

The study on knowledge-attitude-practice of primary care physician toward anticoagulant therapy in patients with Non-valvular atrial fibrillation in Shanghai of China

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Abstract

Background: As the large number of Community Health Service (CHS) centers in China face the majority of non-valvular atrial fibrillation (NVAF) patients, primary care physicians (PCPs) play the primary role in the prevention of embolization. Therefore, an awareness of anticoagulant management in NVAF patients must be brought into focus among PCPs in China. This study will investigate PCPs' Knowledge, Attitude and Practice toward anticoagulant therapy in patients with NVAF and help PCPs increase their awareness of oral anticoagulant (OAC) therapy for NVAF to prevent embolization.

Method: This was a cross-sectional observational study of 462 PCPs in CHS centers across Shanghai. We used a self-administered questionnaire to collect data from September to December 2017. A stratified random cluster sampling was adopted in the 90 CHS centers with the family medicine residency program.

Result: Among 462 participants, 69.3% (320/462) of females got a medical bachelor's degree and over 50% participants had more than 10 years of work experience.

According to similar study, each section for knowledge, attitude, and practice were categorized as poor ($\leq 39.0\%$), fair ($40.0\% - 69.0\%$), and good ($\geq 70.0\%$)^[18].

The level of knowledge of OAC therapy in patients with NVAF among PCPs was insufficient in over half (75.8%) of participants. The majority (89.8%) of PCPs had a positive attitude and 68.0% had modest performance in the anticoagulant management of patients with NVAF.

Conclusion: The knowledge and behaviors of PCPs were insufficient in OAC therapy to prevent embolization in patients with NVAF. The study also revealed there is good potential for PCPs' educational interventions to positively impact on the care of patients with NVAF.

Background

Atrial Fibrillation (AF) is the most common type of cardiac arrhythmias, especially in the elderly, and its prevalence increases with age^[1]. According to the 2010 Global Burden of Disease Study, the number of AF patients worldwide is 33 million, of which more than 13% were over 80-years of age^[2]. The incidence of stroke in patients with AF is six times higher than those without AF, due to atrial contractile dysfunction and mural thrombosis formation^[3,4]. The burden of AF and associated strokes in China have increased significantly in recent years. The prevalence of AF has grown 20-fold, while the prevalence of AF-associated stroke has increased 13-fold in the past 11 years^[1,5]. Nearly 10 million AF patients live in China, NVAF is the most common type of AF, about 62.5%.^[1] More than 24.8% AF patients in China have suffered ischemic strokes^[3], and AF patients with stroke are generally characterized by high morbidity, mortality, disability, and recurrence rates. These features make anticoagulant therapy a high priority for stroke-prevention strategies of AF^{[6][7]}.

Substantial research shows that oral anticoagulant (OAC) therapy can greatly reduce the risk of stroke in AF patients, and reduce the relative risk of ischemic stroke by about 62% [3][8]. However, the current situation to OAC therapy in patients with NVAF in China is unsatisfactory, particularly in primary care settings [3]. In 2002, one Chinese study suggested that only 2% of patients with NVAF were on OAC therapy [3,9], while another study found that less than 3% of 224 AF patients were on such therapy [6]. Additionally, a mere 11.2% of AF patients in China were on OAC therapy from 2008-2011 according to the RE-LY study [10,11].

The standardization of OAC therapy in NVAF management is still in the initial stages in China [6]. China hadn't established OAC therapy guidelines to instruct physicians how to manage patients with NVAF. Moreover, doctors from different regions and hospitals lack consistency when providing advice to patients with NVAF regarding OAC use [6].

To improve the prognoses of patients with NVAF, it is important to strengthen the use of OAC therapy in the long-term management of NVAF and actively follow-up with continuous health education programs [6,12]. CHS centers are indispensable due to their vast coverage, accessibility and convenience for disease prevention [13]. PCPs in CHS centers play a vital role in achieving the prevention of stroke related with AF. The diagnosis and treatment of NVAFs are not standardized in most CHS centers [13, 14], and an awareness of anticoagulant management in patients with NVAF must be brought into focus among PCPs in China.

