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Trends of optimal anti-coagulation for Patients with atrial fibrillation at Tikur Anbessa Specialized Hospital, Cardiology Unit

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Contents

1. Introduction	1
1.1 Background	1
1.2) Statement of the problem	2
1.3) Significance of the study	2
2 Literature review	3
3. Objective of study	6
3.1 General objective	6
3.2 Specific objectives	6
4. Methodology	7
4.1 Study area and study periods	7
4.2 Study design	7
4.3 Source population	7
4.6 Selection criteria	7
4.7 Study variable	8
4.8 Data Collection	8
4.9 Operational definition	8
4.10 Data management	9
4.10 Ethical consideration:	9
4.11 Data dissemination plan:	9
5. Result	10
6. Discussion	12
7. Strength and limitations	14
References	16
Annex 1: Questionnaire	18

List of tables

Table 1 Sociodemographic and Clinical Characteristics of Study Participants (N = 173).....	10
Table 2 Bivariate and Multivariate Analysis of Factors Associated with Suboptimal Anticoagulation	12

Abstract

Background: Atrial fibrillation (AF) is a major risk factor for stroke, and proper anticoagulation management is one of the main pillars of treatment of atrial fibrillation to prevent cardioembolic complications. However, data on anticoagulation practices and quality are limited in Ethiopia. Identifying gaps in anticoagulation management is critical for improving patient outcomes and reducing stroke-related morbidity in low-resource settings.

Objective: to determine the status of anticoagulation therapy in high risk atrial fibrillation patients and identify predictors of suboptimal anticoagulation in high-risk AF patients who had follow up at Tikur Anbessa specialized hospital (TASH), Ethiopia.

Methods: A retrospective cohort study was conducted at TASH from March to September 2024. Data were extracted from electronic and paper records, including demographics, commodities, anticoagulant type, and INR values. For those taking warfarin, anti-coagulation quality was assessed using Time in Therapeutic Range (TTR) with a target TTR of $\geq 65\%$. Data analysis was performed using SPSS version. Multivariable logistic regression was applied to identify predictors of suboptimal anticoagulation, with statistical significance set at $p < 0.05$.

Results: A total of 173 adults with high risk AF (mean age 64.7 ± 13.2 years; 64.7% female) were included. Of these, 90.2% were anticoagulated, while 9.8% were untreated despite being at high stroke risk. Among the 108 warfarin users, 76.9% had suboptimal International Normalized Ratio (INR) control (TTR $\leq 65\%$). Direct oral anticoagulants (DOACs) were prescribed to 30.7% (48/156) of anticoagulated patients, with 20.8% (10/48) exhibiting suboptimal anticoagulation. Overall, 59.6% (93/156) of anticoagulated patients had suboptimal anticoagulation. Logistic regression identified increasing age (AOR = 1.05, 95% CI: 1.02–1.09, $p = 0.001$) and community-based health insurance (CBHI) enrollment (AOR = 2.24, 95% CI: 1.08–4.67, $p = 0.03$) as significant predictors of suboptimal anticoagulation.

Conclusion: Suboptimal anticoagulation remains a significant challenge in Ethiopia, driven by factors such as age and CBHI. Addressing these issues through expanded insurance coverage, point-of-care INR testing, and targeted provider education is essential to improving outcomes for AF patients.

Keywords: AF, anticoagulation, warfarin, DOACs, Ethiopia, low-resource settings.

1. Introduction

1.1 Background

Atrial fibrillation (AF) is a supraventricular arrhythmia characterized electrocardiographically by low-amplitude baseline oscillations and an irregularly irregular ventricular rhythm. Based on its duration, AF is classified as paroxysmal and persistent when it terminates within 7 days and if it persists for more than a week, respectively. AF that persists for longer than 1 year is termed longstanding persistent. When a patient and a physician accept the permanent AF so that a rhythm control strategy no longer pursued is termed permanent (1).

Atrial fibrillation (AF) is the most common arrhythmia of clinical significance. According to Global Burden Disease 2019, more than 59 million people live with AF in that year. This is expected to rise due to longer life expectancy and increased detection of asymptomatic AF. Throughout their lives, males have a higher prevalence than females. There was significant variation in prevalence between Global Burden of Disease in regions. In our country, the prevalence is 4.3% and 4.8% (2, 3, 4).

