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Title of the article

A systematic review of clinicians' views and experiences of direct-acting oral anticoagulants in the management of non-valvular atrial fibrillation

Short running title

Clinicians' views, experiences of DOACs

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Statement of originality

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Conflict of interest

The authors declare that they have no conflict of interest and all authors have read and approved the final draft.

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Abstract

Introduction

While a plethora of systematic reviews have provided evidence of efficacy, effectiveness and safety of direct-acting oral anticoagulants (DOACs) in the management of non-valvular atrial fibrillation (AF), there has been little emphasis on clinicians' perspectives. This systematic review aimed to critically appraise, synthesise and present the available evidence of clinicians' views and experiences.

Methods

Studies published in English from January 2006 to July 2017 reporting the views and/or experiences of doctors, nurses or pharmacists on any individual DOAC or as a pharmacological group were included. Studies were assessed for quality by two researchers, data extracted and findings synthesised using a narrative approach.

Results

Following exclusion of duplicates, 777 titles, 394 abstracts and 196 studies were screened. Ten studies were included in the review, nine of which were quantitative (cross-sectional surveys) and one qualitative (semi-structured interviews), with marked heterogeneity in outcomes reported. Studies were conducted exclusively in Europe and the United States. In those studies reporting clinician preference, DOACs were first choice over warfarin in naïve patients, based on perceptions of evidence of effectiveness equivalent or superior to warfarin and superior safety. Other advantageous factors were in those with an unstable INR and likely to miss appointments. There were, however, concerns relating to management of over-anticoagulation and experiences of observed bleeding rates.

Conclusion

There is a limited evidence base of clinicians' perspectives of DOACs, necessitating further research, particularly given the trajectory of increased use worldwide.

What is already known about this subject

- There is a plethora of evidence, derived from systematic trials and meta-analyses, of the efficacy, effectiveness and safety of DOACs
- DOACs have surpassed warfarin as the oral anticoagulants of choice, particularly for the management of non-valvular AF

What this study adds

- There is a limited evidence base derived from nine surveys and one qualitative interview study
- Clinicians' views and experiences are still very unclear
- There is a need for further robust and rigorous research on clinicians' perspectives

Introduction

Recent years have seen marked changes in the availability and prescription of oral anticoagulants worldwide. The introduction of dabigatran in to the United Kingdom (UK) market in 2008 was followed by rivaroxaban, apixaban and most recently edoxaban. While initially termed 'new' or 'novel' oral anticoagulants (NOACs), the International Society of Thrombosis and Haemostasis has suggested that 'direct-acting oral anticoagulant (DOAC)' be adopted universally [1]. This is more consistent with the pharmacotherapeutic classifications of direct thrombin inhibitors (dabigatran) or directed Factor Xa inhibitors (rivaroxaban, apixaban, edoxaban) [2].

DOACs have now been incorporated into local, national and international prescribing guidance and policy statements. For example, the National institute for Health and Care Excellence (NICE), which provides national guidance and advice to improve health and social care in England and Wales, recommends use of all four DOACs as alternatives to warfarin in non-valvular atrial fibrillation [3]. DOACs are also recommended within atrial fibrillation management guidelines from the European Society of Cardiology [4], the American College of Cardiology/ American Heart Association Task Force on Practice Guidelines and the Heart Rhythm Society [5], and the recently updated 2018 Practical Guide from the European Heart Rhythm Association [6], all of which have retained the term non-Vitamin K antagonist oral anticoagulants (NOACs).

A pharmacoepidemiological study of DOAC prescribing in primary care in the UK from 2009 to 2015 highlighted substantial increases in prescribing over the study period. By 2015, DOACs had surpassed warfarin as the oral anticoagulants of choice, particularly for the management of AF [7]. While there is an extensive evidence base of systematic reviews and meta-analyses demonstrating effectiveness and safety of DOACs for a range of indications and patient groups, to date no systematic reviews have been published on clinicians' preferences, values or experiences with DOACs. Given current prescribing levels and the expected trend towards increasing use and now being recommended first line for several indications [3-7], there is a need for pooled data on their perspectives. The aim of this systematic review was to critically appraise, synthesise and present the available evidence of clinicians' views and experiences of the use of DOACs for the management of non-valvular AF.