So far, inadequate studies and analyses of the influencing factors have been performed in PCPs' knowledge, attitude and practice (KAP) concerning anticoagulant management in patients with NVAF. We aimed to investigate the KAPs of PCPs in CHS centers of Shanghai and identify the influencing factors.

Methods

Sample size

A sample size was set at 384 based on the formula ($N=$). We set π to 0.5 and set $\alpha \leq 0.05$ as the threshold [15]. δ is permissible error which equaling to 0.1π . A total of 460 participants were enrolled in the study, allowing for a 10% non-response rate, a 10% invalid return rate, and limited research fees.

Study setting and population

Our cross-sectional survey adopted stratified random cluster sampling among PCPs working in CHS centers of Shanghai from September to December 2017. The ratio of urban, urban-rural, and rural CHS centers in 245 centers of Shanghai including 90 CHS centers with family medicine residency programs was 80:84:81, which is equal to 1:1:1. We used the random number table to choose CHS centers in a 1:1:1 ratio from the 90 CHS centers.

The inclusion criterion of participants were: 1) worked in 90 CHS centers from September to December 2017; 2) registered as General Practice; 3) agreeing to participate in the study and willing to provide written informed consent.

Questionnaires

We used a self-administered questionnaire which was composed of four parts (seen in supplementary 3) to collect data from PCPs in the Shanghai community. The questionnaire was developed according to the theory of KAP^[16,17]. Based on the theory, the KAP questionnaire was divided into three sections, including knowledge, attitudes, and practices toward anticoagulation in patients with NVAf. The original items of the questionnaire were generated from the results of literature reviews which include 74 items—knowledge—24 items—attitude—27 items—and practice—23 items—. The items were screened during two rounds of consultations, which is called the Delphi technique [18]. After the second round consultation, the new KAP questionnaire in our study was constructed, including 52 items. The expert authority coefficient—Cr—was 0.87, The coefficient of variation (CV) of knowledge dimension—attitude dimension—practice dimension was 0.02 to 0.10—0.03 to 0.10—0.03 to 0.10—respectively [19]. The clarity and intelligibility of each item of the KAP questionnaire were pre-tested.

Each score within the Knowledge section of the KAP questionnaire was based on the following: a score of one was given for one correct answer; A score of zero was given to incorrect or uncertain answers. A five-point Likert scale from 1 (completely disagree) to 5 (completely agree) was used with a neutral midpoint for each question of the A section, except item D4 whose answer was opposite to the others. A four-point Likert scale from 1 (never) to 4 (always) was used for each question in section P. According to similar study, each section for knowledge, attitude, and practice were categorized as poor ($\leq 39.0\%$), fair (40.0%–69.0%), and good ($\geq 70.0\%$)^[20].

Data collection

Questionnaires required approximately 10–20 minutes for PCPs to complete. All data collection teams participated in a training workshop. The investigators who collected the data did not participate directly in the management of the PCPs. The questionnaires were requested to be completed independently on site and collected on time. Questionnaires with repetitive patterns of answers or those in which all responses were the same were excluded following manual assessments. Data collection was conducted from September to December 2017. Following the collection of questionnaires, all data were entered into an EpiData 3.1 Database.

Data analysis

Descriptive analyses were conducted using SPSS statistical package, version 22.

Frequency distributions, percentages, means, and standard deviations were used to present the distributions of each question in the questionnaire. Statistical inferences were made using the normality

test, analysis of variance, and multivariate linear regression analyses. P value was set to 0.05 as a cut-off for entry into the multivariate logistic regression model. The scores of knowledge, attitude and behavior are dependent variables and the other factors are independent variables, the stepwise regression method is used for multiple linear regression analysis.

Results

Population

Finally, 18 CHS centers were randomly chosen in 1:1:1 ratio from 90 CHS centers with Family Medicine residency program. A total of 467 questionnaires were distributed and a total of 462 questionnaires were completed, giving a response rate of 98.93%. Participants' age are mainly from 40-49 years. Most participants had high-education backgrounds. A total of 83.8% of participants had a bachelor's degree. Most PCPs had worked over 10 years (343; 74.3%)., **(Table 1)**.

