklets and interactive video discs being two frequently used) and are designed to serve as an adjunct to counseling from clinicians, not a replacement. In addition to providing the background information about the condition of interest usually found in generic educational materials, they also provide explicit quantitative information (often tailored to personal risk status) on the treatment options and potential benefits and risks relevant to an individual patient, and attempt to explicitly clarify each individual's values and the influence of these values on the treatment decisions. Decision aids have been shown to improve patient knowledge and comfort with their therapies for a variety of conditions, including AF, as well as stimulate their participation in decision making without increasing anxiety.[8,9] However, their effects on patient choices or subsequent adherence have been variable and are generally unclear due to the methodologic limitations of trials to date.[8] There is clearly a need for a large randomized trial to evaluate whether a decision aid for patients with AF will not only help eliminate the knowledge gaps demonstrated by Lip et al but also improve patient outcomes.

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