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Assessing physicians' knowledge, attitude, and practice on anticoagulant therapy in non-valvular atrial fibrillation: Syrian insights

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Abstract

Background Atrial fibrillation (AF) is the most prevalent cardiac condition linked to increased mortality due to complications such as stroke. Oral anticoagulant (OAC) is the mainstay in preventing cerebrovascular accidents in patients with AF. Recent evidence identified gaps in physician's knowledge in diagnosing and managing patients with AF. This study aims to assess Syrian physicians' knowledge, attitude, and practices regarding the use of anticoagulant therapy in non-valvular AF (NVAF) patients. A cross-sectional study was conducted using a validated web-based questionnaire, which included 56 items separated into four sections that collected information about demographics, knowledge, attitude, and practices. Chi-square and Kruskal Wallis were performed to analyze the statistical relationships between the knowledge, attitude, practice, and demographic variables.

Results A total of 497 participants completed the survey, of which 62.6% were between the ages of 25 and 35. The average participant scores for knowledge, attitude, and practices were (48.18 ± 21.57), (81.54 ± 9.26), and (62.83 ± 12.42), respectively. Participants who demonstrated good understanding, a positive attitude, and good practices were 22.3%, 87.3%, and 25.4%, respectively. The fear of bleeding was identified as the most significant barrier to initiating anticoagulant medication in AF patients (55.5%). Doctors who attended training had a better knowledge score than those who did not (mean ± S.D. = 57.24 ± 20.7). Participants who stated that over 70% of their AF patients use aspirin received the highest attitude score (mean ± S.D = 86.98 ± 21.17). PhD participants reported higher practice scores than those with other educational backgrounds (mean ± S.D = 73.96 ± 11.3).

Conclusion This research showed that primary care physicians in Syria had optimistic views regarding OAC therapy, suggesting that training interventions targeting physicians may lead to improvement in the treatment of patients with NVAF in Syria.

Keywords Anticoagulant therapy, Non-valvular atrial fibrillation, Syrian physicians, Awareness, Cross-sectional

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Introduction

Atrial fibrillation (AF) is the most prevalent persistent arrhythmia, with more than 33 million globally diagnosed. Various severe cardiovascular and cerebrovascular complications, such as myocardial infarction, heart failure, stroke, and premature death, are linked to atrial fibrillation [1]. Globally, the incidence and prevalence rates of AF are increasing as the life expectancy for more people is rising. The prevalence of atrial fibrillation has tripled during the last 50 years. The number of patients diagnosed with AF in Asia by 2050 is expected to be at least 72 million, with 3 million people expected to suffer from strokes secondary to AF [2].

Numerous recognized cardiovascular risk factors, such as hypertension, valvular heart disease, and diabetes mellitus, have been identified as independent predictors of atrial fibrillation. Other risk factors include obesity, excessive alcohol consumption, male sex, and left ventricular hypertrophy. Thus, screening patients with these risk factors may be advantageous to diagnose AF before complications occur [3].

Although paroxysmal AF is linked with a slightly lower risk of stroke and systemic embolism in comparison to permanent AF, it is still accompanied by a high possibility of stroke incidence [4]. Paroxysmal AF and atrial arrhythmia, or atrial high-rate events (AHRE), may be identified via comprehensive screening utilizing equipment like pacemakers, implanted cardiac monitors, patches, or smartphones [5].

Atrial fibrillation patients have a high risk of morbidity and mortality due to ischemic stroke; as a result, stroke prevention in the case of non-valvular AF (NVAF) is a top concern for doctors, patients, and their families, as well as for society. Several approaches have been developed to prevent strokes [6]. The CHA2DS2-VASC score is the gold standard for stroke prediction in AF patients since the European Society of Cardiology (ESC) guidelines recommended in 2012 to use this score for stroke risk stratification [7].

Oral anticoagulation (OAC) therapy primarily prevents thromboembolic events and stroke in patients with NAVF [8]. In patients with AF, stroke risk reduction is prioritized when considering anticoagulant medications, and higher bleeding risk in favor of reducing stroke risk is usually accepted. However, patient preferences should be considered when deciding the type of OAC treatment [9].

Antiplatelet and vitamin K antagonists were the only options to prevent stroke in AF until 2009. However, vitamin K antagonists' use limitations have been established, such as a narrow therapeutic index, serious interactions with food and other medications, and the need for monitoring. New OACs (NOAC) are easier to administer than warfarin since they are given at a constant dosage without frequent monitoring [10–12]. However, recent studies have shown that in patients with cardiovascular disease, the nonadherence rate to treatment may approach 50% after 12 months. Since NOACs' anticoagulant action lasts only 12–24 h after each dose, poor adherence would put NOAC therapy at risk [13]

A recent study encompassing six European countries found that physicians needed to be more confident in handling anticoagulant medication in patients with complex AF and identified significant gaps in physicians' Knowledge and abilities in all aspects of AF treatment [14]. Another study showed that the main factors for underusing vitamin K antagonists among patients were the lack of knowledge and comprehension [15]. In contrast, the significant concerns among physicians were uncertainty and the need for personalized decision-making. Providing decision-making tools and improving primary care-hospital cooperation might help atrial fibrillation patients adopt this crucial therapy option. Increasing physician knowledge will aid general practitioners in treating AF with anticoagulation in primary care facilities. If these obstacles are addressed and a shared care plan is developed, AF may be better managed within primary care [16].

This cross-sectional study aimed to assess Syrian physicians' knowledge, attitude, and practice regarding the use of anticoagulant therapy in NVAF patients. The findings will contribute to the present knowledge and will be helpful for decision-makers and policymakers in guiding AF treatment.

Methods

Study setting and design

This online cross-sectional study was performed between 21 December 2022 and 3 February 2023. Each respondent was informed of the study objectives and the research team identification. Additionally, the right to withdraw from the study at any time and the total confidentiality of the personal information was assured, and the fact that only fully reported data would be analyzed. This study included cardiologists, other internists, consultants, and resident doctors within the general internal medicine department or its sub-specialties. Physicians who were unwilling to participate and practitioners from different specialties were excluded from this survey. The questionnaire was based on a previous study conducted in China [17].

The questionnaire was translated into Arabic to ensure complete comprehension of the items. The link for the Google form with the questionnaire was sent to respondents through social media platforms, such as WhatsApp, Facebook, and Telegram. Another source for collecting data was face-to-face interviews between data

collectors and physicians within governmental and private hospitals. The minimal sample size was estimated by applying a single proportion of the population formula [$n = [(Z\alpha/2)2.\ P\ (1-P)]/d2$]. With a 95% confidence level ($Z\alpha/2 = 1.96$), and a 5% margin of error, the KAP level was assumed at 50% to ensure the largest sample size. The required sample size was 385. However, we enrolled 498 participants in this study.

Measures

A modified and validated KAP questionnaire model developed by Ye et al. was used as a measurement tool 15. The questionnaire of this study included 56 items divided into four sections. The first part represented the demographic information of the study population and their previous experience in dealing with AF patients. The second, third, and fourth sections assessed knowledge, attitude, and practice toward anticoagulant therapy in patients with NVAF, respectively. Knowledge, attitude, and practice were rated as either poor (below 39.0%), average (40.0–69.0%), or good (above 70.0%), where these cut-off points were predetermined based on the prior study.

Practitioners' demographics and their previous experience in dealing with AF patients

Overall, this domain contained 19 questions. We obtained the main properties of the study's respondents by asking them 13 questions about their sociodemographics, including age, gender, academic specialty, number of years of work experience, and professional title. The participant's monthly income was defined as poor, moderate, good and excellent if it was < 30%, between 30 and 50%, between 50 and 80% and > 80% of the area median income, respectively. In this part, participants were also asked six questions about their previous experience in dealing with AF patients, including the total number and age of the AF patients they have managed in the past year, the main obstacles of starting anticoagulant therapy in their AF patients, and whether their AF patients were treated with aspirin or warfarin.