Hypertensive heart disease and coronary heart disease (CHD) are the most common underlying chronic disorders in patients with AF in developed countries. Rheumatic heart disease, which is still common in developing countries, is associated with a much higher incidence of AF. Its prevalence ranges from 12.3% to 44.4% in valvular heart disease (3). All AF in the setting of moderate-to-severe mitral stenosis or in the presence of an artificial (mechanical) heart valve requires warfarin for anticoagulation (4).

AF is associated with an approximate 5-fold increase in the risk of thromboembolism, leading to an increased risk of morbidity and mortality if left untreated. Management with oral anticoagulation (OAC) is important to reduce the risk of stroke. The 2019 ACC/AHA/Heart Rhythm Society guidelines updated the recommendations for OAC use in patients with high risk AF based on CHA₂DS₂-VASc score.

1.2) Statement of the problem

Despite clear evidence that warfarin and DOACs reduce risk of stroke, in our country there are many patient and provider barriers that could increase their underutilization. Currently, there is no study that assessed the magnitude of optimal anticoagulation specifically in high risk AF patients based on CHA2DS2VASc in our country.

1.3) Significance of the study

This study will provide data on the prevalence of optimal anticoagulation in high risk AF patients based on their CHA2DS2VASc. That could ultimately lead to a decrease in thromboembolic events by improving OAC use.

2 Literature review

2.1 Definition and diagnosis of AF.

AF is a supraventricular tachyarrhythmia with uncoordinated atrial activation and ineffective atrial contraction. AF can be documented by 12-lead ECG, rhythm strips, wearables, or intracardiac electrograms. A quarter of patients, especially those with persistent AF and older age, are asymptomatic. The most common symptoms are palpitations, fatigue, dyspnea, effort intolerance, and lightheadedness.

Asymptomatic AF patients are not prompted to seek medical care and can present with a thromboembolic complication such as stroke or the insidious onset of heart failure symptoms. Subclinical atrial fibrillation is a term used to describe AF detected by cardiac devices in an asymptomatic patient. The risk of stroke is lower in these patients compared with clinical AF but is significant at two to two-and-a-half times the risk of the general population (6).

2.2 Complications of AF

Stroke continues to be the most important sequelae of AF. Currently, patients with an estimated annual risk of stroke or systemic embolism above 2% are considered high risk and require anticoagulation. Moderate to severe mitral stenosis or prosthetic valve with AF have a 3- to 7-fold increase in thromboembolic risk, with annual risk ranging from 8-31%. So, these patients require anticoagulation. In the other patients, the absolute risk of stroke varies 1 to 20-fold, with a mean annualized rate of 4.5% (5).

2.3 Role of anti-coagulants in AF

Patients diagnosed with AF who have an estimated annual risk of stroke or thromboembolic events $\geq 2\%$ require anticoagulation. The selection of therapy to reduce the risk of stroke should be based on the risk of thromboembolism. Warfarin and other oral anticoagulants are more effective than aspirin for the prevention of thromboembolic complications. In patients with AF who do not have moderate to severe rheumatic mitral stenosis or a mechanical heart valve and who are candidates for anticoagulation, DOACs are recommended over warfarin to reduce the

risk of mortality, stroke, systemic embolism, and ICH. DOACS also don't require periodic INR, which could also be problematic for those taking warfarin.

The first-line therapy for those patients with high-risk AF patients based on CHA2DS2-VASc is now direct oral anticoagulants in DOAC-eligible patients instead of warfarin, as DOACs were found to be non-inferior to warfarin. In patients with AF, the risk of TE increases stepwise with increasing CHA2DS2-VASc score.

However, neither of these drugs, whether warfarin or DOACS, is free from hemorrhagic complications. Therefore, it is useful to risk-stratify patients with AF to identify appropriate candidates for anticoagulation (6-12).

