

# BMJ Open Exploring the pharmacists' role in optimising antithrombotic therapy in primary care: a qualitative study

Jacqueline G van Paassen <sup>1</sup>, Jaïr P Tan,<sup>1</sup> Vera H M Deneer <sup>1,2</sup>, Marcel L Bouvy <sup>1</sup>

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<sup>1</sup>Division of Pharmacoepidemiology and Clinical Pharmacology, Utrecht Institute for Pharmaceutical Sciences, Utrecht University, Utrecht, Netherlands  
<sup>2</sup>Department of Clinical Pharmacy, Division Laboratories, Pharmacy and Biomedical Genetics, University Medical Centre Utrecht, Utrecht, Netherlands

## Correspondence to

Mrs Jacqueline G van Paassen; [j.g.vanpaassen@uu.nl](mailto:j.g.vanpaassen@uu.nl)

## ABSTRACT

**Objective** In antithrombotic therapy, the balance between efficacy and safety is delicate, which makes it challenging for healthcare professionals, including pharmacists, to optimise therapy. Pharmacists may play an important role in optimising antithrombotic therapy, but especially in primary care, this role has not been elucidated. Here, we study how community pharmacists (pharmacists in primary care) perceive their current and future role in antithrombotic therapy.

**Design** We conducted a qualitative study using semi-structured interviews. The interview protocol and subsequent analysis were based on the Theoretical Domains Framework, and the findings were interpreted with the Capability Opportunity Motivation – Behaviour System.

**Setting and participants** The interview participants were community pharmacists, located across the Netherlands, from the Utrecht Pharmacy Practice network for Education and Research.

**Results** We interviewed 16 community pharmacists between February and August 2021 and identified several major themes which were important for the pharmacist's role in antithrombotic therapy. Pharmacists felt responsible for the outcome of antithrombotic treatment and intended to invest in their role in antithrombotic therapy. Pharmacists did, however, experience barriers to their role in antithrombotic therapy, like a lack of access to clinical information such as the indication of antithrombotic treatment and a lack of specific knowledge on this treatment.

**Conclusion** Community pharmacists perceive a role for themselves in antithrombotic therapy. To fulfil this role, several preconditions must be met.

## INTRODUCTION

The delicate balance between efficacy and safety in antithrombotic therapy involves minimising the risk of bleeding while lowering the risk of developing a thrombotic event. Healthcare professionals, including pharmacists, must recognise this delicate balance and optimise treatment for each patient by considering several factors. First, they have to select the most appropriate drug from multiple therapeutic options. This has become increasingly complex with the

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ Use of Theoretical Domains Framework for design interview protocol
- ⇒ Input of experts on antithrombotic therapy for design interview protocol
- ⇒ Predetermined data saturation
- ⇒ Complete information from interviews and thorough analysis through involvement of several researchers
- ⇒ Use of convenience and purposive sampling which could have led to responder bias

introduction of direct oral anticoagulants (DOACs) and the more potent P2Y<sub>12</sub> inhibitors ticagrelor and prasugrel. Second, health professionals must stay up to date with continuously changing clinical guidelines.<sup>1 2</sup> Third, they must know how to individualise treatment for patients with additional complex characteristics, like impaired renal function, high age or comorbidities.<sup>3–9</sup>

Having to consider all these three aspects when prescribing, antithrombotic therapy can easily lead to suboptimal therapy and thus increase the risk of a thrombotic event or bleeding. Suboptimal antithrombotic therapy has been studied mostly in secondary care and focused on inappropriate prescribing.<sup>10–17</sup> Inappropriate prescribing, for example, underdosing, occurred frequently, which showed antithrombotic therapy being complex. Because of this complexity, the pharmacist's expertise should be used. An example of using this specific expertise of the pharmacist is the integrated management team mentioned in the new European Society of Cardiology guideline on atrial fibrillation.<sup>1</sup> In this team, the pharmacist is an important member and has a role in optimising and individualising antithrombotic treatment.

To date, little is known about the role and use of expertise of the pharmacist in primary care settings, the community pharmacist, in optimising antithrombotic therapy. Most antithrombotics are used by patients in primary

care settings, and antithrombotic therapy is frequently initiated by the general practitioner. Therefore, this study aims to investigate community pharmacists' perceptions of their current and future role in antithrombotic therapy and the barriers and facilitators to fulfilling this role.

## METHOD

### Design

In conducting this qualitative study, we followed the COnsolidated criteria for REporting Qualitative research checklist and the Standards for Reporting Qualitative Research guideline (see online supplemental information 1,2).<sup>18 19</sup> We used directed content analysis by using the Theoretical Domains Framework (TDF) to systematically construct our data into a structured format.<sup>20</sup> The Institutional Review Board of the Utrecht Pharmacy Practice network for Education and Research (UPPER) approved this study (approval number UPF2015).

### Patient and public involvement

Because this study was focused on community pharmacists' perceptions, patient or public involvement was not applicable to this study.