The Reality and Reason of Anticoagulation in AF

The majority (50.6%) of patients with NVAF were 70–79 years old. With regard to OAC therapy, we found that 41.6% of PCPs treated NVAF with aspirin in more than 70% of their patients, while only 0.4% of PCPs treated NVAF with OAC in more than 70% of their patients

Our study showed that the top three obstacles for starting OAC therapy in patients with NVAF included 1) monitoring coagulation function tests (78.79%), 2) lack of essential medicines in the community (63.20%), and 3) fear of bleeding in patients with NVAF (60.39%). The investigation also found that the first three major barriers that affected NVAF patients' compliance included 1) monitoring coagulation function tests (68.40%), 2) worrying about bleeding in patients with NVAF (64.50%), and 3) the lack of essential medications in CHS centers (50.43%) **(Figure 1)**.

Knowledge, attitude, and practice

All scores in the three dimensions were normally distributed and the cut-offs for the three dimensions were based on similar studies^[15]. The each section for knowledge, attitude, and practice were calculated and categorized as poor ($\leq 39.0\%$), fair (40.0%–69.0%), and good ($\geq 70.0\%$)^[15].

In this study, 4.5% of PCPs scored a “good” level of knowledge, while 75.8% had an “inadequate” level of knowledge. The majority (89.8%) of PCPs had positive attitudes towards anticoagulation therapy in AF patients; however, 19.0% had unsatisfactory practices of treating AF with OAC therapy **(Table 2)**.

Table 3 shows that 62.55% (289 participants) of PCPs knew how to diagnose AF, 52.16% (241 participants) knew the frequency of the coagulation function for patients with NVAF with long-term warfarin therapy, and 38.96% (180 participants) knew the target range of INR when warfarin therapy was used in patients with NVAF who were under the age of 75 years. Nevertheless, 96.10% (444 participants) did not know which clotting indicators should apply in patients with NVAF treated with warfarin. A total of

94.8% (438 participants) of PCPs did not know the score for predicting bleeding risk in patients with NVAf, and 86.58% (400 participants) did not know of HAS-BLED, which is a bleeding risk scoring system.

The highest scoring attitude item was “to tell NVAf patients about medication and food that affect warfarin's anticoagulant effects,” while the lowest scoring attitude item was “more concerns about the risk of bleeding in AF patients than the risk of stroke in AF patients.” The scores of each item are shown in **Table S1**

The highest scoring practice question was “Have you ever made a differential diagnosis based on the duration of the onset of AF when treating AF patients?”, while the lowest scoring item was “The AF patient in item E8 had gastrointestinal bleeding three months ago, which has stopped for 1 week. Would you give this patient oral anticoagulant therapy?” The scores of each item are shown in **Table S2**

Influence Factors Analysis

Using the knowledge score, attitude score and practice score as the dependent variable respectively, other factors were set as independent variables. The results of the stepwise regression method and multiple linear regression analyses are shown in **Table 4**. According to the order of independent variable effects from large to small, the time that PCPs practiced medicine, whether the practice was outpatient, and the type of CHS center were all related to the knowledge score. Knowledge score, sex, and whether the patient was in an inpatient ward were related to the attitudes of PCPs. Knowledge score, outpatient practice and attitude score were related to the practice score.

Analysis of knowledge acquisition approaches and willingness survey

In this survey, a total of 89.4% of community PCPs hoped to acquire more knowledge about OAC therapy related to AF through special lectures or courses. Second, community PCPs hoped to learn and update their knowledge related to anticoagulant therapy in patients with NVAf through relevant guidance, literature, and special lectures (Table S3).