2.4 Risk stratification for Anticoagulant use

Several risk scores based on clinical factors have been developed to estimate the thromboembolic risk in those patients with AF, excluding moderate-severe mitral stenosis and prosthetic valves (6 to 8). Currently, the CHA2DS2-VASc score is considered the most validated score. Five cohort studies showed that a CHA2DS2-VASc score of 2 had annual rates of stroke risk of > 2%. However, some studies showed patients with a CHA2DS2-VASc score of 2 showing low to intermediate risk (<2% annual risk). CHA2DS2VASc indicates congestive heart failure, hypertension, age ≥ 75 y (doubled), diabetes mellitus, prior stroke or transient ischemic attack or thromboembolism (doubled), vascular disease, age 65 to 74 y, sex category.

2.5 Prevalence of Anticoagulant use in high-risk atrial fibrillation

There is inconsistency in the reported use of OAC among AF patients from different parts of the globe, ranging between as low as 2% to 3% and as high as 88%. Some of the differences are related to geographic region, some to the baseline risk of patients. The use of OAC is higher in Western Europe and North America as opposed to other regions. The overall reported rate of OAC use in AF patients ranged from 70% to 80%, and it was around 90% in patients at highest risk of stroke in studies from Europe (13–15).

In a recent study that was done in South Korea in 2022 among high-risk AF, excluding severe mitral stenosis and prosthetic valves, 11,056 patients, accounting for 65.5%, were receiving OAC on the index date; among this, 6302 (87.1%) were receiving NOACs. Approximately one-third of patients who are recommended anticoagulation therapy do not take OACs (16). In another study that was done in 2019/20 in a rural part of the USA, nearly one in four patients with atrial fibrillation or atrial flutter with a high-risk CHA₂DS₂-VASc score were not anticoagulation, 16.9% had a low-risk ATRIA bleed score at 1 year, and OAC therapy would be recommended (17).

In one study done at Yekatit 12 hospital, Ethiopia in 2019/2020 the inappropriate anticoagulation use both in valvular and non-valvular is 46%. This patient's majority were taking warfarin 71% and 57% were non-valvular. The TTR in those taking warfarin was 26%.(19)

3. Objective of study

3.1 General objective

- To determine optimal use of anticoagulant in patients with high risk atrial fibrillation and identify associated factors among atrial fibrillation patients on follow-up at Tikur Anbessa Specialized Hospital.

3.2 Specific objectives

- To assess the proportion of AF patients receiving optimized anticoagulation therapy based on guideline-recommended criteria;
- To identify factors associated with suboptimal anticoagulation therapy among patients with AF.

4. Methodology

4.1 Study area and study periods

The study was conducted at TASH, the biggest tertiary health care center in Addis Ababa Ethiopia. The hospital provides specialized medical care to patients across the country who are referred for various specialty care programs. The hospital also serves as the main medical training center for undergraduate, specialty training, and fellowship training. The cardiac clinic gives service to around 1800 patients per month (17). The General Cardiology OPD is open for four days per week. Additionally, it also has a separate INR Clinic once per week. All new cardiovascular patients are evaluated by a cardiologist. The study period was from March, 2024, to September 2024.

4.2 Study design

The study is a retrospective institution-based study.

4.3 Source population

All high-risk AF patients with CHA₂DS₂-VASc score have follow-up at the Cardiac clinic in TASH.

4.4 Study populations:

AF patients who fulfill the inclusion criteria and require anti-coagulation based on their CHA₂DS₂-VASc score from March to September 2024.

4.5 Sample size

All high-risk AF patients fulfilled the inclusion criteria from March 2024 to September 2024.

4.6 Selection criteria

Inclusion criteria

- Age >18;
- High risk CHA₂DS₂-VASc score atrial AF;
- Had INR determination of at least >3

Exclusion criteria

- Other anticoagulant indications (DVT, PE);
- Medical records of patients with incomplete information about the anticoagulation, INR values, and other pertinent findings.

4.7 Study variable

Dependent variable

- Optimal anticoagulation use

Independent variables

- Socio-demographic characteristics (Age, Sex, use of community insurance);
- Comorbidities (CVS, Hypertension, DM, Stroke, TIA);
- Type of drugs and others

4.8 Data Collection

The data abstraction instrument is prepared by reviewing different literature. Data on demographic characteristics, indications of anticoagulation, comorbidities, drugs prescribed with warfarin, and corresponding INR results were collected. The data was extracted from the patient's electronic and medical records. The data was collected by the trained data collected and the principal investigators continuously supervised the data collection process.