Methods

A systematic review protocol was developed according to the standards of PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) [8], and subsequently registered with PROSPERO (International Prospective Register of Systematic Reviews) at the University of York, United Kingdom (UK) [9].

Inclusion and exclusion criteria

Studies were included if they reported the views and/or experiences of either doctors, nurses or pharmacists on any individual DOAC or as a pharmacological group. All primary research studies of any design (quantitative, qualitative or mixed), published in English from January 2006 (launch of DOACs) to July 2017 were included. Conference abstracts and proceedings were excluded due to the lack of detail for quality assessment and data extraction.

Search strategy

The following databases were searched: Cumulative Index to Nursing & Allied Health Literature (CINAHL), International Pharmaceutical Abstracts, Medline and PsycARTICLES. Search terms (title, abstract, text, keyword) were: (clinician* OR doctor* OR surgeon* OR general practitioner* OR family doctor* OR physician* OR pharmacist* OR nurse* OR health professional* OR healthcare Professional* OR health carer* OR practitioner* OR prescriber* OR healthcare provider*) AND (new oral anticoagulant* OR novel oral anticoagulant* OR direct oral anticoagulant* OR non-vitamin K oral anticoagulant* OR dabigatran OR rivaroxaban* OR apixaban OR edoxaban) AND (experience* OR use* OR utility* OR evaluation* OR audit* OR behav* OR knowledge OR satisfaction OR skill* OR practice* OR practise* OR belief* OR attitude* OR view* OR opinion* OR perspective*). The reference lists of all identified papers were reviewed to identify additional studies. A random sample of 10% of titles, abstracts and full papers were screened by an independent researcher to confirm reliability of the screening process.

Quality assessment, data extraction and synthesis

All studies were assessed for quality assessment by two independent reviewers and a third consulted if any disagreements. For quantitative, observational studies and adapted STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) checklist was used [10], with an adapted COREQ (Consolidated Criteria for Reporting Qualitative Research) checklist for qualitative studies [11]. A piloted tool was used by two independent researchers to extract data of: study aim; country; setting, study design; participants; use of any theory in data collection and analysis; number of

participants; and key findings. Given the differences in data collected, quantitative findings were synthesised using a narrative approach. It had been intended that qualitative research would be pooled with aggregation or synthesis of findings to generate a set of statements that represented that aggregation; however, only one qualitative study was identified.

Results

Searching

The PRISMA flowchart is given in Figure 1. Removal of duplicates and screening of the titles reduced the number of papers from 979 to 394. Screening of the abstracts reduced this number to 195 and a further 186 removed following screening of the full papers. Reasons for exclusion of full papers included: review articles (systematic and narrative, n=41); editorials and opinion papers (n=36); no data relating to DOACs (n=36); clinician reports of patient registries or databases (n=38); and primary research data on patients' views and experiences only (n=35). Nine papers were retained for quality assessment plus one further paper identified from screening the reference lists of the nine papers. Of the ten papers, nine were quantitative (cross-sectional survey based methodology) and one qualitative (semi-structured interview method, no methodology stated).

Quality assessment

Quality assessment is given in Tables 1 and 2 for the quantitative studies and the one qualitative study respectively. For the quantitative studies, key areas of strength were the clarity of statement of study aims and description of participants, settings and outcome measures. Fewer studies provided detailed information on sampling strategies, and justification of sample size was only provided in two studies [12,15]. There was also a lack of detail provided on the approaches to recruitment. Similarly, very few described any approach to questionnaire development, item selection and pre-testing. Notably theory was not used to support development of questionnaire domains and items in any of the studies reviewed.