Knowledge regarding anticoagulant therapy in patients with NVAF and the sources of information

Fourteen questions were included in this segment. We questioned the participants on issues such as AF diagnosis, the scores used to predict stroke risk and bleeding threat in AF patients, laboratory tests used to monitor AF patients treated with warfarin, the target range of International normalized ratio (INR) in AF patients managed with warfarin under 75 years old and above it, and about NOAC use. In the context of knowledge, participants were asked about their source of information concerning AF and the sources they prefer to use to gather knowledge about AF. Each knowledge item question scored one point for a correct answer and zero for an incorrect answer. The total knowledge score was computed by the addition of all score items.

Attitude toward anticoagulant therapy in patients with NVAF

This section included 13 questions to measure participants' attitudes toward anticoagulant therapy in NVAF patients. Participants were investigated about their degree of agreement with the necessity of using the stroke score tool to calculate the risk of stroke in AF patients before anticoagulant therapy, the necessity of using the bleeding score tool to evaluate the risk of bleeding in AF patients before anticoagulant treatment, the need of understanding the risk of stroke and bleeding in AF patients, and the necessity to tell AF patients about medication and food that affect warfarin's anticoagulant effects. A 5-point Likert scale (1 = strongly disagree, 5 = strongly agree) was used to examine participants' attitudes toward anticoagulant therapy in NVAF patients.

Practice toward anticoagulant therapy in patients with NVAF

We included 18 questions in this domain to evaluate practitioners' experience dealing with non-valvular atrial fibrillation patients. This part showed different scenarios, and participants were asked to choose the appropriate management in each scenario. This part discussed issues such as the use of stroke risk score tools to assess stroke risk in AF patients, the use of bleeding risk score tools to assess bleeding risk in AF patients, informing the patient of the food and drugs that interact with warfarin, informing the patient of the increased risk of stroke related to AF. Respondents were also questioned about their previous attendance of training lectures about atrial fibrillation and anticoagulation therapy and their future desire to attend conferences on this topic. A 4-point scale (1 = never, 4 = always) was performed to measure participants' practice toward anticoagulant therapy in NVAF patients.

Pilot study

To confirm the validity and clarity of the survey, we administered it to 50 members of the public selected at random before accreditation. After performing pilot research and ensuring the questionnaire had strong internal consistency (Cronbach's alpha was between 0.712 and 0.861), we distributed it.

Ethical considerations

The Syrian Ethical Society for Scientific Research provided ethical approval and Aleppo University provided ethical clearance. Participants were given a link to access

an online Google survey, and on the first page of the survey, they were asked if they agreed to complete the questionnaire. Before completing the questionnaire, participants were sent to the linked page containing important research information. The questionnaire took five to twelve minutes to complete, and the responses were saved in a secure online database.

Statistical analysis

We used IBM Statistical Package for the Social Sciences (SPSS) Statistics ver.28 and Microsoft Excel ver.365 for the performance of statistical analysis, considering *p*-values equal to or below 0.05 as significant values. For continuous data (scores) that were not normally distributed according to the Shapiro–Wilk test, the Kruskal–Wallis was performed to determine the difference between the scores and basic variables. However, the chi-square test was used to reveal the difference between the categorical variables. In addition, we carried out binary logistic regression to define the actual probabilities of each subgroup having adequate levels of knowledge, attitude, and practices of anticoagulant therapy in patients with NVAF.

Results

Participant demographics

The respondents' demographic data are summarized in Table 1. A total of 511 doctors were invited to participate in this study; however, 14 declined, reducing the final sample size to 497. Almost two-thirds of the participants (62.6%) were male, whereas most respondents (93.7%) were aged between 25 and 35. Less than half of the participants (47.5%) reported moderate monthly income, while 83.5% were residents' doctors. 87.1% of the study sample reported less than five years of working experience. Nearly a third of respondents (34.0%) indicated they had attended training courses in their specialty. Just 11.3% of participants stated they had 20–49 AF patients in the past year; 20.5% stated 40–69% of their patients take aspirin. Lastly, 10.4% of participants revealed that 20–39% of their AF patients take warfarin.

Participant's knowledge assessment

Most participants knew how to diagnose AF, and 74.6% knew the tool that could be used to predict stroke risk in AF patients. Most respondents (81.7%) indicated the correct risk factors included in the CHADS2 score, while 21.3% did not. Approximately, 36.4% and 75.9% of respondents did not recognize the risk factors "Hypertension, Abnormal renal/liver function, Stroke, Bleeding history or predisposition, Labile INR, Elderly, Drugs/alcohol concomitantly" (HAS-BLED) score included and how long coagulation function should be monitored in AF patients with long-term warfarin

Table 1 Demographic characteristics of participants

Variable	Frequency	Percentage %
Gender		
Male	311	62.6
Female	186	37.4
Age		
20–35	459	93.7
36–50	25	5.1
51–65	6	1.2
Residence		
Rural	117	23.5
Urban	380	76.5
Monthly income		
Poor	28	5.6
Moderate	236	47.5
Good	211	42.5
Excellent	22	4.4
Educational level		
Medical school graduate	400	80.5
Master's degree	89	17.9
PhD degree	8	1.6
Types of CHS centers		
The rural	12	2.4
The urban	297	59.8
The Urban–Rural	188	37.8
Professional title		
Resident	415	83.5
Physician	79	15.9
Associate senior physician	2	0.4
Chief physician	1	0.2
Years of working experience		
< 5 years	433	87.1
5–10 years	44	8.9
10–15 years	15	3.0
15–20 years	2	0.4
20–25 years	1	0.2
> 25 years	2	0.4
Training attendance		
No	328	66.0
Yes	169	34.0
Number of AF patients		
No one	160	32.3
1–9	147	29.6
10–19	80	16.1
20–49	56	11.3
50–99	33	6.7
100–149	8	1.6
≥ 150	12	2.4
Age group of AF patients		
< 50	11	2.2
50–59	133	26.8

Table 1 (continued)

Variable	Frequency	Percentage %
60–69	135	27.2
70–79	28	5.6
Others	190	38.2
Number of AF patients on aspirin		
< 5%	45	13.4
5–9%	53	15.7
10–19%	57	16.9
20–39%	61	18.1
40–69%	69	20.5
≥ 70%	52	15.4
Number of AF patients on warfarin		
< 5%	190	56.4
5–9%	53	15.7
10–19%	41	12.2
20–39%	35	10.4
40–69%	16	4.7
≥ 70%	2	0.6

therapy at a stable period, respectively. The target range of INR in AF patients with warfarin under 75 years old and the target range of INR in AF patients over 75 years old were identified among 42.9% and 45.7% of respondents, respectively. Most respondents (90.5%) and (94.2%) replied correctly about the factor that is susceptible to the anticoagulation effect of warfarin and the antagonist that antagonizes warfarin's anticoagulation, respectively (Table 2).

Most participants (85.7%) reported that electrocardiogram (ECG) made the diagnoses of AF, while 13.7% were done by Holter. 23.5% and 33% of respondents did not know the tool used to predict stroke risk in AF patients and can be used to predict bleeding risk in AF patients, respectively. Hypertension and diabetes were identified by 71% and 55.5% of respondents as risk factors in the CHADS2 score and CHADS2-VASc score, respectively. Only 3% of the participants used the Outcomes Registry for Better Informed Treatment of Atrial Fibrillation (ORBIT) score to predict bleeding risk in AF patients. Most of the respondents (83.5%) addressed INR as an indicator that should be monitored in AF patients with warfarin; however, 19.9% of respondents expressed that every seven days, the period coagulation function should be monitored in AF patients with long-term warfarin therapy at a stable period. A portion (42.9%) of participants thought the target range of INR in AF patients taking warfarin under 75 years of age was 2.0–3.0. Nearly two-thirds of respondents, 62.8%, identified food as a factor that is susceptible to the anticoagulation effect of warfarin (Table 3).

Participant attitude assessment

A total of 18.3% of the participants strongly agreed the type of AF would affect the doctor's initiation of anticoagulant therapy and choice of oral anticoagulants. In comparison, 12.9% and 11.1% didn't agree if it is necessary to use the stroke score tool to assess the risk of stroke in AF patients before anticoagulant therapy and if it is essential to use the bleeding score tool to measure the risk of bleeding in AF patients before anticoagulant treatment. Of the respondents, only 26.6% disagreed and were not more concerned about the risk of bleeding in AF patients than the risk of stroke in AF patients.