4.9 Operational definition

- **AF:** defined as an arrhythmia that is diagnosed through ECG at least once by a physician as AF;
- **High risk AF:** CHA2DS2-VASc score of ≥ 2 for male and ≥ 3
- **TTR:** it is calculated by dividing the number of INR values in the target range over the total number of INR values measured (denominator); that is, the fraction of INRs in the target range. TTR is calculated after the patients' chart is reviewed until 4 INR determinations are found. The data was calculated using 4 INR determination determined in 6-month period on treatment.
- **Optimal Dose of DOACs**
 - Rivaroxaban: 20 mg orally once daily. For patients with a GFR between 15-49 mL/min, the dose should be reduced to 15 mg daily.
 - Apixaban: 5 mg orally twice daily. For patients with at least two of the following risk factors—age >80 , weight <60 kg, or creatinine >1.5 mg/dL—the dose should be reduced to 2.5 mg orally twice daily.

- Optimal Anticoagulation with Warfarin: Defined as an INR between 2 and 3, with a TTR of at least 65%.
 - Sub-therapeutic INR: INR <2;
 - Supra-therapeutic INR: INR >3.

4.10 Data management

The data entry and analysis were conducted using SPSS version 27.1. Descriptive analysis was done to determine the frequency, percentage, mean, and median. Risk factors for suboptimal anticoagulation were determined using the Binary logistic regression analysis. Variables with p value less than 0.2 in the univariate will be selected for further analysis in multivariable analysis. Statistical significance was determined at 95%CI of the OR and p-value less than 0.05

4.10 Ethical consideration:

Ethical approval was obtained from the Institutional Review Board (IRB). Everything concerning the patient's matter including the evaluating physician was kept confidential.

4.11 Data dissemination plan:

The research will be presented to Addis Ababa University College of Health Science to the Department of Internal Medicine. It will also submitted for possible publication on completion and presented to any person, group, or institution when needed.

5. Result

5.1 Sociodemographic and Comorbidity

A total of 173 patients with nonvalvular atrial fibrillation (AF) and a high CHA₂DS₂-VASc score were included in the study. The majority of participants were female, accounting for 64.7% (112/173). The mean age was 64.7 ± 13.2 years. Regarding age distribution, 40.5% (70/173) were under 65 years, and 39.9% (69/173) were between 65 and 74 years. A total of 60.1% (104/173) of participants obtained anticoagulants through community-based sources. The most common comorbidity was heart failure, present in 61.8% (107/173), followed by diabetes mellitus in 57.2% (99/173) (table 1).

Table 1 Sociodemographic and Clinical Characteristics of Study Participants (N = 173)

Variables	Count	Percentage
sex		
Female	112	64.7
Male	61	35.3
Age groups (years)		
<65	70	40.5
65-74	69	39.9
>75	34	19.6
Source of drug		
Community	104	60.1
Pocket many	69	39.9
Comorbidities		
Heart failure	99	57.2
Diabetes mellitus	34	19.6
Hypertension	104	60.1
TIA/ischemic stroke	60	34.7
Chronic kidney disease	7	5.2

5.2 Anticoagulant types and CHADVASC scores

The median CHA₂DS₂-VASc score among the study participants was 3 (IQR: 2–4). Among all study participants, 90.2% (156/173) were receiving anticoagulant therapy, while 9.8% (17/173) were not. Among those receiving anticoagulant therapy, 69.2% were on warfarin, 26.9% on rivaroxaban, and 3.8% on apixaban.

Within the 6-month follow-up period (with 4 measurements included), 432 INR determinations were recorded among those receiving warfarin therapy. The median INR was 2.42 (IQR: 2.12–2.88). The mean of the four measurements per patient over the six months showed that 63.9% (69) had an INR between 2 and 3, 17.6% (19) were below 2, and 18.5% (20) were above 3.

5.3 Optimization of anticoagulant

Using the cross-sectional method to calculate TTR, only 23.1% of patients on warfarin therapy achieved a TTR above 65%, indicating optimal anticoagulation control. The remaining 76.9% had suboptimal control ($TTR \leq 65\%$) (figure 1).