While the one qualitative study involved semi-structured interviews, the study methodology (e.g. phenomenology, grounded theory) was not stated. Key areas of strength were aspects of research trustworthiness (e.g. double coding of interview transcripts and representing the participants' voices through illustrative quotes). Areas of weakness were: the lack of consideration of the researcher perspective, no theory to underpin the development of the interview schedule or coding framework, and the limited sample size of seven which reduced the potential of obtaining data saturation.

All studies were, however, considered to be of sufficient quality to be included within the data extraction phase.

Data extraction

Data extraction of these ten studies is given in Tables 3 and 4. Nine studies were of a cross-sectional survey methodology conducted largely in Europe (n=7) and North America (n=3), with one study reporting data from Europe and North America. DOACs as a group were the focus of eight studies with one specifically related to dabigatran. Populations studied were described as: GPs (n=4), centres of research networks (n=3), cardiologists (n=3), general internists (n=2), hospital doctors (n=1), members of associations (n=1) and non-medical prescribers (n=1), with many of the studies reporting data from more than one group. None of the studies referred to any theories (e.g. psychological, organisational) considered as part of data collection tool development. The number of respondents ranged from 38 to 450 (total of 1246) with response rates of 9% to 35.9%. Only three studies quoted a response rate.

The one qualitative study reported data from seven physicians in the USA. There was no description of any theory used in the stages of data generation, analysis or interpretation.

Data synthesis

The heterogeneity of the quantitative studies in terms of study aims and specific domains and items within the questionnaires limited the approach to data synthesis. Given that there was only one qualitative study, meta-synthesis of the qualitative findings was not possible. Table 5 gives the synthesis of the findings from the nine quantitative studies, highlighting the lack of homogeneity in the specific elements studied in each. While only one quantitative study reported factors influencing DOAC use [12], this was also the aim of the one qualitative study [21]. The quantitative study highlighted the top three factors determining eligibility for dabigatran in warfarin naïve patients as: cost to the patient (reported by 25% of respondents); non-compromised renal function (21%); and $CHADS_2$ score (18%). For patients on warfarin, these were: having an unstable INR (37%); patient affordability (9%); and missed appointments (17%) [12]. Some of these also emerged in the qualitative study in terms of risks to the patient, patient convenience and cost, with additional themes of the clinician willingness to try new agents and their experience of these agents [21].

Six studies reported data on clinician preference for DOACs compared to warfarin [12-14, 17, 18, 20]. In a study of 65 cardiologists and general internists, cardiologists were significantly more comfortable than general internists in prescribing DAOCs over warfarin, as were those who had prescribed DOACs in more than ten patients [14]. While DOACs were not the main focus of a study of 45 research network centres, there were differences across centres in the use of DOACs first line [13]. Data from a further study of 38 of these centres identified that 33.3% of respondents preferred DOACs to warfarin, with 48.5% considering them to be equally safe [17]. Similar safety data were reported in a study of 227 cardiologists and GPs, with over 80% considering DOACs as effective as warfarin [14]. Rivaroxaban was selected as first line oral anticoagulant by 178 physicians, with only 12% opting for warfarin [18]. DOACs were also selected first line by 70% of 53 GPs attending a medical congress [20]. Key reasons reported in these studies for DOAC preference were the perceptions of evidence of effectiveness equivalent or superior to warfarin and superior safety. While DOACs were largely considered more appropriate in warfarin naïve patients, there was less support for switching patients established on warfarin.

DOAC associated bleeding was a key issue, being observed in patients of 40% (n=90) of cardiologists and GPs [14]. In the preceding two years, 53 GPs had seen 1.9 ± 2.87 (range 0–14) bleeding complications in patients prescribed DOACs, of which 0.5 ± 0.95 (range 0–5) were referred to hospital [20]. Two studies reported the need for guidelines to support the use of DOACs in the management of AF, with respondents welcoming specific guidance on the management of DOAC induced bleeding [13,14].