### Interview protocol

The interview protocol (see online supplemental information 3) was designed using the TDF<sup>20</sup> and other qualitative research on pharmacists' experiences, perceptions, barriers and facilitators.<sup>21–24</sup> We derived additional input for the interview protocol by interviewing several (internationally recognised experts (see online supplemental information 4 for the question guides of the experts). These experts were healthcare professionals with different medical specialties, including a vascular specialist, a geriatrician, a general practitioner, a neurologist, a cardiologist and community pharmacists with a special interest in antithrombotic therapy. Subsequently, we interviewed three community pharmacists from the network of the researchers to test the interview protocol.

### Data collection

We conducted semi-structured interviews (in Dutch) with community pharmacists, using MS Teams video calls, with only audio being recorded. Field notes were made during the interview by the second interviewer. The second interviewer also asked follow-up questions, if necessary. The interviewers (JGvP and JPT) switched roles after nine interviews. In line with the TDF guidelines, we conducted at least 10 interviews.<sup>20 25</sup> After these interviews, we considered data saturation to be reached if no new codes emerged in three additional interviews.<sup>26</sup> We aimed for a maximum of 20 interviews. The intended interview time was 45–60 min. We conducted no repeat interviews.

### Participants

Eligible participants for our study were all community pharmacists in the Netherlands, responsible for both the provision of pharmaceutical care and dispensing

medications. To recruit these pharmacists, we used a purposive sampling strategy, consisting of two steps. First, we placed a call to participate in the UPPER network newsletter, which covers approximately 65% of Dutch community pharmacies,<sup>27</sup> around 1300 pharmacies. We aimed for an initial response of at least 20 pharmacists to select specific pharmacists who met our purposive sampling criteria. Unfortunately, the response rate to this call was insufficient. Therefore, we subsequently sent personal invitations to 100 pharmacies, selected by our purposive sampling criteria. We repeated this procedure once to obtain enough participants. In this second appeal, we also called non-responding pharmacists to invite them to participate in the study.

Purposive sampling was used to create diversity. We selected pharmacies both in rural and urban areas, both privately owned pharmacies and those that were part of a pharmacy chain (pharmacists in employment), and both stand-alone pharmacies and pharmacies that were located in a community health centre (with other healthcare professionals).

Prior to the interview, all participants gave written informed consent.

### Data analysis

For our analysis, we applied the directed content analysis method.<sup>20</sup> At first, the audio recordings were transcribed and transferred to NVivo (V.12.6) for qualitative analysis. In NVivo, we created a predefined coding tree (deductive analysis; see online supplemental information 5), assembled by using the expertise of the researchers and the information of the expert interviews. In this coding tree, not all domains of the TDF were covered. We only included domains that provided relevant information for our study objective. However, during the analysis of the transcripts, we could generate new codes for all possible domains (inductive analysis; see online supplemental information 5) when they did not correspond to an existing code.

Out of all derived codes, we conducted overarching themes. These themes supported answers to the research question.

The first four interviews were coded independently by two researchers (JGvP and JPT). They checked and discussed similarities, additions and discrepancies of selected coding. Discrepancies or ambiguity in the remaining codes were discussed with the experienced researchers (VHMD and MLB) until a complete consensus was reached. The other interviews were coded by JPT (with the exception of the last one). JGvP checked those interviews and discussed with VHMD and MLB in case of discrepancies or ambiguity until consensus.

During analysis, we combined the TDF with the Capability Opportunity Motivation – Behaviour System (COM-B system) to interpret the findings and to see which component of behaviour had a main impact on the experiences and role of the pharmacist in antithrombotic therapy.<sup>20 28</sup>

**Table 1** Characteristics of the interviewed pharmacists

Characteristics of participants (n=16)	Value
Mean age in years (range)	43 (27–58)
Female, n (%)	12 (75%)
Experience in years (range)	20 (2–31)
Pharmacist in privately owned pharmacy, n (%)	11 (69%)
Owner, n (%)	5 (31%)
No owner, n (%)	6 (37%)
Pharmacist in employment*, n (%)	5 (31%)
Pharmacy, located in a health centre, n (%)	12 (75%)

\*Pharmacists working for a pharmacy chain.

## RESULTS

### Interviews

We interviewed 16 Dutch community pharmacists (table 1) between February and August 2021. The pharmacies were located in 11 out of 12 provinces of the Netherlands. The mean duration of the interviews was 56 min (range: 39–66 min). The pilot interviews were included in the analysis because only minor revisions were made after these interviews, which regarded the wording and order of the questions in the interview protocol. During the subsequent interviews, we changed the interview protocol slightly by removing one question and adding two subquestions (see online supplemental information 3).

After the announcement in the UPPER newsletter, we enrolled four additional pharmacists, and after the first round of personal email invitations, we enrolled another five pharmacists. After the second round of email invitations, we enrolled the last four pharmacists: two who replied to the email spontaneously and two who agreed to participate after a personal call.

Almost all deductive and inductive codes were defined after the first six interviews. Formal, after 13 interviews, predefined data saturation was reached. In the three subsequent interviews, no new deductive or inductive codes emerged (see online supplemental information 6).