Among patients on direct oral anticoagulants (DOACs), 79.2% (38/48) achieved optimal anticoagulation, while the remaining 20.8% (10/48) had suboptimal anticoagulation.

When including both warfarin and direct oral anticoagulants (DOACs) such as rivaroxaban and apixaban, a total of 59.6% of patients were classified as having suboptimal coagulation control, based on the TTR for warfarin users and/or the recommended dose for anticoagulants, while 40.4% demonstrated optimal coagulation control.

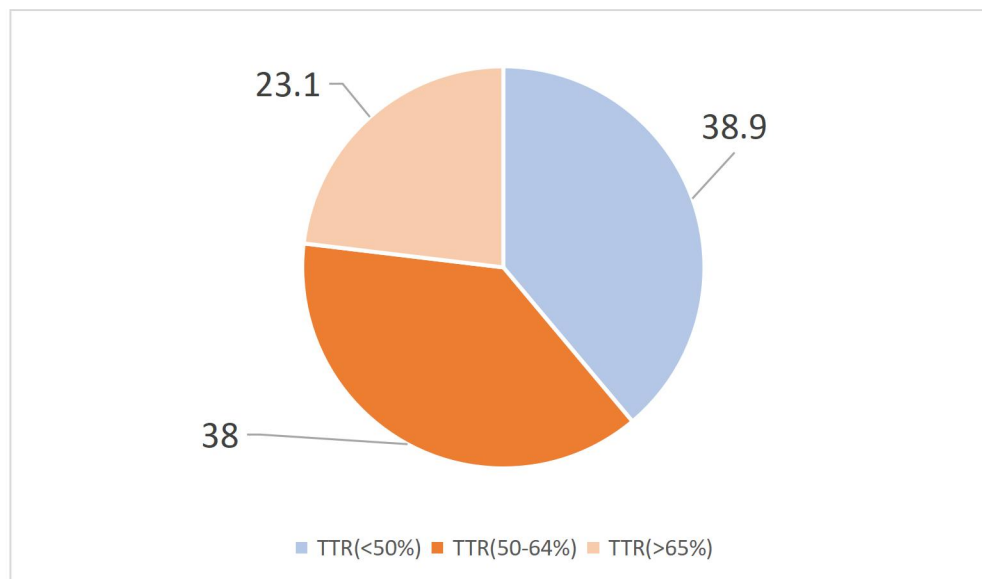


Figure 1 Pie chart showing the TTR among patients on warfarin.

5.4 Factors associated with suboptimal coagulation

In the bivariate analysis, several variables showed potential associations with suboptimal anticoagulation and were considered for further multivariable analysis using a p-value threshold of <0.20 . Age ($p = 0.003$), CBHI use ($p = 0.027$), presence of congestive heart failure ($p = 0.11$),

hypertension (p = 0.11), and chronic kidney disease (p = 0.10) met the criteria for inclusion in the multivariable model(table 2).

In the multivariable analysis, increasing age was independently associated with suboptimal anticoagulation; for each additional year of age, the odds of suboptimal anticoagulation increased by 5% (AOR = 1.05; 95% CI: 1.02–1.09; p = 0.001). Patients who used CBHI had more than twice the odds of experiencing suboptimal anticoagulation compared to those who paid out of pocket (AOR = 2.24; 95% CI: 1.08–4.67; p = 0.03). Although the presence of hypertension was not statistically significant, it showed a borderline association with lower odds of suboptimal anticoagulation (AOR = 0.44; 95% CI: 0.19–1.01; p = 0.06)(table 2).

Table 2 Bivariate and Multivariate Analysis of Factors Associated with Suboptimal Anticoagulation

Variables	COR (95%CI)	P-value	AOR (95%CI)	P-value
Age	1.04(1.02,1.07)	0.003	1.05(1.02,1.09)	0.001
Health insurance			1	
CBHI used	2.11(1.09,4.09)	0.027	2.24(1.08,4.67)	0.03
Pocket money	1		1	
Presence of CHF				
Yes	1.88(0.97,3.65)	0.11	1.19(0.52,2.71)	0.687
No	1		1	
Hypertension				
Yes	0.58(0.31,1.13)	0.11	0.44(0.19,1.01)	0.06
No	1		1	
Chronic kidney disease				
Yes	5.83(0.71,47.86)	0.10	4.28(0.51,35.80)	0.44
No	1		1	

6. Discussion

This study evaluated coagulation optimization and identified predictors for patients with non-valvular atrial fibrillation (AF) in Addis Ababa, Ethiopia. Among patients on warfarin, 76.9% had suboptimal control (TTR ≤ 65%), 20.8% of DOAC users had suboptimal anticoagulation, and overall, 59.6% of patients had suboptimal coagulation control. In the multivariable analysis, increasing age and CBHI, significantly increased the odds of suboptimal anticoagulation.