Discussion

The study revealed the number of patients with NVAf seeking medical attention in community clinics was far less than the number of patients with NVAf in China. Our study also found that the management of patients with NVAf in CHS centers was not standardized adequately in China. We indicated that doctors were deficient in their knowledge of OAC therapy for NVAf, PCPs recognized the importance of OAC therapy in NVAf and most PCPs got not good score in the behavioral component of the questionnaire. In the multiple linear regression analysis, the PCPs' knowledge score was related to their years of practice, whether they were in outpatient service, and their type of CHS center. Our study also revealed the influences of attitude and behavioral scores (seen in Supplementary material 2).

Few patients with NVAf went to community clinics to manage their anticoagulation therapy. The reason for this finding may be due to the majority of patients with NVAf going to tertiary and secondary

hospitals for treatment.

The specific results of the survey indicated that 41.6% of PCPs treated more than 70% of their NVAF patients with aspirin for OAC therapy, while only 0.4% of PCPs treated over 70% of their NVAF patients with warfarin for OAC therapy. Many other studies showed that the rate of warfarin therapy for NVAF patients in China was less than 2%^[3,6], and Huiping Chen *et al.*^[21] also suggested similar conclusion in China. The results of this survey are similar to those of the above studies. However, Bai Y *et al.*^[22] showed that warfarin was superior to aspirin and antithrombotic therapy was required to reduce the risk of stroke in older patients with AF. PCPs should also more frequently consider the anticoagulant, warfarin, for patients with NVAF in the community.

More than half (75.8%) of the GPs had inadequate knowledge scores, indicating that doctors were deficient in their knowledge of OAC therapy for NVAF. This study showed PCPs had insufficient knowledge of anticoagulation therapy for patients with NVAF is consistent with the results of Changing Wang *et al.*^[4] who also observed the unsatisfactory knowledge among physicians. Even so, 89.8% of PCPs had good scores in the attitude portion of the study. However, 68.0% of PCPs received a score of average, and only 13.0% of PCPs scored high in the behavioral component of the questionnaire. This study found that not all PCPs knew how to diagnose AF and most PCPs did not routinely apply assessment tools to evaluate the relevant risks of patients with NVAF in their clinical practice. The low awareness of such tools for stroke- and bleeding-risk calculations among patients with NVAF was noted, and we concluded that the management of OAC therapy in patients with NVAF was not ideal.

Warfarin anticoagulant therapy has several limitations^[23], including the effect of variability (associated with the clinical and genetic factors), and drug-drug and drug-food interactions. Such limitations are essential for patient education; however, 65.58% of PCPs answered questions incorrectly with regard to the factors, genes, drugs, and food that were prone to interacting with warfarin. Therefore, most PCPs did not provide adequate levels of education to NVAF patients. The latest studies have shown that among patients with NVAF, the newer OAC is superior to warfarin for the prevention of AF-related strokes^[24]. However, we found that 81.39% of PCPs did not know of the newer OAC therapy because most PCPs in the community did not have a good understanding of the literature, despite having a positive attitude toward acquiring such knowledge.

The risk of stroke and bleeding among patients with NVAF must be calculated before OAC therapy. PCPs should make the most appropriate clinical decisions after weighing the risk of bleeding against the benefit of stroke prevention in patients with NVAF. CHADS2-VASc score and HAS-BLED score are two valuable tools in making such clinical decisions; however, we found that most participants did not have a good understanding of either tool. Thus, we encourage and advise up-to-date CME among PCPs who work in the community, especially in the application of easy scoring systems to assist in superior clinical decision making. The practice score of PCPs in OAC for patients with NVAF was average; however, they had a positive attitude toward OAC. Thus, we inferred that the under-treatment of OAC in patients with NVAF was due to the lack of knowledge. A total of 94.4% of PCPs answered that they would participate in

a specific CME program based on our questionnaire (question: if training of AF disease and anticoagulation were available, would you participate?). As their willingness was high, we anticipate the establishment of an effective CME program to assist PCPs provide OAC therapy to patients with NVAF.

In the multiple linear regression analysis, Physicians with more years of experience and solid clinical abilities may have superior performances in managing patients with NVAF. Conversely, our study found that PCPs with fewer years of practice had higher knowledge scores.