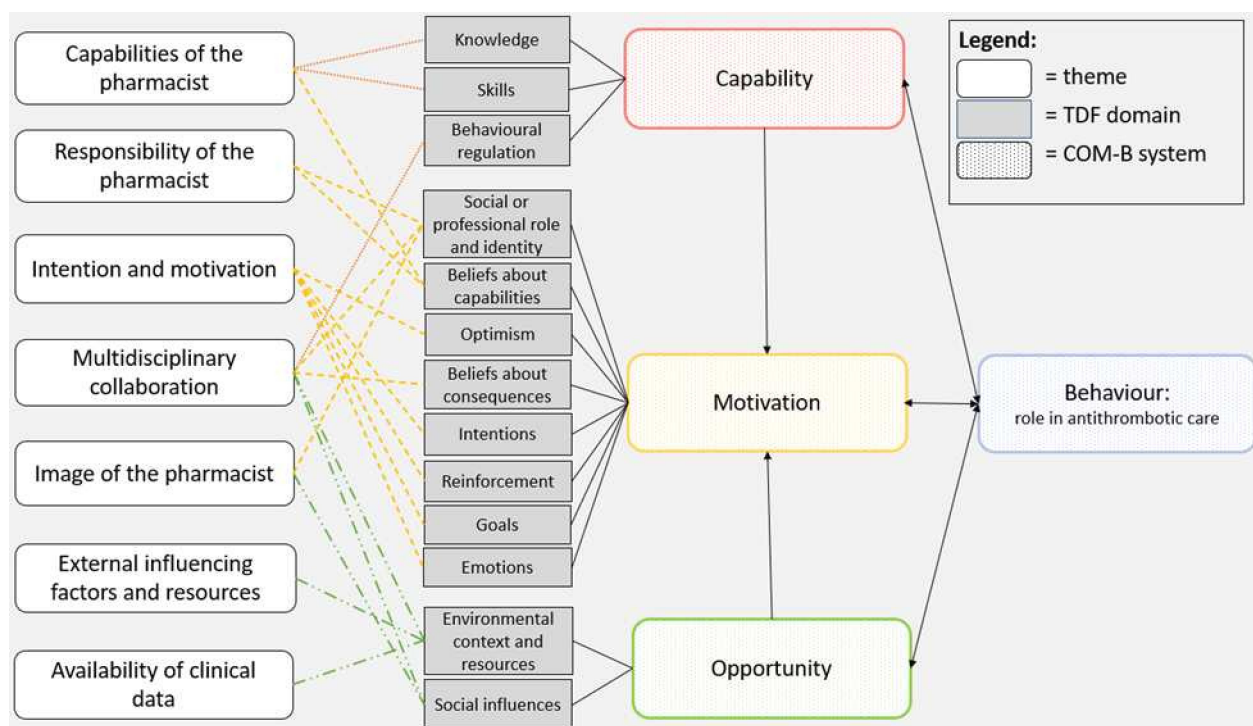
### TDF domains and COM-B system

We allocated codes to 13 of 14 TDF domains (see online supplemental information 5). The only domain that was not covered was “memory, attention and decision processes” (D10). Out of these 13 TDF domains, we identified seven major themes. After conducting an analysis (detailed in online supplemental information 7), we found that most themes linked to multiple TDF domains. Next, we linked these TDF domains to the COM-B system. This led to some major themes being linked to multiple components of the COM-B system (figure 1).

### CAPABILITIES

This part of the COM-B system is linked with the major themes ‘capabilities of the pharmacist’ and ‘multidisciplinary collaboration’.

The community pharmacists were aware of their capabilities and had different perceptions on their level of knowledge and skills regarding antithrombotic therapy:



**Figure 1** Major themes and their relation with the Theoretical Domains Framework (TDF) and the Capability Opportunity Motivation – Behaviour system (COM-B system).



“Yes, I think I know what I do not know.” P07—F, 30–40 years old

“I do realise that when someone has a question about antithrombotic therapy I am not able to give an immediate answer and that I will also probably have to drop out because I do not have enough information or the necessary knowledge.” P03—M, 40–50 years old

“With all the knowledge I have, I make a well-considered assessment whether it is a logical medication policy. [...] I think, as you get more experienced, you will get a better feeling whether your assessment is correct.” P04—M, 20–30 years old

The pharmacists who were more positive about their knowledge felt more confident in their communication with physicians, which resulted in more positive opinions on their role in multidisciplinary collaboration:

“The general practitioners always consult me when they want to prescribe something and ask: what would you do? When I email a cardiologist, I usually get an answer saying ‘good of you to ask’ or ‘thanks for your input’. It is never negative, or what are you meddling with?” P10—F, 40–50 years old

The pharmacists that were more negative about their knowledge perceived antithrombotic therapy as complex because of the multiple new indications and medication regimes:

“I do try to ask critical questions [e.g. to the medical specialist about using both acenocoumarol and acetyl salicylic acid continuously], but I am still not equipped enough to know if it is possible or not [...] What I am saying is that I do not have the knowledge. P12—F, 30–40 years old

“I myself think it is a very difficult subject matter and I really do not feel like an expert in this area.” P16—F, 50–60 years old

### Motivation

This part of the COM-B system is linked with the major themes ‘capabilities of the pharmacist’, ‘responsibility of the pharmacist’, ‘intention and motivation’, ‘multidisciplinary collaboration’ and ‘image of the pharmacist’.