Reducing the risk of stroke and bleeding caused by AF is critical for AF patients, according to more than half of the respondents (56.7%). Of the participants, 6.2%, 2.0%, and 4.0% reported their disagreement that it is safe to maintain the INR between 2.0 and 3.0 for warfarin anticoagulation therapy in NVAF patients; that it is necessary to tell AF patients about medication and food that affect warfarin's anticoagulant effects, and they fully understand the views of AF patients on reducing the risk of stroke and bleeding caused by warfarin therapy, respectively. Finally, 53.7% and 63.8% of respondents addressed strongly they hope to have more Knowledge to discuss the advantages and disadvantages of stroke, bleeding risk, and anticoagulation, and they think doctors can improve the standard anticoagulant treatment rate in AF patients after training in atrial fibrillation, respectively (Table 4).

Participant's practices assessment

Only 38% of participants have never made a differential diagnosis according to the duration of the onset of atrial fibrillation. On the other hand, 22.5% and 20.9% indicated they sometimes made differential diagnoses between valvular AF and non-valvular AF in AF patients when they dealt with AF and used stroke risk score tools to assess stroke risk in AF patients, respectively. Moreover, 32.4% of respondents stated they often use bleeding risk score tools to evaluate bleeding risk in AF patients. Additionally, 36.4% of respondents reported they sometimes would give warfarin for anticoagulant treatment to a 75-year-old male NVAF patient with hypertension and no history of diabetes and cardiovascular disease.

A proportion of 32.8% stated they would not provide the AF patient who had gastrointestinal bleeding three months ago and has stopped bleeding for 1-week oral anticoagulant therapy, whereas 38.8% expressed they would never give warfarin to the AF patient whose nose bleeds once and gum occasionally bleeds when brushing his teeth. Furthermore, 32.6% of participants expressed

Table 2 Community primary care physician (PCP) knowledge of OAC therapy in NVAF patients

Knowledge items	Frequency	Percentage %
AF diagnosis		
No	3	0.6
Yes	494	99.4
Score tool for predicting stroke risk in AF patients		
No	126	25.4
Yes	371	74.6
Score tool for predicting bleeding risk in AF patients		
No	220	44.3
Yes	277	55.7
Risk factors included in the CHADS2 score		
No	91	18.3
Yes	406	81.7
Risk factors included in the CHADS2-VASc score		
No	106	21.3
Yes	391	78.7
Risk factors included the HAS-BLED score		
No	181	36.4
Yes	316	63.6
Which indicator should be monitored in AF patients with warfarin		
No	17	3.4
Yes	480	96.6
How long should be monitored coagulation function in AF patients with long-term warfarin therapy at a stable period?		
No	377	75.9
Yes	120	24.1
What's the target range of INR in AF patients with warfarin under 75 years old		
No	284	57.1
Yes	213	42.9
What's the target range of INR in AF patients with warfarin over 75 years old		
No	270	54.3
Yes	227	45.7
Which factor is susceptible to the anticoagulation effect of warfarin		
No	47	9.5
Yes	450	90.5
What's the antagonist that antagonizes warfarin's anticoagulation		
No	29	5.8
Yes	468	94.2
Which of the following AF patients need to adjust warfarin dose		
No	164	33.0
Yes	333	67.0
Which medication are the new oral anticoagulants (NOAC)		
No	98	19.7
Yes	399	80.3

Table 3 The Knowledge of PCPs in anticoagulant therapy for NVAF patients

Knowledge of PCPs items	Frequency	Percentage%
How to diagnose AF		
ECG	426	85.7
Holter	68	13.7
Auscultation of the heart and palpation of the pulse	3	0.6
Which score tool can be used to predict stroke risk in AF patients		
CHADS2 score	63	12.7
CHADS2-VASc score	308	62
HAS-BLED score	6	1.2
ORBIT score	3	0.6
Not known	117	23.5
Which score tool can be used to predict bleed risk in AF patients		
CHADS2 score	21	4.2
CHADS2-VASc score	35	7
HAS-BLED score	262	52.7
ORBIT score	15	3
Not known	164	33
What risk factors does the CHADS2 score include		
Hypertension	353	71
Diabetes	315	63.4
Dyslipidemia	132	26.6
Congestive heart failure	280	56.3
Female	134	27
Age > 75yo	334	67.2
Prior stroke/TIA	274	55.1
Not known	88	17.7
What risk factors does the CHADS2-VASc score include		
Diabetes	276	55.5
Prior stroke/TIA/thrombosis	320	64.4
Vascular disease	275	55.3
Age 65–74 yo	227	45.7
Age ≥ 75 yo	277	55.7
Hypertension	296	59.6
Congestive heart failure/left ventricular dysfunction	288	57.9
Female	208	41.9
Dyslipidemia	75	15.1
Not known	107	21.5
What risk factors does the HAS-BLED score include		
Female	68	13.7
Hypertension	228	45.9
Liver dysfunction and renal dysfunction	228	45.9
Stroke	167	33.6
History of bleeding	255	51.3
Unstable INR	241	48.5
Alcoholism	161	32.4
Concomitant medications (eg. antiplatelet drugs, NSAIDS)	180	36.2
Age > 65yo	200	40.2
Not known	182	36.6
Which indicator should be monitored in AF patients with warfarin		
PT	267	53.7
APTT	63	12.7
INR	415	83.5

Table 3 (continued)

Knowledge of PCPs items	Frequency	Percentage%
D-Dimer	20	4
Fibrinogen	13	2.6
Not known	12	2.4
How long should be monitor coagulation function in AF patients with long-term warfarin therapy at a stable period?		
Every 2 days	27	5.4
Every 7 days	99	19.9
Every 30 days	120	24.1
Every 3 months	175	35.2
Not known	76	15.3
What's the target range of INR in AF patients with warfarin under 75 years old?		
1.5–2.4	49	9.9
2.0–3.0	213	42.9
2.0–2.5	86	17.3
1.8–2.6	15	3
2.5–3.5	75	15.1
Not known	59	11.9
What's the target range of INR in AF patients with warfarin over 75 years old		
1.5–2.4	63	12.7
2.0–3.0	105	21.1
2.0–2.5	138	27.8
1.8–2.6	26	5.2
2.5–3.5	56	11.3
Not known	109	21.9
Which factor is susceptible to the anticoagulation effect of warfarin		
The patient's genes	213	42.9
Food	312	62.8
Drugs	420	84.5
Not known	49	9.9
What's the antagonist that antagonizes warfarin's anticoagulation		
Vitamin K	455	91.5
Protamine	32	6.4
Prothrombin complex	93	18.7
Fresh plasma	135	27.2
Not known	16	3.2
Which of the following AF patients need to adjust warfarin dose		
INR 2.0–3.0	32	6.4
INR 1.0–1.5	225	45.3
INR 3.8–4.5	291	58.6
INR 2.0–2.5 and age ≥ 75y	125	25.2
Not known	119	23.9
Which medication are the new oral anticoagulants (NOAC)?		
Dabigatran	237	47.7
Rivaroxaban	341	68.6
Apixaban	316	63.6
Dicoumarin	85	17.1
Edoxaban	211	42.5
Not known	97	19.5

INR: International normalized ratio; CHADS2-VASc: Congestive heart failure, hypertension, age ≥ 75 (doubled), diabetes, stroke (doubled), vascular disease score; HAS-BLED: Hypertension, Abnormal renal/liver function, Stroke, Bleeding history or predisposition, Labile INR, Elderly, Drugs/alcohol concomitantly; ECG: electrocardiogram; ORBIT: Outcomes Registry for Better Informed Treatment of Atrial Fibrillation