PCPs who are in inpatient settings (some CHS centers have inpatient service) had higher knowledge scores than those in outpatient settings. We found that PCPs met less patients with NVAF in outpatient clinics, and therefore, have less motivation to acquire the necessary knowledge to treat such patients. The PCPs in community hospitals in the urban and rural areas had the highest knowledge score, followed by those in community hospitals in central urban areas, with those in suburban community hospitals having the lowest knowledge scores.

The medical resources in the central urban areas are relatively abundant compared to those in the urban-rural junctions and suburbs^[25]. Thus, such a factor incentivizes a large number of patients with NVAF to attend the superior hospitals for treatment. Patients in the suburbs have a poor awareness of health^[26] and as a result, PCPs in downtown and suburban areas have less opportunities to manage patients with NVAF. Such a factor may explain the low knowledge scores among PCPs in the central urban and suburban regions. However, no relevant studies have been performed to discuss the reasons for the above results. The sample size of our study can be expanded to further assess such factors.

Our study also revealed the influences of attitude and behavioral scores (seen in Supplementary material 2). Based on KAP theory, individuals gradually acknowledge content when relevant information is perceived or received^[16]. Therefore, PCPs' attitudes toward OAC therapy in patients with NVAF can be changed when their need for knowledge is satisfied. Thus, selective CME training on OAC therapy can improve PCPs' awareness of treating patients with NVAF with OAC. With comprehensive care provided by PCPs to improve the rate of OAC therapy among patients with NVAF in CHS centers, we expect reductions in the morbidity of AF-related stroke, as well as improvements in the quality of life and prognosis of AF patients.

Strengths and limitations

To our knowledge, this was the largest cross-sectional observational study of KAPs for PCPs relating to OAC therapy in patients with NVAF. This study investigated the current conditions of OAC treatment in patients with NVAF from PCPs' perspectives and PCPs' desires to acquire additional relevant knowledge on the topic. This study also details comprehensive intervention measures to improve the rate of anticoagulant therapy in the community.

Due to the limited time, social desirability bias, recall bias and resources for this study, this research can be improved further. This study included only a subset of the demographic characteristics of community

PCPs and may not fully reflect the reality of the management of OAC therapy in patients with NVAf. Therefore, future studies should include multiple other factors to complement and verify the conclusions of the current study. This study is a cross-sectional survey of the current situation, and thus, intervention studies should be performed in the future to explore possible confounding factors.

Conclusion

The knowledge and behaviors of PCPs were insufficient in OAC therapy to prevent embolization in patients with NVAf. However, the study also revealed the positive attitudes of participants, and their desire to learn the latest knowledge of OAC therapy, which means there is good potential for PCPs' educational interventions to positively impact on the care of patients with NVAf.

Declarations

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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Contributions

PZG is responsible for the design and funding of the research. YSS, WTH, YY and GJ designed the questionnaire. YY,AL carried out the data collection. , GJ and PZG supervised the project. YSS and WTH analysed the data and drafted the first manuscript. All authors participated in the critical revision of the manuscript and approved the final version.

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Ethics declarations

Ethics approval and consent to participate

Documentation of informed consent was secured at the beginning of the survey, initially using an wechat and later using a checkbox for affirmation (Y/N) of having read and agreed to the Informed Consent agreement. The confidentiality of all GPs was guaranteed, and the study protocol was approved by The Medical Ethics Committee of Zhongshan Hospital of Fudan University

Consent for publication

Not applicable.

Competing Interests

The authors declare that they do not have any conflicts of interests.