All interviewed pharmacists felt responsible for the patient outcome of antithrombotic therapy, both regarding efficacy and safety:

“[...] We are the last link towards the patient because we deliver the medication. So it has to be the right medication for this specific patient [...]” P02—F, 40–50 years old

Some pharmacists regarded antithrombotic therapy as high-risk medication and, therefore, felt increased motivation for appropriate use:

“We do not have a choice, do we? We think it [antithrombotic therapy] is so important that you just

have to do something with it. You cannot ignore it. Antithrombotic therapy is a very important group, we are aware of that.” P05—M, 50–60 years old

Other pharmacists did not regard antithrombotics as high-risk medication and felt the same responsibility for all medication delivered to the patient.

All pharmacists wanted to invest in their role in antithrombotic therapy. For most pharmacists, this investment in their role was internally driven because they considered pharmaceutical patient-centred care the most important part of being a healthcare professional:

“I think helping people has to be one of the reasons for becoming a community pharmacist. And in antithrombotic therapy there is a large role to help people, answer questions, take away uncertainties and lower hospitalisations.” P15—F, 20–30 years old

However, some pharmacists would only be motivated to invest in their role in antithrombotic therapy by external factors, such as quality indicators imposed by the Health and Youth Care Inspectorate, division of the Ministry of Health, or healthcare payers or additional reimbursement:

“Antithrombotic therapy is only a small part of our profession, I mean, the time you invest must be financially viable these days. If you want to pay more attention to it, it must be paid to do something extra.” P09—F, 40–50 years old

Multidisciplinary collaboration motivated pharmacists in their role in antithrombotic therapy because their expertise and professional role were appreciated by other healthcare professionals. This appreciation led to the pharmacists feeling they contribute to better patient-centred care:

“If you can show your added value once to a doctor, it has a knock-on effect. You get phone calls about difficult things more often. And you notice that the doctors think they could call the pharmacist more often for input.” P06—F, 30–40 years old

“Especially young specialists and general practitioners are more open to discuss a different opinion or insight in the treatment of a patient. I think we can really show we add value. And the doctors must feel less like ‘why are you interfering with my business’ and more like ‘nice to have another person [pharmacist] paying attention to this patient and checking it together.” P15—F, 20–30 years old

### Opportunity

This part of the COM-B system is linked with the major themes ‘multidisciplinary collaboration’, ‘image of the pharmacist’, ‘external influencing factors and resources’ and ‘availability of clinical data’.

The interviewed pharmacists mentioned a lot of barriers and facilitators within this domain. Multidisciplinary collaboration aimed at optimal antithrombotic care, as

already mentioned in 'motivation', is also influenced by the general 'image of the pharmacist'. The pharmacists had different perspectives on how they are perceived by other healthcare professionals. This perception could be positive because healthcare professionals value the pharmacists' knowledge and expertise or negative because the healthcare professionals do not acknowledge the pharmacists' expertise or his role as healthcare professional:

"For all doctors, we are still just a shop giving pills. And it is really unfortunate that they don't really include us [in specific patient characteristics and relevant conditions]. Because if we were to hear all of that, we would be more aware and involved." P01—F, 50–60 years old

"We sometimes know this is not right, but are overruled by the physician and think 'oh well, this patient is not going to die' and leave it. But then afterwards we think 'this is not right'! It is sometimes not known what we can do, what we are allowed to do and what we must do. And that is something I struggle with very much." P06—F, 30–40 years old

"I think the general practitioners, and they have also pointed that out on occasion, they completely rely on my knowledge about dosage and renal function and if I say 'should we not change that' they just do it. Just saying, I think the general practitioners appreciate that you know what you are doing." P07—F, 30–40 years old

When it comes to the image of the pharmacist perceived by patients, most pharmacists indicated that a therapeutic alliance with patients helps in gaining trust in their role as healthcare professional:

"[...] Well, the patient is not used to the pharmacist being proactive. They think, does the general practitioner not arrange that for me? Will the specialist not take care of that? What is the pharmacist up to? But I do not let that put me off, because I know in the end, it shows its added value, also for the patient. But that just takes time, you just have to build that relationship." P11—F, 40–50 years old

"Actually, patients have quite a lot of confidence in you as a pharmacist, at least those with whom you build a relationship with. They often come to you for a second opinion or advice. Especially if you have been in the pharmacy a bit longer and you have already been able to give them good advice, some people ask for a lot of information." P13—F, 50–60 years old

The pharmacists mentioned various more practical barriers and facilitators that either hindered or enabled them to play a significant role in antithrombotic care. Some practical barriers mentioned were related to reimbursement, limitations of Information Technology (IT) systems, available time of the pharmacist and accessibility of other healthcare professionals:

"That I just get the information automatically put into my pharmacy information system, apart from having to actively retrieve the information myself. I think it would save me a lot. Then I could totally do it right." P13—F, 50–60 years old

"Especially when needing to contact a medical specialist, it is a lot of hassle to find the right person at the right time." P02—F, 40–50 years old

"We are not always going to call [in case of a missing indication], as it concerns every prescription. That takes us way too much time." P09—F, 40–50 years old

The pharmacists also mentioned the barrier of lacking clinical data, especially missing the indication on the antithrombotic prescription, as seen in the last quotation. Missing the indication hindered the interviewed pharmacists in performing their role in antithrombotic care:

"That indication should just be on the prescription. I think that for this group of medication [antithrombotics] it should actually be regulated." P05—M, 50–60 years old

"Sometimes the communication between the hospital and the community pharmacy is not adequate. [...] Especially not knowing the indication is one of the biggest barriers." P15—F, 20–30 years old

The indication could be derived by asking the patient, by checking with the prescriber or by inferring it yourself. The pharmacists mentioned that having the indication on the prescription saves time and provides the confirmation to do it right:

"Missing information is the biggest barrier, because it takes so much time. If you have to call and get called back. And if you do not get called back, you have to call again another time. This is the biggest factor in the whole assessment of antithrombotics." P08—F, 20–30 years old

"DOACs made their appearance. They have a lot of advantages, but you also have to check a lot; indication, weight, renal function. The first one is a problem right away, because usually the patient himself knows, but it is not always on the prescription." P05—M, 50–60 years old

"Indication is also important. With triple-therapy I can more or less guess the indication, but it is just nice to have confirmation anyway and also be able to put it in your patient file." P04—M, 20–30 years old

### Behaviour

This part of the COM-B system is connecting the 'capability', 'motivation' and 'opportunity' parts of the system and complies with the role in antithrombotic care.

In the interview, we asked the pharmacists about their ideal role in antithrombotic care. This role was especially patient oriented and focused on the specific expertise of the pharmacist as a medication expert in safe and effective use of medication:

"Antithrombotics have difficult aspects, but therefore are also challenging and need our responsibility. The question for us was not whether we would take this role in antithrombotic care, but how to implement it." P05—M, 50–60 years old

"The future of the pharmacist is to be much more involved in treatment.[...] Of course patients are seen by a lot of medical specialists, the general practitioner and the nurse practitioner. And we see the patients with all their medication, so I think we can do a lot of great things there." P15—F, 20–30 years old

"We all want the best for the patient, that is what it is all about. So let us all make it as easy as possible for everyone." P08—F, 20–30 years old

## DISCUSSION

This study suggests that community pharmacists want to take shared responsibility for the treatment outcome of patients who use antithrombotic therapy. To fulfil this responsibility, important preconditions must be considered.

First, pharmacists emphasised the importance of having sufficient knowledge about antithrombotic treatment protocols. These findings are consistent with other studies that indicate that pharmacists consider their knowledge of DOACs as insufficient.<sup>29–32</sup> Improving knowledge on the appropriate use of DOACs will enhance the pharmacists' confidence in providing antithrombotic therapy.<sup>30–32</sup> Interestingly, pharmacists who expressed a special interest in antithrombotic therapy appeared to be more confident in their own knowledge and performance. These pharmacists were more inclined to desire more information, particularly a more comprehensive picture of the patient's medical history, in order to make an accurate assessment of antithrombotic prescriptions.

Second, the lack of clinical data hindered pharmacists from fulfilling their role in antithrombotic therapy. Access to clinical data, like renal function or indication, would greatly benefit pharmacists in providing pharmaceutical care. Studies on inappropriate prescribing of antithrombotics have shown that reduced renal function and prescriptions without clinical data are often associated with inappropriate dosing of DOACs.<sup>10 13 14 17</sup> To address this issue, these studies recommended that pharmacists should play a more active role in the prescription process.<sup>10 14 17</sup> For dual antiplatelet therapy, it was suggested that sharing the intended duration of therapy with community pharmacists could help optimise prescribing.<sup>11 12</sup>

Third, multidisciplinary collaboration strengthened the pharmacists in their role in providing antithrombotic therapy. When pharmacists feel valued for their knowledge and expertise, they are more willing to consult with healthcare professionals, exchange patient information and discuss pharmacotherapy.<sup>33</sup> However, pharmacists

also identified barriers to multidisciplinary collaboration, such as inaccessibility and unwillingness of healthcare professionals, perceived hierarchy and lack of recognition of their expertise. Improving multidisciplinary collaboration and communication between healthcare professionals is commonly recommended to reduce inappropriate prescribing of antithrombotics.<sup>10–12 34</sup> A multidisciplinary antithrombotic team has been shown to reduce the incidence of thrombotic events and bleeding in patients receiving anticoagulant therapy.<sup>35</sup>

Fourth, the pharmacists experienced more practical barriers, like fee structures, possibilities of IT systems, available time and accessibility of other healthcare professionals. Problems with accessing other healthcare professionals and limited IT integration of information systems were also seen in other studies as a barrier to the safe and effective use of DOACs.<sup>31 36</sup>

The four preconditions mentioned above are crucial for community pharmacists to meet in order to optimise their role in antithrombotic therapy. Given that antithrombotics are a leading cause of preventable hospital admissions,<sup>37–41</sup> the role of the community pharmacist is particularly important. In our study, however, not all community pharmacists regarded antithrombotics as high-risk medications. Some treat all medication groups equally in terms of safety and efficacy.

Three major themes in our study are linked to multiple components of the COM-B system (see [figure 1](#) and online supplemental information 7). The theme 'capabilities of the pharmacist' links to both the 'capability' and 'motivation' components, as it includes the TDF domain 'beliefs about capabilities'. The pharmacist's capabilities are determined by their knowledge, skills and willingness to put these capabilities into action. The theme 'multidisciplinary collaboration' links to all three COM-B components, as pharmacists can use their capability, motivation and external opportunities to change their behaviour. The theme 'image of the pharmacist' links to 'motivation' and 'opportunity', as it can be influenced by professional identity and personal relationship.