The high proportion of warfarin users with suboptimal anticoagulation (76.9%) mirrors a prior Ethiopian study at Yekatit 12 hospital reported a TTR of 74% (19). Both far below the recommended threshold of >65–70% for effective stroke prevention. This contrasts sharply with high-income settings like Western Europe and North America, where structured anticoagulation clinics and frequent INR testing achieve TTR rates exceeding 70% (13–15). Challenges in Ethiopia, such as infrequent INR testing, medication stockouts, and poor patient education, likely perpetuate suboptimal control. Reliance on warfarin, despite global shifts toward DOACs, may reflect cost barriers or limited availability of newer agents (19).

Despite optimization is better with DOACs better than warfarin, the 20.8% suboptimal control, only 30.7% were on DOACS in our study. This contrasts sharply with high-income regions like South Korea, where 87.1% of high-risk AF patients received DOACs (16), and rural U.S. settings where DOACs dominate (17). The dominance of warfarin use in Ethiopia—a drug with inherently higher management complexity—exacerbates the overall burden of suboptimal anticoagulation.

Increasing age emerged as a critical predictor of suboptimal anticoagulation, aligning with global evidence that older adults face heightened risks due to polypharmacy, comorbidities, and physiological changes affecting drug metabolism (6–12). Older patients often rely on caregivers or face financial barriers to consistent follow-up, leading to poor adherence, particularly with warfarin, which requires rigorous dietary and monitoring compliance. Ethiopia’s reliance on warfarin—a drug demanding frequent INR testing—places older adults at a disadvantage.

The association between CBHI and suboptimal anticoagulation underscores systemic gaps in Ethiopia’s healthcare financing. While the Community-Based Health Insurance (CBHI) scheme is commendable for its efforts to improve healthcare access, challenges remain—particularly regarding the limited coverage of direct oral anticoagulants (DOACs), inconsistent reimbursement for INR monitoring, and occasional medication stockouts at affiliated facilities. These issues can hinder consistent and effective treatment for patients. By contrast, in countries like the United States, insurance systems that cover DOACs and integrate anticoagulation management into primary care demonstrate higher adherence rates (17). Addressing this issue in Ethiopia requires policy reforms to expand CBHI formularies to include DOACs, coupled with investments in supply chains to ensure consistent anticoagulant availability.

7. Strength and limitations

This study has several strengths. The use of standardized outcome measures—TTR for warfarin and guideline-based dosing for direct oral anticoagulants (DOACs)—ensured consistency with international protocols. Stratifying patients using CHA₂DS₂-VASc scores enhanced the clinical relevance for stroke prevention strategies. Including both warfarin and DOAC users provided a comprehensive overview of anticoagulation practices. Furthermore, the application of multivariable analysis helped identify independent predictors of suboptimal control, such as age and insurance type, offering actionable insights for clinical decision-making.

However, the study has several limitations. Its retrospective, single-center design may introduce selection bias and limits generalizability to rural or non-tertiary settings. The cross-sectional TTR assessment using four INR values over six months may not reflect true therapeutic control. Moreover, the cross-sectional nature of the study precludes causal inference, making it difficult to determine whether the identified factors preceded or contributed to suboptimal anticoagulation. Unmeasured factors like health literacy, adherence, and socioeconomic status were not assessed. The six-month follow-up precluded evaluation of long-term outcomes. Though CKD showed a trend toward significance, larger studies are needed to confirm its role.