Table 4 Participant attitude toward OAC therapy in NVAF patients

Attitude items	Frequency	Percentage %
The type of atrial fibrillation would affect doctors' initiate anticoagulant therapy and choose oral anticoagulants		
Strongly disagree	47	9.5
Somewhat disagree	64	12.9
Not sure	118	23.7
Somewhat agree	177	35.6
Strongly agree	91	18.3
It is necessary to use the stroke score tool to assess the risk of stroke in AF patients before anticoagulant therapy		
Strongly disagree	1	0.2
Somewhat disagree	12	2.4
Not sure	64	12.9
Somewhat agree	186	37.4
Strongly agree	234	47.1
It is necessary to use the bleeding score tool to assess the risk of bleeding in AF patients before anticoagulant therapy		
Strongly disagree	5	1.0
Somewhat disagree	8	1.6
Not sure	55	11.1
Somewhat agree	161	32.4
Strongly agree	268	53.9
I am more concerned about the risk of bleeding in AF patients than the risk of stroke in AF patients		
Strongly disagree	52	10.5
Somewhat disagree	132	26.6
Not sure	122	24.5
Somewhat agree	143	28.8
Strongly agree	48	9.7
I think it's important for AF patients to "understand the risk of stroke and bleeding in patients with AF"		
Strongly disagree	4	0.8
Somewhat disagree	8	1.6
Not sure	48	9.7
Somewhat agree	155	31.2
Strongly agree	282	56.7
I think it's important for AF patients to "reduce the risk of stroke and bleeding due to atrial fibrillation"		
Strongly disagree	3	0.6
Somewhat disagree	10	2.0
Not sure	51	10.3
Somewhat agree	151	30.4
Strongly agree	282	56.7
It is safe to maintain the INR between 2.0 and 3.0 for warfarin anticoagulation therapy in NVAF patients		
Strongly disagree	18	3.6
Somewhat disagree	31	6.2
Not sure	122	24.5
Somewhat agree	171	34.4
Strongly agree	155	31.2
It is necessary to tell AF patients about medication and food that affect warfarin's anticoagulant effects		
Strongly disagree	1	0.2
Somewhat disagree	10	2.0
Not sure	57	11.5
Somewhat agree	134	27.0
Strongly agree	295	59.4

Table 4 (continued)

Attitude items	Frequency	Percentage %
I fully understand the views of AF patients on reducing the risk of stroke and bleeding caused by warfarin therapy		
Strongly disagree	1	0.2
Somewhat disagree	20	4.0
Not sure	70	14.1
Somewhat agree	228	45.9
Strongly agree	178	35.8
I think the new oral anticoagulant (NOAC) has a lower risk of bleeding than warfarin		
Strongly disagree	6	1.2
Somewhat disagree	22	4.4
Not sure	130	26.2
Somewhat agree	183	36.8
Strongly agree	156	31.4
I think the new oral anticoagulant (NOAC) is easier to administer than warfarin		
Strongly disagree	5	1.0
Somewhat disagree	32	6.4
Not sure	141	28.4
Somewhat agree	143	28.8
Strongly agree	176	35.4
I hope to have more Knowledge to discuss the advantages and disadvantages of stroke, bleeding risk and anticoagulation r		
Strongly disagree	1	0.2
Somewhat disagree	10	2.0
Not sure	60	12.1
Somewhat agree	159	32.0
Strongly agree	267	53.7
I think doctors can improve the standard anticoagulant treatment rate in AF patients after training atrial fibrillation		
Strongly disagree	1	0.2
Somewhat disagree	4	0.8
Not sure	47	9.5
Somewhat agree	128	25.8
Strongly agree	317	63.8

that the AF patient with coronary stent implantation for one month should often give antiplatelet and warfarin therapy (Table 5).

Participant's knowledge, attitude, and practice scores

Less than half of the participants (42.5%) reported poor knowledge grade. Most respondents (87.3%) reported a good attitude, whereas 68.6% indicated a fair practice grade. The mean score and standard deviation for knowledge, attitude, and practice were (48.18 ± 21.57), (81.54 ± 9.26), and (62.83 ± 12.42), respectively (Table 6).

Barriers and obstacles to starting OAC

The main obstacle to starting anticoagulant treatment in AF patients identified by participants was the fear of the risk of bleeding (55.5%) participants; however, monitoring coagulation function tests, drug-drug interactions, and fees of coagulation were identified by 48.1%, 44.7%, and 41.2%, respectively of respondents. Regarding the significant barrier affecting AF patients' compliance, fees of coagulation were reported by 77.5% of respondents. However, monitoring coagulation function tests, lack of medications, and fear of the risk of bleeding were indicated by 51.3%, 49.1%, and 44.3%, respectively (Fig. 1).

Demographic factors and participant's knowledge

From the total participants, 25.6% of males showed poor knowledge, whereas 14.9% of females showed fair knowledge. A good understanding was identified among 17.9% of those who live in the city, 11.5% of those with moderate monthly income, and 16.3% of singles. 35.4% of residents, 38.6% of participants with less than five years of practice, and 34.2% of those who didn't attend training reported poor knowledge. 11.3% of Participants with

Table 5 Participant practices when diagnosing and managing patients with AF

Practice items	Frequency	Percentage %
Have you ever made differential diagnosis according to the duration of the onset of atrial fibrillation		
Never	189	38.0
Sometimes	162	32.6
Often	124	24.9
Always	22	4.4
Have you ever made differential diagnosis between valvular AF and non-valvular AF in AF patients when you deal with AF		
Never	71	14.3
Sometimes	112	22.5
Often	129	26.0
Always	185	37.2
Do you use stroke risk score tools to assess stroke risk in AF patients?		
Never	77	15.5
Sometimes	104	20.9
Often	160	32.2
Always	156	31.4
Do you use bleeding risk score tools to assess bleeding risk in AF patients		
Never	78	15.7
Sometimes	117	23.5
Often	161	32.4
Always	141	28.4
For AF patients treated with warfarin, the INR is maintained at 1.1–2.0. Would you increase the warfarin dose for this p		
Never	62	12.5
Sometimes	163	32.8
Often	168	33.8
Always	104	20.9
For AF patients treated with warfarin, the INR is maintained at 3.5–5.5. Would you decrease the warfarin dose for this p		
Never	16	3.2
Sometimes	120	24.1
Often	177	35.6
Always	184	37.0
A 75-year-old male NVAF patient, with hypertension and no history of diabetes and cardiovascular disease, would you give this patient warfarin for anticoagulant treatment?		
Never	110	22.1
Sometimes	181	36.4
Often	154	31.0
Always	52	10.5
A 75-year-old female NVAF patient, with history of hypertension, congestive heart failure and TIA 3 years ago. Ultrasound indicated aortic atherosclerosis and atrial enlargement. Would you give this patient oral anticoagulant therapy		
Never	36	7.2
Sometimes	114	22.9
Often	162	32.6
Always	185	37.2
The AF patient in E8 item had gastrointestinal bleeding 3 months ago and has stopped bleeding for 1 week. Would you give this patient oral anticoagulant therapy?		
Never	163	32.8
Sometimes	168	33.8
Often	140	28.2
Always	26	5.2
The AF patient in E8 item had nosebleeds once and gum bleeds occasionally when brushing his teeth. Would you give this p		
Never	193	38.8

Table 5 (continued)

Practice items	Frequency	Percentage %
Sometimes	153	30.8
Often	120	24.1
Always	31	6.2
The AF patient in E8 item has taken coronary stent implantation for 1 month, would you give the patient dual antiplatelet and warfarin therapy		
Never	86	17.3
Sometimes	185	37.2
Often	162	32.6
Always	64	12.9
The AF patient in E8 item with ACS has taken coronary stent implantation and has been stable for 1 year. Would you give		
Never	55	11.1
Sometimes	167	33.6
Often	202	40.6
Always	73	14.7
A 68-year-old hypertensive female patient with recurrent episodes of paroxysmal atrial fibrillation and without previous		
Never	34	6.8
Sometimes	168	33.8
Often	206	41.4
Always	89	17.9
Have you often told AF patients who use warfarin therapy about the food and drugs that interacts with warfarin?		
Never	81	16.3
Sometimes	128	25.8
Often	143	28.8
Always	145	29.2
Have you ever actively communicated with AF patients with about increasing the risk of AF-related stroke and anticoagulation		
Never	89	17.9
Sometimes	129	26.0
Often	158	31.8
Always	121	24.3
Have you ever used different methods, such as pamphlets, health lectures and education, to educate AF patients about the		
Never	236	47.5
Sometimes	129	26.0
Often	83	16.7
Always	49	9.9
Have you ever attended relevant training or learned lectures about atrial fibrillation diseases and anticoagulation		
Never	234	47.1
Sometimes	112	22.5
Often	89	17.9
Always	62	12.5
Will you attend the training about AF disease and anticoagulation therapy?		
Never	31	6.2
Sometimes	85	17.1
Often	246	49.5
Always	135	27.2

1–9 AF patients in the past year indicated fair awareness. Good awareness was noticed among 6.8% of respondents who stated their AF patients aged 60–69 years, while 11.9% of participants who addressed 40–69% of their AF patients taking aspirin showed fair knowledge (Table 7). Doctors who attended training had a better knowledge score than those who did not (mean ± S.D. = 57.24 ± 20.7).