Discussion

This systematic review has highlighted that relatively few studies have reported clinician perspectives; nine cross-sectional surveys and one qualitative study were included in the review, with marked heterogeneity in the specific outcomes reported. In those studies reporting preference, DOACs were first choice over warfarin in naïve patients based on perceptions of evidence of effectiveness equivalent or superior to warfarin and superior safety. Other advantageous factors were in those with an unstable INR and likely to miss appointments. There were, however, concerns relating to their experiences of observed bleeding rates.

One key strength of this systematic review was conducted according to best practice and reported in accordance with the PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis) standards [22]. However, the generalisability or transferability of review findings to other countries or cultures may be limited given that all were conducted in either Europe or the USA. None of the quantitative studies had response rates over 40%, increasing the likelihood of response bias thus threatening internal validity. Furthermore, to date, only one qualitative study and no mixed-methods studies have been reported.

Ours is the first systematic review which has focused on clinicians' perspectives of DOACs which is rather surprising given the vast number of systematic reviews and meta-analyses of effectiveness and safety. While each of the studies was generally of good quality, reporting could be enhanced by referring to design specific checklists which are now hosted on the EQUATOR (Enhancing the QUAlity and Transparency Of health Research) website. In particular, none of the studies reporting influences on prescribing options were grounded in theories of behaviour. Frameworks such as the Theoretical Domains Framework, which is derived from 33 psychological theories and 128 theoretical constructs, which are organised into 14 overarching domains, would provide a more comprehensive approach thus facilitating development of behaviour change interventions if required [23].

Despite the limited number of studies, review findings have highlighted a number of issues which merit further consideration given current prescribing levels and likely future increases [7]. Positive factors influencing selection of a DOAC over warfarin, such as patient convenience, reduced risk and stability of INR reflect DOAC clinical pharmacological properties relating to mechanism of action eliminating the need for INR testing [2]. There appeared to be awareness of the evidence base of DOAC effectiveness and safety, although also a stated need for practice guidelines, particularly to support

management of over-anticoagulation and anticoagulant reversal. Given that idarucizumab is now licensed for use and is indicated to reverse dabigatran in patients with life threatening haemorrhage or need for urgent surgery [24], it is likely that these issues will resolve in the near future.

The findings of our systematic review provide some evidence of the need to support decision-making and management of those patients already established on warfarin and how to transfer safely to DOACs if appropriate. The recently updated 2018 European Heart Rhythm Association Practical Guide on the use of DOACs in non-valvular AF provides much needed protocols for tapering, stopping and switching from DOACs to warfarin and vice versa [6].

Views of patients should also be central to decision-making around choice of oral anticoagulants. A systematic review of patients' values and preferences for DOACs versus warfarin generated heterogeneous findings, highlighting the need for focusing on patients' individual values and preferences [25]. A further systematic review reported that stroke risk reduction and a moderate increase in the risk of bleeding were the most important attributes for patients when deciding between DOACs and warfarin [26]. The need to focus on the patient perspective is increasingly highlighted within local, national and international guidelines [3-6].

Forty percent of respondents in one study included in our systematic review reported observed bleeding complications in those prescribed DOACs [14]. While the incidence and severity of bleeding were not reported, several systematic reviews have concluded that the risk of major bleeding is generally equivalent to or less than that with warfarin, there is a need for further high quality studies [27-29]. There is therefore a need for intensive patient monitoring and reporting of events to national and international pharmacovigilance schemes.

Given the limited evidence base, there is a need for more robust and rigorous research which systematically explores experiences, views and behaviours of clinicians, with the overall aim of optimising appropriate use of DOACs. Mixed quantitative-qualitative approaches are recommended to allow, specifically an explanatory, sequential mixed methods design characterised by the collection and analysis of quantitative data followed by generation and analysis of qualitative data. The qualitative findings will generate in-depth and rich data to assist in exploring, explaining and interpreting the statistically based results of the quantitative element.

Conclusion

This systematic review has identified a limited evidence base of clinicians' views and experiences and a need for further research. While DOACs were first choice over warfarin in naïve patients based and perceptions being advantageous in those with an unstable INR and likely to miss appointments, there is a need to support prescribing and specifically the management of over-anticoagulation.