## Strengths and weaknesses

The major strength of this study was the rigorous data saturation (online supplemental information 6). To see if we achieved data saturation, we counted deductive and inductive codes of all 16 interviews. After six interviews, there were no more deductive codes, and only seven inductive codes were added in the next 10 interviews. This small amount of new codes implies that the issues concerning the role of antithrombotic therapy are similar for most community pharmacists.

To recruit participants, we sent an invite by convenience and purposive sampling. This way of sampling could give biased results because pharmacists interested in antithrombotic therapy might be more likely to respond. In total, 11 pharmacists actively responded of which some of them did not assume antithrombotic therapy as high-risk



medication with increased responsibility. Therefore, we consider this way of sampling not being a limitation.

Due to the COVID-19 pandemic, we conducted interviews via video calls. We believe these calls did not impact our data collection or analysis. Face-to-face conversations with the pharmacists were maintained, enabling us to respond to non-verbal cues. Two researchers were present during all interviews (except the last one) to react to participant cues and to complement each other when necessary.

## CONCLUSION

This study shows that community pharmacists perceive a role for themselves in antithrombotic therapy. To fulfil this role, pharmacists need to have extensive insight into clinical data, fewer restrictions due to external factors, good multidisciplinary collaboration and sufficient knowledge of treatment with antithrombotics.

Future research could help to create an effective intervention to fulfil the pharmacists' role in optimising antithrombotic therapy in primary care.

**Contributors** Concept and design of the study: JGvP, VHMD, MLB. Data collection and analysis of data: JGvP, JPT. Interpretation of data: all authors. Draft manuscript: JGvP. Critical revision of the manuscript: JGvP, VHMD, MLB. Reviewing the manuscript: all authors. Approval of the latest version of the manuscript and agreement to be accountable for all aspects of the work: all authors. Guarantor: MLB.

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**Patient consent for publication** Not applicable.

**Ethics approval** This study involves human participants and was approved by the Institutional Review Board of the Utrecht Pharmacy Practice network for Education and Research (approval number: UPF2015). Participants gave informed consent to participate in the study before taking part.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** No data are available. The datasets generated and analysed during the current study are not publicly available due to privacy-related concerns. The main findings are further specified and uploaded as supplementary information.

**Supplemental material** This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

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## ORCID iDs

Jacqueline G van Paassen <http://orcid.org/0000-0002-6709-1619>

Vera H M Deneer <http://orcid.org/0000-0002-8564-4424>

Marcel L Bouvy <http://orcid.org/0000-0002-4596-0684>

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Exploring the pharmacists’ role in optimising antithrombotic therapy in primary care: a qualitative study

Jacqueline G. van Paassen

Supplementary Information (SI) :

Supplementary information 1 - COREQ:

Domain 1: research team and reflexivity		
Personal characteristics		Answer
1. Interviewer/facilitator	Which author/s conducted the interview or focus group?	Jacqueline van Paassen (JvP): main interviewer and Jair Tan (JT): secondary interviewer
2. Credentials	What were the researcher’s credentials?	JvP: PharmD, PhD-candidate JT: BSc, MSc student VD: PhD, PharmD MB: PhD, PharmD
3. Occupation	What was their occupation at the time of the study?	JvP: PhD-candidate and Lecturer at Utrecht University (history of 18 years of work as a community pharmacist) JT: MSc Pharmacy student VD: hospital pharmacist and associate professor MB: community pharmacist and professor
4. Gender	Was the researcher male or female?	JvP, VD: female JT, MB: male
5. Experience and training	What experience or training did the researcher have?	JvP: 18 years of work as a community pharmacist. Lecturer in oral communication skills JT: student VD: >20 years as a hospital pharmacist – clinical pharmacologist, >20 years in research MB: >30 years as a community pharmacist, >20 years in research
Relationship with participants		
6. Relationship established	Was a relationship established prior to study commencement?	Pharmacists for the pilot interviews were known to JvP as former colleagues or former fellow students. JvP knew 1 other pharmacist, as well as JT. (not the same person)

**Exploring the pharmacists' role in optimising antithrombotic therapy in primary care: a qualitative study**

Jacqueline G. van Paassen

7. Participant knowledge of the interviewer	What did the participants know about the researcher?	The pharmacists knew the name of JvP, VD and MB when assigning to participate
8. Interviewer characteristics	What characteristics were reported about the interviewer / facilitator? e.g. bias, assumptions, reasons and interests in the research topic	JvP is a former community pharmacist JT is a MSc Pharmacy student
<b>Domain 2: study design</b>		
<b>Theoretical framework</b>		
9. Methodological orientation and theory	What methodological orientation was stated to underpin the study? E.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	The Theoretical Domains Framework (TDF) was used in this study.
<b>Participant selection</b>		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	With purposive sampling using a sampling matrix. For the pilot interviews convenience sampling was used.
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	The participants were approached by a invitation in the UPPER newsletter and by a personal request sent by email. When they did not respond on this request, they were called and asked to participate.
12. Sample size	How many participants were in the study?	16
13. Non-participation	How many people refused to participate or dropped out? Reasons?	0
<b>Setting</b>		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	Through a videocall. The interviewers were at home and the participants were either at home or in the pharmacy.
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	In one interview a MSc Pharmacy student was present, doing an internship.
16. Description of sample	What are the important characteristics of the	(Non) managing community pharmacists, independent vs