8. Conclusion and recommendations

This study highlights challenges in anticoagulation optimization for high-risk atrial fibrillation patients at TASH, Ethiopia. With 59.6% of patients experiencing suboptimal control—mainly due to poor warfarin management (76.9% with TTR \leq 65%) and limited DOAC access (30.7%)—the findings point to gaps in the healthcare system. Key predictors, including age, CBHI, and CKD, reflect clinical and socioeconomic barriers.

To address the high prevalence of suboptimal anticoagulation, several key recommendations are proposed. First, optimizing warfarin management is critical, with point-of-care INR testing enabling more frequent monitoring. Expanding access to direct oral anticoagulants (DOACs) through inclusion in Ethiopia's CBHI formulary and subsidizing costs would improve affordability, along with training clinicians on renal-adjusted DOAC dosing. Second, strengthening health systems through patient and provider education is vital. Culturally tailored materials on AF, stroke risk, and adherence should be distributed, while workshops on CHA₂DS₂-VASc scoring and anticoagulant selection could improve clinician competency. Finally,

policy and collaboration must drive systemic change. Developing national AF management guidelines that emphasize anticoagulation optimization and equitable DOAC access would standardize care.

Abbreviations

AF-atrial fibrillation,ACC/AHA america college of cardiology/america heart association, CHA2DS2-VASc- congestive heart failure, hypertension, age ≥ 75 years, diabetes mellitus, stroke or transient ischemic attack, vascular disease, age 65 to 74 years, sex category, DOAC- direct oral anticoagulant, INR- international normalization ratio;TTR-time in therapeutic range

DM-diabetes,HTN-hypertension,CHF-congestive heart failure,HMIS-health management and information system.CBHI-communitybased health insurance

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Annex 1: Questionnaire

1.Sociodemographic variables

Age	<65 <input type="checkbox"/>
	65-74 <input type="checkbox"/>
	>75 <input type="checkbox"/>
Sex	Male <input type="checkbox"/>
	Female <input type="checkbox"/>
Medical Record Number	

2. Source of the Anti-coagulant

Community based insurance	<input type="checkbox"/>
Out of pocket	<input type="checkbox"/>

3.Thrombotic risks

Congestive heart failure	Yes <input type="checkbox"/>
	No <input type="checkbox"/>
Hypertension	Yes <input type="checkbox"/>
	No <input type="checkbox"/>
Diabetes mellitus	Yes <input type="checkbox"/>
	No <input type="checkbox"/>
Stroke	Yes <input type="checkbox"/>
	No <input type="checkbox"/>
TIA	Yes <input type="checkbox"/>
	No <input type="checkbox"/>
Thrombo-embolic history	Yes <input type="checkbox"/>
	No <input type="checkbox"/>
Peripheral arterial disease	Yes <input type="checkbox"/>
	No <input type="checkbox"/>
Prior Myocardial infarction	Yes <input type="checkbox"/>
	No <input type="checkbox"/>

Aortic plaque	Yes <input type="checkbox"/>
	No <input type="checkbox"/>

4) Factors that could decrease anticoagulant usage

Chronic renal failure	Yes <input type="checkbox"/>
	No <input type="checkbox"/>
Cirrhosis	Yes <input type="checkbox"/>
	No <input type="checkbox"/>
History of hemorrhage	Yes <input type="checkbox"/>
	No <input type="checkbox"/>

5) CHA2DS2-VASc score

1 <input type="checkbox"/>
2 <input type="checkbox"/>
3 <input type="checkbox"/>
>3 <input type="checkbox"/>

Annex 2: CHA2DS2-VASc Calculator.

Age	<input checked="" type="radio"/> <65 0 <input type="radio"/> 65-74 +1 <input type="radio"/> ≥75 +2
Sex	<input checked="" type="radio"/> Female +1 <input type="radio"/> Male 0
CHF history	<input checked="" type="radio"/> No 0 <input type="radio"/> Yes +1
Hypertension history	<input checked="" type="radio"/> No 0 <input type="radio"/> Yes +1
Stroke/TIA/thromboembolism history	<input checked="" type="radio"/> No 0 <input type="radio"/> Yes +2
Vascular disease history (prior MI, peripheral artery disease, or aortic plaque)	<input checked="" type="radio"/> No 0 <input type="radio"/> Yes +1
Diabetes history	<input type="radio"/> No 0 <input checked="" type="radio"/> Yes +1