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Table 1. Quality assessment of the nine cross-sectional studies using adapted STROBE criteria

STROBE criteria		Huang *et al*., 2013 [12]	Lip *et al*., 2013 [13]	Wutzler *et al*., 2014 [14]	Faraoni, *et al*., 2014 [15]	Potpara *et al*., 2014 [16]	Larsen *et al*., 2015 [17]	Andrade *et al*., 2016 [18]	Olaiya *et al*., 2016 [19]	Sauter *et al*., 2016 [20]
Aim	State specific aim/ objectives	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Methods										
Setting	Describe the setting, locations, and relevant dates	Yes	Partly	Yes	Yes	Partly	Partly	Partly	Partly	Partly
Participants	Give the eligibility criteria, and the sources and methods of participant selection	Partly	Partly	Partly	Partly	No	No	Partly	Partly	Partly
Variables	Clearly define all outcomes	Partly	Partly	Partly	Partly	Partly	Partly	Yes	Yes	Partly
Data sources	For each variable of interest, give sources of data and details of methods of assessment	Yes	Partly	Partly	Partly	Partly	Partly	Partly	Yes	Partly
Bias	Describe any efforts to address potential sources of bias	Partly	No	No	No	No	No	Partly	Partly	No
Study size	Explain how the study size was arrived at	Partly	Partly	No	Yes	Partly	Partly	Partly	Partly	No
Quantitative variables	Explain how quantitative variables were handled in the analyses	Yes	Partly	No	Yes	Partly	Partly	Yes	Yes	Partly

Statistical methods	(*a*) Describe all statistical methods	Partly	Partly	No	Yes	Partly	Partly	Partly	Partly	No
	(*b*) Describe any methods used to examine subgroups and interactions	Partly	N/A	No	Yes	N/A	N/A	No	Partly	N/A
Participants	(a) Report numbers of individuals at each stage of study	Yes	N/A	Partly	Yes	Yes	Yes	Partly	Partly	Yes
	(b) Give reasons for non-participation at each stage	N/A	No	No	Partly	No	No	N/A	N/A	N/A
Descriptive data	(a) Give characteristics of study participants	Yes	No	Partly	Yes	Partly	Partly	Partly	Partly	Yes
	(b) Indicate number of participants with missing data for each variable of interest	N/A	No	No	Partly	No	No	No	Yes	Yes
Outcome data	Report numbers of outcome events or summary measures	Yes	Yes	Partly	Yes	Partly	Partly	Yes	Yes	Yes

Table 2. Quality assessment of the qualitative study using adapted COREQ criteria

Criteria		Kirley et al., 2016 [21]
Aim	State specific aim/objectives	Yes
Personal Characteristics	(a) Interviewer/facilitator. Which author/s conducted the interview or focus group?	Yes
	(b) Interviewer characteristics. What characteristics were reported about the interviewer/facilitator?	No
Methodological orientation and Theory	What methodological orientation was stated to underpin the study?	No
Sampling	How were participants selected?	Yes
Method of approach	How were participants approached?	No
Sample size	How many participants were in the study?	Yes
Non-participation	How many people refused to participate or dropped out? Reasons?	No
Setting of data collection	Where were the data collected?	No
Description of sample	What are the important characteristics of the sample?	Partly
Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Partial
Audio/visual recording	Did the research use audio or visual recording to collect the data?	Yes
Field notes	Were field notes made during and/or after the interview or focus group?	No
Data saturation	Was data saturation discussed?	Partly
Number of data coders	How many data coders coded the data?	Yes
Description of the coding tree	Did authors provide a description of the coding tree?	No
Derivation of themes	Were themes identified in advance or derived from the data?	Yes
Quotations presented	Were participant quotations presented to illustrate the themes / findings? Was each quotation identified?	Yes
Data and findings consistent	Was there consistency between the data presented and the findings?	Yes