Table 6 The scores of the KAP questionnaire (Knowledge, Attitude, and practice) of the participants

Item	Frequency	Percentage %
Knowledge grade		
Poor	211	42.5
Fair	175	35.2
Good	111	22.3
Knowledge score (mean ± standard deviation)		
48.18 ± 21.57		
Attitude grade		
Poor	1	0.2
Fair	62	12.5
Good	434	87.3
Attitude score (mean ± standard deviation)		
81.54 ± 9.26		
Practice grade		
Poor	30	6.0
Fair	341	68.6
Good	126	25.4
Practice score (mean ± standard deviation)		
62.83 ± 12.42		

Demographic factors and participant's attitude

A good attitude was identified among 55.3% of males and 81.4% among those aged 20–35. 36.2% of participants had a good monthly income and 71.4% of singles reported good attitudes. A fair attitude was noticed among 11.3% of residents and 12.1% of those with less than 5 years of practice. 27.0% of participants with 1–9 AF patients in the past year indicated good attitude. Furthermore, a good attitude was noticed among 25.6% of respondents who stated their AF patients aged between 60 and 69 years, while 19.9% of participants who addressed 40–69% of their AF patients taking aspirin showed a good attitude. (Table 8). Participants who stated that over 70% of their AF patients use aspirin received the highest attitude score (mean ± S.D = 86.98 ± 21.17).

Demographic factors and participant's practices

Only 4.6% of males showed poor practice, whereas 28.8% of females showed fair practice. Good practice was identified among 20.5% of those who live in the city, 11.1% of those with moderate monthly income, and 18.3% of singles. 61.8% of residents, 63.0% of participants with less than five years of practice, and 47.9% of those who didn't attend training reported fair practice. 7.5% of Participants with 1–9 AF patients in the past year indicated good practice. Fair practice was noticed among 17.5% of respondents who stated their AF patients aged between 60 and 69 years, while only 3.6% of participants who addressed 40–69% of their AF patients taking aspirin showed good practice (Table 9). PhD participants reported higher practice scores than those with other educational backgrounds (mean ± S.D = 73.96 ± 11.3).

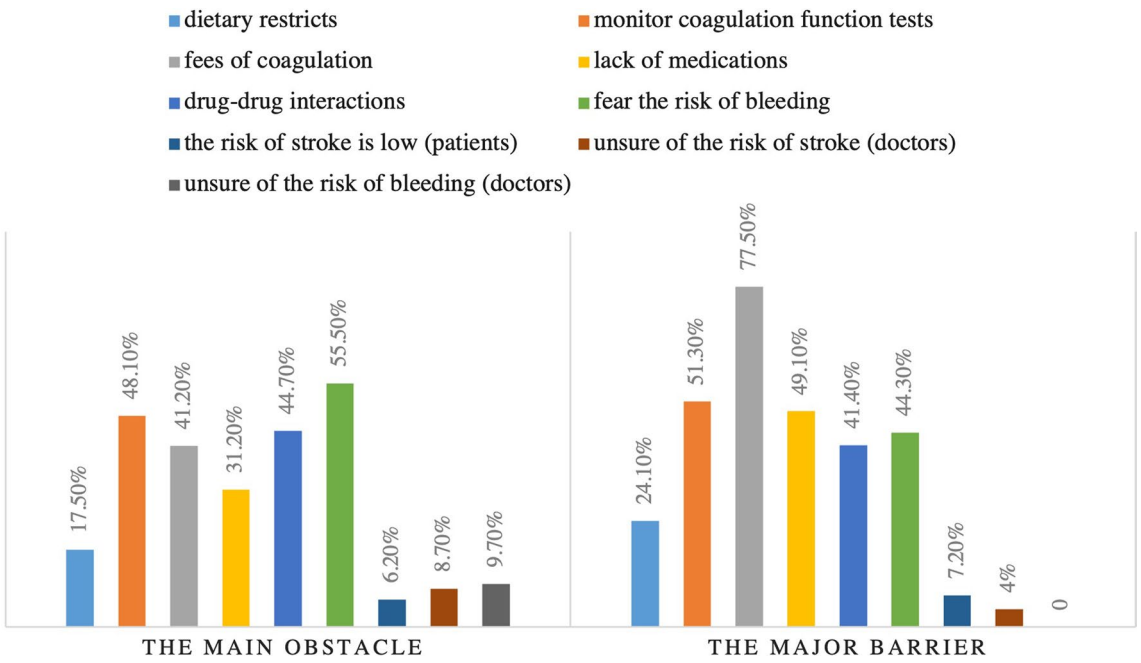

Fig. 1 The main obstacles for starting OAC therapy and barriers affecting patients' compliance

Table 7 The Knowledge of primary care physicians of OAC therapy in NVAF patients based on demographic characteristics

Statement	Knowledge grade					
	Poor		Fair		Good	
	N	%	*N*	%	*N*	%
Gender						
Male	127	25.6	101	20.3	83	16.7
Female	84	16.9	74	14.9	28	5.6
Age						
20–35	192	39.2	160	32.7	107	21.8
36–50	15	3.1	7	1.4	3	0.6
51–65	2	0.4	4	0.8	0	0.0
Residence						
Rural	51	10.3	44	8.9	22	4.4
Urban	160	32.2	131	26.4	89	17.9
Monthly income						
Poor	11	2.2	8	1.6	9	1.8
Moderate	94	18.9	85	17.1	57	11.5
Good	95	19.1	76	15.3	40	8.0
Excellent	11	2.2	6	1.2	5	1.0
Educational level						
Medical school graduate	174	35.0	143	28.8	83	16.7
Master's degree	36	7.2	28	5.6	25	5.0
Ph.D. degree	1	0.2	4	0.8	3	0.6
Types of CHS centers						
The rural	6	1.2	5	1.0	1	0.2
The urban	121	24.3	115	23.1	61	12.3
The urban–rural	84	16.9	55	11.1	49	9.9
Professional title						
Resident	176	35.4	150	30.2	89	17.9
Physician	33	6.6	24	4.8	22	4.4
Associate senior physician	2	0.4	0	0.0	0	0.0
Chief physician	0	0.0	1	0.2	0	0.0
Years of working experience						
< 5 years	192	38.6	151	30.4	90	18.1
5–10 years	11	2.2	18	3.6	15	3.0
10–15 years	8	1.6	2	0.4	5	1.0
15–20 years	0	0.0	1	0.2	1	0.2
20–25 years	0	0.0	1	0.2	0	0.0
> 25 years	0	0.0	2	0.4	0	0.0
Attending training						
No	170	34.2	109	21.9	49	9.9
Yes	41	8.2	66	13.3	62	12.5
How many AF patients do you have in the past year?						
No one	105	21.2	32	6.5	23	4.6
1–9	61	12.3	56	11.3	30	6.0
10–19	20	4.0	40	8.1	20	4.0
20–49	21	4.2	24	4.8	11	2.2
50–99	3	0.6	14	2.8	16	3.2
100–149	1	0.2	5	1.0	2	0.4
≥ 150	0	0.0	4	0.8	8	1.6

Table 7 (continued)