Abbreviations

PCPs: primary care physicians;

OAC: oral anticoagulants

NVAF: non-valvular atrial fibrillation

KAP: knowledge, attitudes and practices

CHS: community health service

AF: Atrial Fibrillation

INR: international normal ratio

POCT: Point-of-care testing

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Tables

Table 1. Demographic Characteristic of PCPs

| Variable | No % |
|----------------------------------|-----------|
| Sex | |
| ·Male | 142(30.7) |
| ·Female | 320(69.3) |
| Age | |
| ·≤30 years old | 49(10.6) |
| ·30–39 years old | 180(39.0) |
| ·40–49 years old | 192(41.6) |
| ·50–59 years old | 35(7.6) |
| ·>60 years old | 6(1.3) |
| Maximum Educational Level | |
| ·Technical School Graduate | 3(0.6) |
| ·College Degree | 45(9.7) |
| ·bachelor Degree | 387(83.8) |
| ·Master's Degree | 27(5.8) |
| Types of CHS Centers | |
| ·The Urban-Rural | 148(32.0) |
| ·The Rural | 158(34.2) |
| ·The Urban | 156(33.8) |
| Professional Title | |
| ·Resident | 90(19.5) |
| ·Physician | 326(70.6) |
| ·Associate Senior Physician | 44(9.5) |
| ·Chief Physician | 2(0.4) |
| Working Years | |
| ·>5 years | 46(10.0) |
| ·5–10 years | 73(15.8) |
| ·10–15 years | 96(20.8) |
| ·15–20 years | 100(21.6) |
| ·20–25 years | 83(18.0) |
| ·>25 years | 64(13.9) |
| Attending Training | |
| ·Yes | 242(52.4) |
| ·No | 220(47.6) |

Table 2. The scores of the KAP questionnaire, knowledge, attitude, and practice

| | Mean Score [M±SD] | Scores | | |
|-----------|----------------------|------------|---------------|------------|
| | | ≤39%[n(%)] | 40%-69%[n(%)] | ≥70%[n(%)] |
| Knowledge | 3.68±2.752 | 350[75.8%] | 91[19.7%] | 21[4.5%] |
| Attitude | 53.62±7.148 | 3[0.6%] | 44[9.6%] | 415[89.8%] |
| Practice | 37.63±10.336 | 88[19.0%] | 314[68.0%] | 60[13.0%] |
| Total | 102.29±18.517 | - | - | - |

Table 3 Community PCP knowledge of OAC therapy in NVAf patients (N=462)

| Knowledge items | yes[n(%)] | no[n(%)] |
|--|-------------|-------------|
| How to diagnose AF? | 289[62.55%] | 173[37.45%] |
| Which score tool can be used to predict stroke risk in AF patients? | 112[24.24%] | 350[75.76%] |
| Which score tool can be used to predict bleed risk in AF patients? | 24[5.19%] | 438[94.81%] |
| What risk factors does CHADS2 score include? | 75[16.23%] | 387[83.77%] |
| What risk factors does CHADS2-VASc score include? | 71[15.37%] | 391[84.63%] |
| What risk factors does HAS-BLED score include? | 62[13.42%] | 400[86.58%] |
| Which indicator should be monitored in AF patients with warfarin? | 18[3.90%] | 444[96.10%] |
| How long should be monitor coagulation function in AF patients with long-term warfarin therapy at a stable period? | 241[52.16%] | 221[47.84%] |
| What's the target range of INR in AF patients with warfarin under 75 years? | 180[38.96%] | 282[61.04%] |
| What's the target range of INR in AF patients with warfarin over 75 years? | 90[19.48%] | 372[80.52%] |
| Which factor is susceptible to the anticoagulation effect of warfarin? | 159[34.42%] | 303[65.58%] |
| What's the antagonist that antagonize warfarin's anticoagulation? | 157[33.98%] | 305[66.02%] |
| Which of the following AF patients need to adjust warfarin dose? | 136[29.44%] | 326[70.56%] |
| Which medication are the new oral anticoagulants (NOAC)? | 86[18.61%] | 376[81.39%] |