Table 3. Data extraction of the nine quantitative studies

Authors/years	Aim(s)	Country/ setting (if stated)	Design	Participants	Theory applied	Number of participants (response rate)	Key findings
Huang *et al*., 2013 [12]	To identify factors that influence doctors' decisions to prescribe dabigatran. To compare levels of comfort with prescribing dabigatran between healthcare professionals	USA (California)	Cross-sectional survey	Cardiologists and general internists	No	65/181 (35.9%) responses; 13 cardiologists, 51 general internists (one not stated)	In warfarin naive patients, the main influences were: affordability for patient; renal function; and CHADS2 score For those prescribed warfarin, were: unstable INR; affordability for patient; missed appointments Cardiologists preferred to prescribe dabigatran more often compared to general internists who were less comfortable prescribing cardiologists
Lip *et al*., 2013 [13]	To assess European clinical practice in relation to the use of oral anticoagulants for stroke prevention in AF with particular focus on DOACs as a management strategy	European countries	Cross-sectional survey	Participating centres of the Electro-physiology Research Network	No	No overall response rate given. Responses from 45 centres, 66.7% were university hospitals, 22.2% private hospitals, 11.1% others	There were clear practice differences evident, and also the need for greater adherence to the guidelines, especially since guideline adherent management results in better outcomes Reassuring information on current practice in Europe for the use of DOACs for stroke prevention in AF was evident, although VKA use remained dominant in some clinical scenarios
Wutzler *et al*., 2014 [14]	To access physicians' acceptance and appreciation of the DOACs in a real-life community setting	Germany	Cross-sectional survey	Cardiologists and GPs	No	227 responses	45.4% considered DOACs and VKAs to be equally safe and 82.8% to be equally effective Bleeding complications following the use of DOACs were observed by 39.6%
Faraoni *et al.,* 2014 [15]	To assess: physicians'	Europe and USA	Cross–sectional survey	All members of Society of	No	450/5262 (9%) but only 117 completed all	29% stated no guidelines on DOAC reversal used in their institution while 28% used local

	level of knowledge about perioperative management of patients treated with NOACs; current practices; and perspectives needed to improve the management of patients treated with NOACs			Cardiovascular Anesthesi-ologists and European Association of Cardiothoracic Anaesthesi-ologists		sections of the questionnaire	guidelines, 35% national and 14% international guidelines 46% stated that no agreement had been reached in their institution on the use of guidelines and 18% believed that no guidelines had been established due to the lack evidence 97% thought guidelines were needed to improve management generally and particularly for monitoring (69%) and reversal (73%)
Potpara *et al*.,2014 [16]	To assess the European practice of treatment of patients with non-valvular AF presenting with an Acute Coronary Syndrome	European countries	Cross-sectional survey	European Heart Rhythm Association electrophysiolo gy research network participating centres	No	No overall response rate given. Responses from 47 centres, 85.4% university hospitals. Cardiac surgery available in 82.9%	Key findings were two important areas of uncertainty regarding: the optimal composition and duration of antithrombotic therapy with multiple drugs; and the optimal regimen(s) of DOACs
Larsen *et al*., 2015 [17]	To assess the clinical practice in relation to the use of OAC therapy for patients with AF in Europe, in different clinical situations	Multiple countries in Europe. University hospitals, private hospitals, other sites	Cross-sectional survey	Participating centres of the Electro-physiology Research Network	No	No overall response rate given. Responses from 38 centres, 65.8% were university hospitals, 21.0% private hospitals, 13.2% others.	33.3% stated that DOACs were their preferred treatments 48.5% considered DOACs to be equally effective compared to VKAs 12% preferred using DOACs for dual antiplatelet therapy in AF patients undergoing percutaneous coronary intervention
Andrade *et al*., 2016 [18]	To determine the attitudes, values, preferences, and experience of physicians prescribing OAC therapy for non-valvular AF	Canada	Cross-sectional survey	GPs, cardiologists, internal medicine specialists	No	178 physicians were randomly selected and responded	Preferences regarding OAC therapy largely focused on characteristics related to safety and efficacy Physicians stated preferred anticoagulant was apixaban based on properties and blinded to specific drugs (61%). However, 49% of physicians spontaneously stated