Statement	Knowledge grade					
	Poor		Fair		Good	
	N	%	*N*	%	*N*	%
Which age group are your AF patients in?						
< 50	3	0.6	7	1.4	1	0.2
50–59	45	9.1	66	13.3	22	4.4
60–69	51	10.3	50	10.1	34	6.8
70–79	2	0.4	7	1.4	19	3.8
Others	110	22.1	45	9.1	35	7.0
How many of your AF patients take aspirin?						
< 5%	15	4.5	18	5.3	12	3.6
5–9%	28	8.3	17	5.0	8	2.4
10–19%	19	5.6	23	6.8	15	4.5
20–39%	13	3.9	23	6.8	25	7.4
40–69%	20	5.9	40	11.9	9	2.7
≥ 70%	11	3.3	22	6.5	19	5.6
How many of your AF patients take warfarin?						
< 5%	57	16.9	85	25.2	48	14.2
5–9%	19	5.6	20	5.9	14	4.2
10–19%	15	4.5	17	5.0	9	2.7
20–39%	9	2.7	14	4.2	12	3.6
40–69%	4	1.2	7	2.1	5	1.5
≥ 70%	2	0.6	0	0.0	0	0.0

N number % percentage

Factors associated with knowledge score

In the binary logistic regression analysis, out of fourteen variables, only six predictors were statistically significant for predicting adequate knowledge of primary care physicians (PCPs) in anticoagulant therapy for NVAF patients (p-value < 0.05). Females were less expected to have good Knowledge than males (OR = 0.525). Respondents aged 36–50 years were less likely to have good Knowledge than those aged between 20 and 35 (OR = 0.038). Participants attending training had higher odds of understanding 2.369 times than those who didn't (Table 10).

Factors associated with attitude score

The Attitude of PCPs in anticoagulant therapy for NVAF patients was statistically correlated to two variables in the binary logistic regression analysis (p-value < 0.05). Participants with good practice grades were 5.872 times more likely to have a good attitude than those with bad\fair practice grades (Table 11).

Factors associated with practice score

We identified a statistically significant correlation between an adequate level of practice and four variables in the binary logistic regression (p-value < 0.05). Physicians were more likely to have good practice than residents (OR = 5.679). Participants who scored good knowledge grades had higher odds of having good practice than those with bad\fair knowledge grades (OR = 4.143) (Table 12).

Discussion

The risk of developing atrial fibrillation (AF) rises with age; it is the most common kind of cardiac arrhythmia affecting people over 60 [18]. According to the Global Burden of Disease Study findings conducted in 2010, more than one-third of all patients suffering from AF are above 80 [19].

The current study was aimed at evaluating Syrian physicians' knowledge, attitude, and practice regarding the use of anticoagulant therapy in NVAF patients and how their demographic characteristics may significantly impact it. Overall, the study findings indicate that Syrian physicians showed suboptimal knowledge and understanding regarding the diagnosis of AF and screening of bleeding risk, where 35% had a fair knowledge score. Furthermore, the results suggested that younger participants and those attending training exhibited better knowledge. Additionally, higher knowledge scores correlated with

Table 8 The attitudes of PCP of OAC therapy in NVAF patients based on demographic characteristics

Statement	Attitude grade					
	Poor		Fair		Good	
	N	%	*N*	%	*N*	%
Gender						
Male	0	0.0	36	7.2	275	55.3
Female	1	0.2	26	5.2	159	32.0
Age						
20–35	1	0.2	59	12.0	399	81.4
36–50	0	0.0	2	0.4	23	4.7
51–65	0	0.0	0	0.0	6	1.2
Residence						
Village	0	0.0	4	0.8	113	22.7
City	1	0.2	58	11.7	321	64.6
Monthly income						
Poor	0	0.0	0	0.0	28	5.6
Moderate	0	0.0	27	5.4	209	42.1
Good	0	0.0	31	6.2	180	36.2
Excellent	1	0.2	4	0.8	17	3.4
Educational level						
Medical school graduate	1	0.2	56	11.3	343	69.0
Master's degree	0	0.0	6	1.2	83	16.7
PhD degree	0	0.0	0	0.0	8	1.6
Types of CHS centers						
The rural	0	0.0	1	0.2	11	2.2
The urban	1	0.2	38	7.6	258	51.9
The urban–rural	0	0.0	23	4.6	165	33.2
Professional title						
Resident	1	0.2	56	11.3	358	72.0
Physician	0	0.0	6	1.2	73	14.7
Associate senior physician	0	0.0	0	0.0	2	0.4
Chief physician	0	0.0	0	0.0	1	0.2
Years of working experience						
< 5 years	1	0.2	60	12.1	372	74.8
5–10 years	0	0.0	2	0.4	42	8.5
10–15 years	0	0.0	0	0.0	15	3.0
15–20 years	0	0.0	0	0.0	2	0.4
20–25 years	0	0.0	0	0.0	1	0.2
> 25 years	0	0.0	0	0.0	2	0.4
Attending training						
No	0	0.0	50	10.1	278	55.9
Yes	1	0.2	12	2.4	156	31.4
B1 How many of AF patients do you have in the past year?						
No one	1	0.2	43	8.7	116	23.4
1–9	0	0.0	13	2.6	134	27.0
10–19	0	0.0	3	0.6	77	15.5
20–49	0	0.0	2	0.4	54	10.9
50–99	0	0.0	1	0.2	32	6.5
100–149	0	0.0	0	0.0	8	1.6
≥ 150	0	0.0	0	0.0	12	2.4

Table 8 (continued)

Statement	Attitude grade					
	Poor		Fair		Good	
	N	%	*N*	%	*N*	%
B2 Which age group are your AF patients in?						
< 50	0	0.0	1	0.2	10	2.0
50–59	0	0.0	8	1.6	125	25.2
60–69	0	0.0	8	1.6	127	25.6
70–79	0	0.0	2	0.4	26	5.2
Others	1	0.2	43	8.7	146	29.4
B3 How many of your AF patients take aspirin?						
< 5%	0	0.0	4	1.2	41	12.2
5–9%	0	0.0	4	1.2	49	14.5
10–19%	0	0.0	4	1.2	53	15.7
20–39%	0	0.0	5	1.5	56	16.6
40–69%	0	0.0	2	0.6	67	19.9
≥ 70%	0	0.0	0	0.0	52	15.4
B4 How many of your AF patients take warfarin?						
< 5%	0	0.0	9	2.7	181	53.7
5–9%	0	0.0	3	0.9	50	14.8
10–19%	0	0.0	4	1.2	37	11.0
20–39%	0	0.0	2	0.6	33	9.8
40–69%	0	0.0	1	0.3	15	4.5
≥ 70%	0	0.0	0	0.0	2	0.6

N number %: percentage

better practice, while better practice scores were linked to better attitudes.

According to the study, a much lower percentage of Syrians diagnosed with AF sought medical care in community clinics than the expected number of Syrians who had AF. According to the survey results, 20.5% of physicians recommend aspirin to between 40 and 69% of their patients. This finding is particularly striking compared to the findings of a study in China, where 41.6% of primary care physicians employed aspirin as an OAC therapy for more than 70% of their NVAF patients. In addition, between 20 and 39% of those diagnosed with AF had reevaluation by 10.4% of the study's participants to initiate warfarin treatment. According to the findings of the Chinese research, however, just 0.4% of primary care physicians administered warfarin as an OAC medication to more than 70% of their patients who had NVAF [17]. This knowledge gap was further demonstrated in a recent study among physicians [20].

Elderly adults with AF need antithrombotic therapy to reduce the chance of a stroke Patients in the community diagnosed with NVAF should discuss with their PCPs the possibility of taking the anticoagulant warfarin [21]. The findings of this study show that PCPs have an insufficient grasp of the anticoagulant therapy options available for patients with NVAF. Despite this, most responders (87.3%) reported having a positive mindset. Our findings are corroborated by the results of another study, which found that 89.8% of PCPs there got excellent ratings in the survey's component that measured attitude [17]. Moreover, an Iraqi study conveyed positive attitudes toward the use of OAC for NVAF patients, despite lacking in knowledge, further verifying the current study findings [22].