Table 4. Multiple linear regression analyses in KAP scores of NVAf patients treated with anticoagulant therapy by a community PCP

| Item | Independent Variables | B | SE(B) | Standardized regression coefficient | t | p |
|-----------|---------------------------|--------|-------|-------------------------------------|--------|-------|
| Knowledge | Constant | 6.979 | 0.472 | — | 14.786 | 0.000 |
| | Practice Time | -0.412 | 0.084 | -0.229 | -4.889 | 0.000 |
| | Outpatient in CHS center | -1.528 | 0.385 | -0.135 | -2.869 | 0.004 |
| | Type of CHS center | -0.423 | 0.148 | -0.127 | -2.863 | 0.004 |
| Attitude | Constant | 50.305 | 0.655 | — | 76.767 | 0.000 |
| | Knowledge score | 0.819 | 0.113 | 0.315 | 7.215 | 0.000 |
| | Gender | -2.166 | 0.673 | -0.140 | -3.218 | 0.001 |
| | Whether in inpatient ward | 1.596 | 0.638 | 0.109 | 2.501 | 0.013 |
| Practice | Constant | 27.951 | 3.717 | — | 7.519 | 0.000 |
| | Knowledge score | 0.702 | 0.178 | 0.187 | 3.95 | 0.000 |
| | Whether in CHS outpatient | -5.175 | 1.389 | -0.167 | -3.725 | 0.000 |
| | Attitude score | 0.216 | 0.067 | 0.15 | 3.236 | 0.001 |

Figures

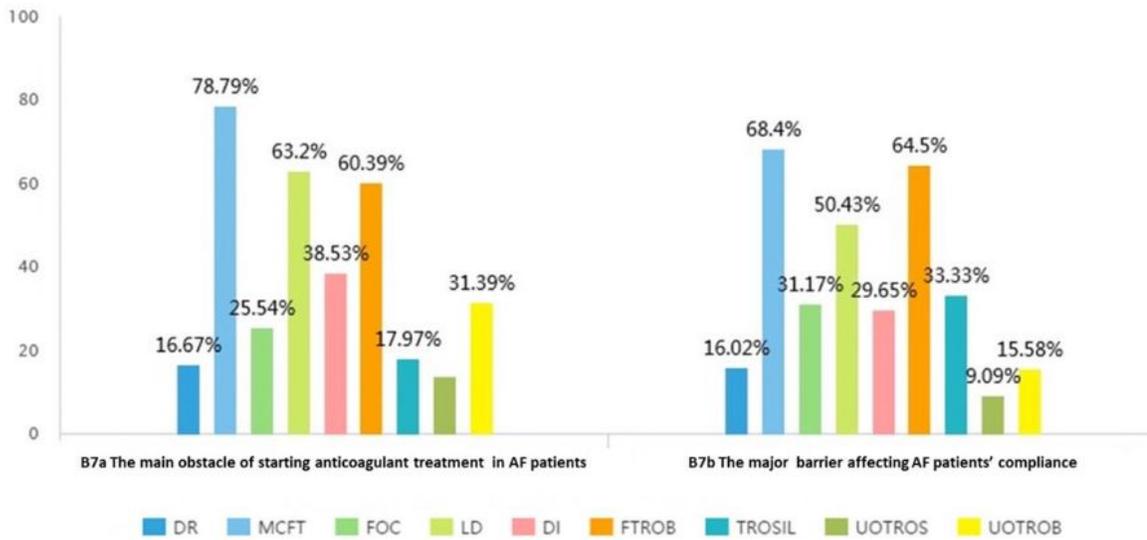


Figure 1. The main barriers for starting OAC therapy and affecting patients' compliance

DR=dietary restrictions
 MCFT=monitoring coagulation function tests
 FOC=fees of coagulation
 LD=lack of drugs (medications)
 DI=drug-drug interactions
 FTROB=fear of the risk of bleeding
 TROSIL=the risk of stroke is low (patients)
 UOTROS=unsure of the risk of stroke (doctors)
 UOTROB=unsure of the risk of bleeding (doctors)

Figure 1

The investigation also found that the first three major barriers that affected NVAf patients' compliance included 1) monitoring coagulation function tests (68.40%), 2) worrying about bleeding in patients with NVAf (64.50%), and 3) the lack of essential medications in CHS centers (50.43%)

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [tables3.docx](#)
- [STROBEchecklistcrosssectional.doc](#)
- [supplementary2.docx](#)
- [supplementary3.docx](#)
- [tables1.docx](#)
- [tables2.docx](#)