							rivaroxaban as their preferred agent (vs 25% apixaban)
Olaiya *et al*., 2016 [19]	To determine healthcare professionals' level of awareness of the DOACs and to examine their understanding of the effects of DOACs on a hypothetical patient	Scotland	Cross-sectional survey	Hospital doctors, GPs, non-medical independent prescribers (nurses and pharmacists)	No	143 practising clinicians and non-medical prescribers responded	There were significant differences in awareness of DOACs. 88%, 80% and 50%, respectively, recognised rivaroxaban, dabigatran, and apixaban to be DOACs When provided with a routine clinical situation, only 13.5%, 17.5% and 16.8% respondents respectively recognised that the hypothetical patient was anticoagulated, and only 55–58% recognised that it was unsafe to proceed with an invasive procedure
Sauter *et a*l., 2016 [20]	To investigate physicians' preferences of DOACs, prevalence and choice of DOACs, clinical follow up including follow up blood testing and bleeding complications	Switzerland	Cross-sectional survey	GPs attending a GP emergency medicine congress	No	53 GPs participated (response rate 40.8%)	Participants treated 32.7% (±19) of their patients requiring oral anticoagulation with DOACs New AF patients who had started oral anticoagulation received DOACs from 70% but most would not switch patients from warfarin to DOACs In the preceding 2 years, GPs had seen 1.9 (±2.87) bleeding complications in patients with DOACs

Table 4. Data extraction of the one qualitative study

Authors/years	Aim	Country	Design	Participants	Theory applied	Key findings
Kirley et al., 2016 [21]	A qualitative study of physicians' decision-making processes regarding anticoagulation management in AF, with a specific focus on the role of DOACs	USA	Semi-structured interviews	A total of seven physicians, three family physicians, one internist, two cardiologists, one cardiologist sub-specialising in electro-physiology	No	Four themes emerged: the likelihood of prescribing DOACs depended upon their willingness to try new medications and experience; they typically balanced the benefits and risks of anticoagulation in AF patient; patient convenience and preferences, as well as physician convenience, were important; and concerns regarding out-of-pocket cost of DOACs deterred many from prescribing

Table 5. Synthesis of the key findings of clinicians' views and experiences from the nine quantitative studies

Clinician reported…	Huang *et al*., 2013 [12]	Lip *et al*., 2013 [13]	Wutzler *et al*., 2014 [14]	Faraoni, *et al*., 2014 [15]	Potpara *et al*., 2014 [16]	Larsen *et al*., 2015 [17]	Andrade *et al*., 2016 [18]	Olaiya *et al*., 2016 [19]	Sauter *et al*., 2016 [20]
factors influencing DOAC use	Cost, renal function, $CHADS_2$ score, unstable INR, patient attendance	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Easier dosing, fewer blood tests, follow-up and bleeding events
preference over warfarin	Cardiologists preferred more than general internists Cardiologists more comfortable	Clear practice differences across centres, warfarin remained dominant	Majority considered equally effective, half equally safe	Not reported	Not reported	Third preferred DOACs, half considered equally safe	Half selected rivaroxaban as their preferred oral anticoagulant	Not reported	New patients started DOACs, less likely to change stabilised on warfarin
comments on guidelines	Not reported	Need for greater adherence to AF guidelines in general	Not reported	Need for guidelines on use of DOACs and reversal specifically	Not reported	Not reported	Not reported	Not reported	Not reported
issues in use of DOACs	Not reported	Not reported	Almost 40% had observed bleeding complication	Not reported	Need for evidence on optimal regimens	Not reported	Not reported	Not reported	Bleeding issues reported by all respondents Poor clinician recognition of specific DOACs as anti-coagulants