**Exploring the pharmacists' role in optimising antithrombotic therapy in primary care: a qualitative study**

Jacqueline G. van Paassen

	sample? e.g. demographic data, date	pharmacy chain, stand-alone pharmacy vs part of a health centre, located in different provinces of the Netherlands
<b>Data collection</b>		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	The researchers used an interview protocol which was pilot tested in advance. The participants did not receive the interview protocol in advance. They did receive information on the objective of the study
18. Repeat interviews	Were repeat interviews carried out? If yes, how many?	No
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	Audio recording (Audacity 2.4.2) was used to collect the data and to transcribe the interview. A manual audio-recorder made a back-up recording. In the last interview (P16) only the manual audio-recorder was used, because the Audacity recording failed.
20. Field notes	Were field notes made during and/or after the interview or focus group?	Yes, made during the interview by the secondary interviewer and complemented after the interview by the interviewer.
21. Duration	What was the duration of the interviews or focus group?	Mean length 56 min (range: 39-66 min)
22. Data saturation	Was data saturation discussed?	Yes
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	The participants were given the option to comment on their transcript. Only 1 participant requested access (and had no comments)
<b>Domain 3: analysis and findings</b>		
<b>Data analysis</b>		
24. Number of data coders	How many data coders coded the data?	The first 4 interviews were coded independently by two different researchers, JvP and JT. They checked for similarities, additions and discrepancies of selected citations and of coding and discussed these. Discrepancies or



**Exploring the pharmacists' role in optimising antithrombotic therapy in primary care: a qualitative study**

Jacqueline G. van Paassen

		ambiguity were discussed together with VD and MB, the experienced researchers. The other interviews were coded by JT (with exception of the last one), checked by JvP and discussed with JvP, VD and MB in case of discrepancies or ambiguity.
25. Description of the coding tree	Did authors provide a description of the coding tree?	Yes, in the appendix
26. Derivation of themes	Were themes identified in advance or derived from the data?	The themes were identified in advance. We made use of open-coding in case new themes derived.
27. Software	What software, if applicable, was used to manage the data?	NVivo version 12.6
28. Participant checking	Did participants provide feedback on the findings?	No, only a summary of the results was sent to all participants.
<b>Reporting</b>		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	Yes
30. Data and findings consistent	Was there consistency between the data presented and the findings?	Yes
31. Clarity of major themes	Were major themes clearly presented in the findings?	Yes
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Yes

Exploring the pharmacists’ role in optimising antithrombotic therapy in primary care: a qualitative study

Jacqueline G. van Paassen

Supplementary Information (SI) :

Supplementary information 2 - SRQR:

Differences between COREQ and SRQR:  
(SRQR describes more components that are usual in any research, while COREQ doesn’t include those)

Not present or different in COREQ		
Title and Abstract		Answer
S1. Title	Concise description of the nature and topic of the study. Identifying the study as qualitative or indicating the approach (e.g. ethnography, grounded theory) or data collection methods (e.g. interview, focus group) is recommended	Yes
S2. Abstract	Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	Yes
Introduction		
S3. Problem formulation	Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	Yes
S4. Purpose of research question	Purpose of the study and specific objectives or questions	Yes
Methods		
S5. Qualitative approach and research paradigm	Qualitative approach (e.g. ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g. postpositivist, constructivist/interpretivist) is also recommended; rationale <sup>b</sup>	The Theoretical Domains Framework was used

**Exploring the pharmacists' role in optimising antithrombotic therapy in primary care: a qualitative study**

Jacqueline G. van Paassen

S7. Context	Setting/site and salient contextual factors; rationale <sup>b</sup>	See 'methods'. A videocall was used because of COVID-19 restrictions
S8. Sampling strategy	How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g. sampling saturation); rationale <sup>b</sup>	See 'methods'
S9. Ethical issues pertaining to human subjects	Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	The study protocol was approved by the Institutional Review Board of the Utrecht Pharmacy Practice network for Education and Research
S10. Data collection methods	Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale <sup>b</sup>	See 'methods' and 'results'
S13. Data processing	Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/deidentification of excerpts	See 'methods'. The recorded audio was transcribed and coded with a research number. This key was saved separately on a secured server, where also audio and transcripts were saved. The audio will be deleted after publishing this research.
S14. Data analysis	Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale <sup>b</sup>	See 'methods'
S15. Techniques to enhance trustworthiness	Techniques to enhance trustworthiness and credibility of data analysis (e.g. member	See 'methods'



Exploring the pharmacists’ role in optimising antithrombotic therapy in primary care: a qualitative study