This study identified that not all PCPs knew how to identify AF, and some do not frequently utilize evaluation techniques to evaluate the relevant risks faced by patients with NVAF in their clinical practice. It was observed that patients with NVAF needed a greater understanding of such methods for calculating the risk of stroke and bleeding. Based on this observation, we concluded that the treatment of OAC therapy in patients with NVAF was not optimal.

Anticoagulant treatment with warfarin has several drawbacks including the impact of variability, which is connected to clinical and hereditary variables and drug-drug and drug-food interactions [23]. However, drug-drug interactions were found in 41.2% of the cases despite these limits, which are critical for patient education. This occurs less often than in research from China

Table 9 The practice of primary care physicians of OAC therapy in NVAF patients based on demographic characteristics

Statement	Practice grade					
	Poor		Fair		Good	
	N	%	*N*	%	*N*	%
Gender						
Male	23	4.6	198	39.8	90	18.1
Female	7	1.4	143	28.8	36	7.2
Age						
20–35	30	6.1	318	64.9	111	22.7
36–50	0	0.0	14	2.9	11	2.2
51–65	0	0.0	2	0.4	4	0.8
Residence						
Village	14	2.8	79	15.9	24	4.8
City	16	3.2	262	52.7	102	20.5
Monthly income						
Poor	1	0.2	19	3.8	8	1.6
Moderate	10	2.0	171	34.4	55	11.1
Good	19	3.8	137	27.6	55	11.1
Excellent	0	0.0	14	2.8	8	1.6
Educational level						
Medical school graduate	30	6.0	294	59.2	76	15.3
Master's degree	0	0.0	44	8.9	45	9.1
Ph.D. degree	0	0.0	3	0.6	5	1.0
Types of CHS centers						
The rural	2	0.4	9	1.8	1	0.2
The urban	4	0.8	215	43.3	78	15.7
The urban–rural	24	4.8	117	23.5	47	9.5
Professional title						
Resident	30	6.0	307	61.8	78	15.7
Physician	0	0.0	32	6.4	47	9.5
Associate senior physician	0	0.0	2	0.4	0	0.0
Chief physician	0	0.0	0	0.0	1	0.2
Years of working experience						
< 5 years	30	6.0	313	63.0	90	18.1
5–10 years	0	0.0	21	4.2	23	4.6
10–15 years	0	0.0	5	1.0	10	2.0
15–20 years	0	0.0	1	0.2	1	0.2
20–25 years	0	0.0	0	0.0	1	0.2
> 25 years	0	0.0	1	0.2	1	0.2
Attending training						
No	30	6.0	238	47.9	60	12.1
Yes	0	0.0	103	20.7	66	13.3
B1 How many AF patients do you have in the past year?						
No one	29	5.8	116	23.4	15	3.0
1–9	1	0.2	109	22.0	37	7.5
10–19	0	0.0	53	10.7	27	5.4
20–49	0	0.0	38	7.7	18	3.6
50–99	0	0.0	17	3.4	16	3.2
100–149	0	0.0	3	0.6	5	1.0
≥ 150	0	0.0	5	1.0	7	1.4

Table 9 (continued)

Statement	Practice grade					
	Poor		Fair		Good	
	N	%	*N*	%	*N*	%
B2 Which age group are your AF patients in?						
< 50	0	0.0	9	1.8	2	0.4
50–59	1	0.2	97	19.5	35	7.0
60–69	0	0.0	87	17.5	48	9.7
70–79	0	0.0	16	3.2	12	2.4
Others	29	5.8	132	26.6	29	5.8
B3 How many your AF patients take aspirin?						
< 5%	0	0.0	27	8.0	18	5.3
5–9%	0	0.0	36	10.7	17	5.0
10–19%	0	0.0	35	10.4	22	6.5
20–39%	0	0.0	38	11.3	23	6.8
40–69%	0	0.0	57	16.9	12	3.6
≥ 70%	1	0.3	32	9.5	19	5.6
B4 How many your AF patients take warfarin?						
< 5%	1	0.3	128	38.0	61	18.1
5–9%	0	0.0	34	10.1	19	5.6
10–19%	0	0.0	30	8.9	11	3.3
20–39%	0	0.0	21	6.2	14	4.2
40–69%	0	0.0	11	3.3	5	1.5
≥ 70%	0	0.0	1	0.3	1	0.3

N number % percentage

when 65.58% of PCPs gave incorrect answers to questions about the variables, genes, medicines, and nutrition that were likely to interact with warfarin [17].

Stroke and bleeding risk must be assessed before starting OAC therapy for NVAF. PCPs caring for patients with NVAF should weigh the risks of bleeding against the potential benefits of avoiding strokes when making treatment decisions. The best possible therapy choice may then be made. Even though the CHADS2-VASc score and the HAS-BLED score are crucial tools in generating such clinical judgments, most participants lacked an in-depth understanding of both measures. Therefore, we promote continued education among community-based PCPs, especially in using simple scoring systems to enhance clinical decision-making. In a recent study, PCPs admitted they utilized the HASBLED score and the CHA2DS2-VASc score to determine the patient's risk of bleeding and stroke, which also affected their decision to start anticoagulants which agrees with the findings of the current study [24].

Our findings indicate that 68.6% of respondents reported being at an appropriate level of practice for their roles, and 87.3% said they had a positive attitude. Thus, most likely, a lack of education was to blame for the underuse of OAC in NVAF patients. The average score for practicality was 83.33, with chief medical officers and those with 20 + years of experience scoring higher than those with less experience.

The results of the current study highlight the impact of training on knowledge level, where it reveals that respondents who received training had better knowledge scores compared to those without. This is consistent with previous studies where education and training were proven essential for ensuring optimal AF therapy [20]. Furthermore, research has demonstrated the importance of the role of training in enhancing PCP, knowledge in AF management [16].

The current findings revealed that the main obstacle to initiating anticoagulant treatment in AF was the fear of bleeding risk while the major barrier to OAC compliance was found to be coagulation fees followed by monitoring coagulation function tests, which complies with previous reported evidence [22, 25].

Community hospital PCPs in urban and rural regions scored best in Knowledge, followed by their urban counterparts, and finally by their rural counterparts in the country's geographic center. Previous research conducted in China [17] demonstrates similar results. Central urban areas have more medical resources when comparing center urban regions to urban–rural

Table 10 Binary logistic regression between demographic characteristics of the study population and Knowledge of PCPs in anticoagulant therapy for NVAF patients

Poor and fair vs. good								
Statement	***P*-value**	**COR**	**Lower**	**Upper**	***P*-value**	**AOR**	**Lower**	**Upper**
Gender								
Male	Reference							
Female	.003	.487	.303	.782	.019*	.525	.307	.899
Age								
20–35	Reference							
36–50	.200	.449	.132	1.528	.016*	.038	.003	.545
51–65	–	–	–	–	–	–	–	–
Residence								
Village	Reference							
City	.295	1.321	.784	2.224	.311	1.382	.739	2.584
Monthly income								
Poor	Reference							
Moderate	.358	.672	.288	1.569	.511	.714	.262	1.948
Good	.110	.494	.208	1.172	.146	.469	.169	1.301
Excellent	.463	.621	.174	2.220	.435	.548	.121	2.483
Educational level								
Medical school graduate	Reference							
Master's degree	.133	1.492	.886	2.513	.350	1.571	.609	4.050
PhD degree	.263	2.292	.537	9.785	.543	1.842	.257	13.173
Types of CHS centers								
The Rural	Reference							
The urban	.322	2.843	.360	22.451	.960	.946	.112	8.026
The urban–rural	.200	3.878	.488	30.818	.708	1.502	.179	12.602
Professional title								
Resident	Reference							
Physician	.213	1.414	.820	2.438	.128	.426	.142	1.278
Associate senior physician	–	–	–	–	–	–	–	–
Chief physician	–	–	–	–	–	–	–	–
Years of experience								
5 >	Reference							
5–10	.046	1.971	1.014	3.834	.335	1.590	.620	4.079
10–15	.250	1.906	.635	5.715	.088	12.504	.684	228.737
15 <	.966	.953	.105	8.630	.058	20.570	.906	467.233
Attending training								
No	Reference							
Yes	.000	3.299	2.134	5.102	.001*	2.369	1.424	3.940
Attitude grade								
Bad\fair	Reference							
Good	.729	1.122	.585	2.150	.111	.545	.258	1.150
Practice grade								
Bad\fair	Reference							
Good	.000	4.357	2.772	6.851	.000*	3.973	2.285	6.908