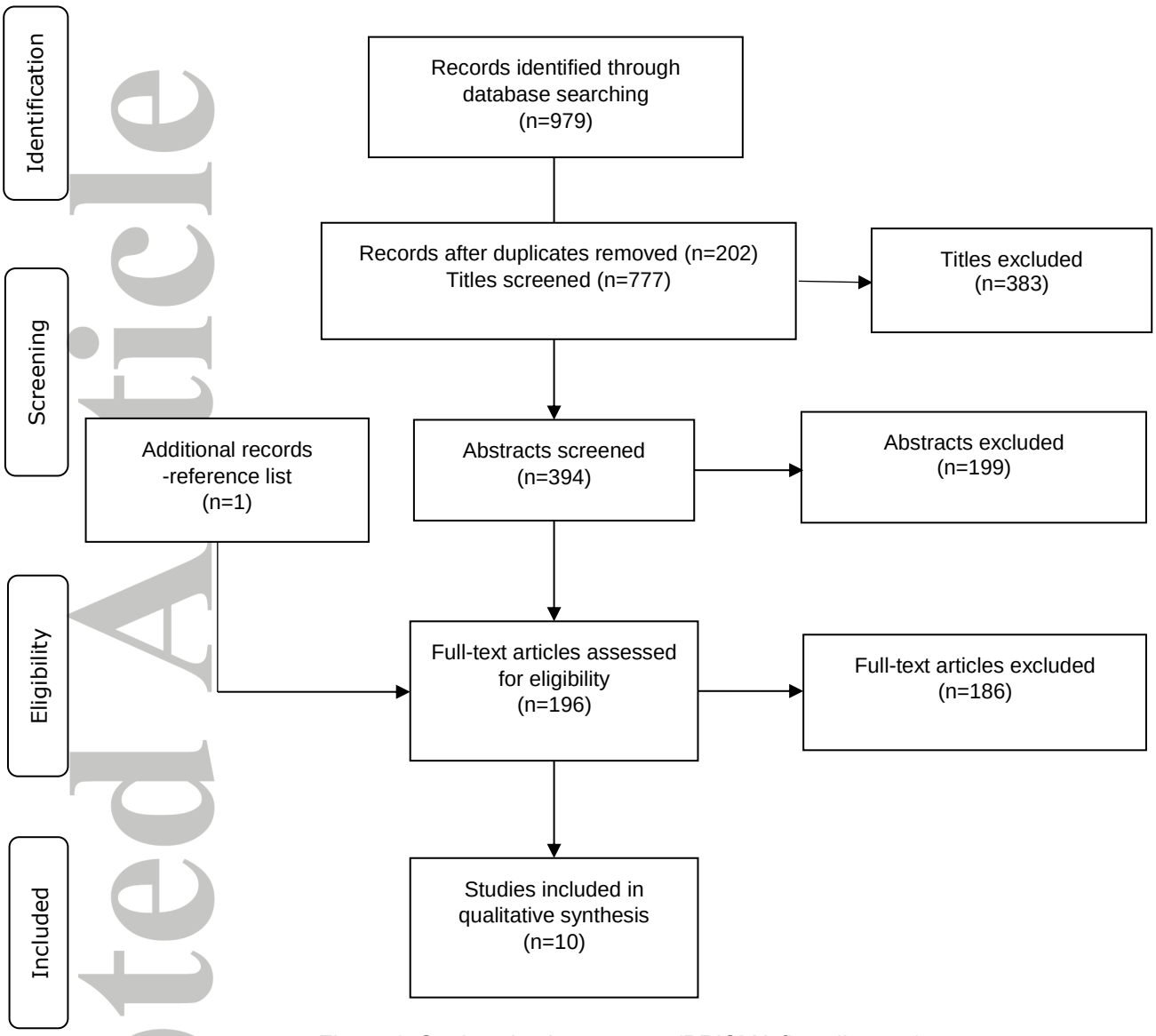

Figure 1: Study selection process (PRISMA flow diagram)