*Statistically significant value-*P*-value ≤ 0.05, *COR* crude odds ratio, *AOR* adjusted odds ratio

Table 11 Binary logistic regression between Baseline Characteristics of the study population and Attitude of PCPs in anticoagulant therapy for NVAF patients

Poor and fair vs. good								
	***P*-value**	**COR**	**Lower**	**Upper**	***P*-value**	**AOR**	**Lower**	**Upper**
Gender								
Male	Reference							
Female	.341	.771	.451	1.317	.303	.727	.396	1.333
Age								
20–35	Reference							
36–50	.465	1.729	.398	7.523	.331	.244	.014	4.197
51–65	–	–	–	–	1.000	.175	.000	
Residence								
Rural	Reference							
Urban	.002	.193	.068	.542	.002*	.181	.062	.531
Monthly income								
Poor	Reference							
Moderate	–	–	–	–	–	–	–	–
Good	–	–	–	–	–	–	–	–
Excellent	–	–	–	–	–	–	–	–
Educational level								
Medical school graduate	Reference							
Master's degree	.062	2.299	.959	5.513	.086	4.438	.809	24.341
Ph.D. degree	–	–	–	–	–	–	–	–
Types of CHS centers								
The Rural	Reference							
The Urban	.631	.601	.076	4.788	.516	.472	.049	4.551
The urban–rural	.689	.652	.080	5.289	.497	.453	.046	4.448
Professional title								
Resident	Reference							
Physician	.140	1.937	.805	4.661	.086	.254	.053	1.215
Associate senior physician	–	–	–	–	–	–	–	–
Chief physician	–	–	–	–	–	–	–	–
Years of experience								
5 >	Reference							
5–10	.093	3.444	.813	14.594	.387	2.878	.263	31.514
10–15	–	–	–	–	–	–	–	–
15 <	–	–	–	–	–	–	–	–
Attending training								
No	Reference							
Yes	.019	2.158	1.137	4.097	.098	1.852	.893	3.838
Knowledge grade								
Bad\fair	Reference							
Good	.729	1.122	.585	2.150	.212	.609	.280	1.326
Practice grade								
Bad\fair	Reference							
Good	.001	5.768	2.051	16.221	.002*	5.872	1.883	18.305

*Statistically significant value-*P*-value ≤ 0.05, *COR* crude odds ratio, *AOR* adjusted odds ratio

Table 12 Binary logistic regression between Baseline Characteristics of the study population and Practice of PCPs in anticoagulant therapy for NVAF patients

	Poor and fair vs. good							
	***P*-value**	**COR**	**Lower**	**Upper**	***P*-value**	**AOR**	**Lower**	**Upper**
Gender								
Male	Reference							
Female	.018	.589	.380	.914	.941	1.020	.610	1.704
Age								
20–35	Reference							
36–50	.031	2.463	1.087	5.582	.054	.236	.054	1.027
51–65	.035	6.270	1.133	34.695	.645	.532	.036	7.808
Residence								
Rural	Reference							
Urban	.170	1.422	.860	2.351	.269	1.423	.762	2.657
Monthly income								
Poor	Reference							
Moderate	.537	.760	.317	1.820	.705	.827	.309	2.213
Good	.778	.881	.367	2.116	.832	1.113	.414	2.988
Excellent	.558	1.429	.433	4.717	.604	1.470	.342	6.311
Educational level								
Medical school graduate	Reference							
Master's degree	.000	4.360	2.685	7.080	.553	1.317	.529	3.279
Ph.D. degree	.008	7.105	1.662	30.381	.976	1.031	.143	7.439
Types of CHS centers								
The rural	Reference							
The urban	.195	3.918	.498	30.843	.344	2.877	.323	25.665
The urban–rural	.219	3.667	.461	29.161	.384	2.642	.296	23.594
Professional title								
Resident	Reference							
Physician	.000	6.346	3.802	10.592	.000*	5.679	2.138	15.084
Associate senior physician	–	–	–	–	–	–	–	–
Chief physician	–	–	–	–	–	–	–	–
Years of experience								
5 >	Reference							
5–10	.000	4.174	2.211	7.880	.203	1.816	.725	4.547
10–15	.000	7.622	2.541	22.860	.317	2.548	.408	15.927
15 <	.058	5.717	.941	34.729	.854	1.301	.078	21.609
Attending training								
No	Reference							
Yes	.000	2.862	1.886	4.343	.029*	1.750	1.059	2.892
Knowledge grade								
Bad\fair	Reference							
Good	.000	4.357	2.772	6.851	.000*	4.143	2.394	7.169
Attitude grade								
Bad\fair	Reference							
Good	.001	5.768	2.051	16.221	.003*	5.496	1.816	16.630

*Statistically significant value-*P*-value ≤ 0.05, *COR* crude odds ratio, *AOR* adjusted odds ratio

intersections and rural areas [26]. On the other hand, in a previous study, PCPs working in rural regions had a higher practice score in comparison to those working in urban centers. This contradiction may be explained by the small number of PCPs in the mentioned study hindering the generalization of this finding [22].

As a result, many people with NVAF are encouraged by this aspect to seek care at the best facilities. Suburban residents have a low health literacy [27], which leaves primary care physicians in urban and rural regions with fewer patients suffering from NVAF. This might be why PCPs in the central urban and rural areas have lower average test results. However, there needs to be appropriate research conducted to explain these findings. Our study's sample size may be increased to evaluate these elements better.

The current study and previous reports identifying physician prescribing patterns helps enforce the importance of clinical decision-making and physician knowledge in appropriate anticoagulant prescribing [28].

Limitations

This is the first cross-sectional observational research of KAPs for PCPs on OAC treatment in patients with NVAF in Syria. We included a suitable sample size to decrease bias and analysis errors. However, as our study design is cross-sectional, the limitations consisted of difficulty in making causal inferences, the determined analysis relationships might be difficult to interpret, and susceptibility to nonresponse and recall biases. Furthermore, the significant reliance on mainly social media platforms for data collection may have introduced selection bias since it excludes those who could not be reached through those platforms.

Conclusion

OAC treatment effectively prevented embolization in patients with NVAF due to the understanding and actions of PCPs. This study showed that PCPs in Syria who participated had optimistic views and attitudes, despite suboptimal knowledge. The results indicated that participants attending training demonstrated better knowledge suggesting that training interventions aimed at PCPs play a crucial role in improving the treatment of patients with NVAF. Furthermore, higher knowledge scores correlated with better practice, while better practice scores were linked to better attitudes.

Abbreviations

AF	Atrial fibrillation
OAC	Oral anticoagulant
NVAF	Non-valvular Atrial fibrillation
KAP	Knowledge, attitude, and practices
AHRE	Atrial high-rate events
ESC	European Society of Cardiology
NOAC	New oral anticoagulants
INR	International normalized ratio
SPSS	Statistical package for the social sciences
CHADS2-VASc	Congestive heart failure, hypertension, age ≥ 75 (doubled), diabetes, stroke (doubled), vascular disease score
HAS-BLED	Hypertension, abnormal renal/liver function, stroke, bleeding history or predisposition, labile INR, elderly, drugs/alcohol concomitantly
ECG	Electrocardiogram
PCP	Primary care physicians
ORBIT	Outcomes registry for better informed treatment of atrial fibrillation

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Author contributions

SS, YA, HB, and HA contributed to the conception and design of the study. MNN, NJ, AI, and BD collected, distributed, and organized the data sets. EM and SM analyzed the study data. BS and WH prepared the first draft of the manuscript. The final manuscript was revised by NOES and EAW. All the authors approved the final version of the manuscript.

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Availability of data and material

The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

The Syrian Ethical Society for Scientific Research provided ethical approval. Ref. No.: HN/47-15 and consent was received from participants prior to study inclusion.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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