Jacqueline G. van Paassen

	checking, audit trail, triangulation); rationale <sup>b</sup>	
Results/findings		
S16. Synthesis and interpretation	Main findings (e.g. interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	See ‘results’
Discussion		
S18. Integration with prior work, implications, transferability, and contribution(s) to the field	Short summary of findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	See ‘discussion’
S19. Limitations	Trustworthiness and limitations of findings	See ‘discussion’
Other		
S20. Conflicts of interest	Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	There was no conflict of interest for all researchers
S21. Funding	Sources of funding and other support; role of funders in data collection, interpretation, and reporting	There was no funding or financial support

b: the rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

## Exploring the pharmacists' role in optimising antithrombotic therapy in primary care: a qualitative study

Jacqueline G. van Paassen

### Supplementary Information (SI) :

#### Supplementary information 3 - interview protocol:

#	Question	Prompts/follow up
0 <sup>a</sup>	<i>How do you assess your patients' antithrombotic therapy?</i>	<i>And when do you find this assessment difficult? (combination therapy)</i>
1	What information do you need to assess antithrombotic therapy?	Prompts: indication, guidelines (and which ones), knowledge of antithrombotics, proper transfer second to primary care, accessibility other healthcare professionals, clinical data Why? <sup>b</sup> And to which of this information do you have sufficient access?
2	Can you give an example of an assessment you thought was difficult?	What considerations did you make? How can this situation be prevented in the future? Prompts: dual/triple therapy, no (recent) renal function, uncertainty about indication, dosage, choice of medication
3	What do you consider the pharmacists responsibility regarding antithrombotic therapy?	Is this any different from other therapies? How?
4	Which role do you fulfil in your pharmacy for patients using antithrombotic medication?	Prompts: medication counselling, medication review, medication adherence, role as healthcare provider
5	How do you perceive your performance regarding your role in antithrombotic therapy?	Prompts: skills, confidence in own ability How confident and informed are you in your decisions regarding the assessment of antithrombotic therapy?
6	What aspects in your specific situation can be considered facilitators regarding your role in antithrombotic therapy?	Prompts: knowledge, contact with other healthcare providers, difference between general practitioner and medical specialist, access to clinical information, time, staffing, willingness of patients, perception of role
7	What barriers do you perceive regarding your role in antithrombotic therapy?	Prompts: knowledge, contact with other healthcare providers, difference between general practitioner and medical specialist, access to clinical information, time, staffing, willingness of patients, perception of role, reimbursement
8	What is your vision on the ideal healthcare regarding antithrombotic therapy?	Prompts: involvement, responsibilities healthcare providers What do you think will be the first and most important step towards that ideal? To what extent do you see this happening in the future? <sup>b</sup>
9	What opportunities do you see in taking your role in antithrombotic therapy?	

**Exploring the pharmacists' role in optimising antithrombotic therapy in primary care: a qualitative study**

Jacqueline G. van Paassen

10	What do you need to optimize your role in antithrombotic therapy? (next to answers to question 1 and 7)	Prompts: time, knowledge, willingness of patients, clinical information on patients, clinical information provided by doctor
11	To what extent are you motivated to invest in your role in antithrombotic therapy?	
12	In antithrombotic therapy many healthcare professionals are involved, beside the patient and the pharmacist. What do you think is the role of each person named?	
13	How do you deal with different insights in antithrombotic therapy between prescribers in your communication towards the patient?	
14	How do you think taking your role in antithrombotic therapy will affect your relationship with the prescriber and the patient?	
15	Is there something you want to add to this interview which has not been addressed?	
16	In closing, some demographic questions, if not already addressed or known: <ul style="list-style-type: none"> <li>- Gender</li> <li>- Age</li> <li>- Number of years of experience as a community pharmacist (done any other jobs before this)</li> <li>- Community pharmacist specialism (if yes, since what time)</li> <li>- Location of the pharmacy</li> <li>- Working years in this pharmacy</li> <li>- Position in this pharmacy</li> <li>- Pharmacy part of health centre or pharmacy chain</li> <li>- Fellow pharmacists in this pharmacy (if yes, % of working together)</li> </ul>	

<sup>a</sup> question deleted after interview 1 ; <sup>b</sup> question added after interview 13



**Exploring the pharmacists' role in optimising antithrombotic therapy in primary care: a qualitative study**

Jacqueline G. van Paassen

**Supplementary Information (SI) :****Supplementary information 4 – question guides for the experts (to derive additional input for the interview protocol):****Questions for experts (not pharmacists):**

- 1a. What important issues do you see regarding efficacy and safety in antithrombotic therapy for your medical specialty in particular?
- 1b. What important issues do you see specifically for the community pharmacist?
- 2a. Which high risk groups do you identify for antithrombotic therapy?
- 2b. And what do you think is important for antithrombotic treatment in these high risk groups (patientcare, monitoring, balance of efficacy and safety, .....)
3. Can you elaborate on one recent case of a patient treated with antithrombotics for primary and secondary prevention of venous and arterial thromboembolism in which it was difficult to balance efficacy and safety?
- 4a. To what extent is the patient involved in the decision regarding the choice of antithrombotics?
- 4b. And to what extent do you inform other healthcare professionals of the considerations forming the basis of choosing the antithrombotic? (and which healthcare professionals will be informed?)
5. What are reasons to contact the community pharmacist regarding antithrombotic treatment? And in which way do you contact the pharmacist?
- 6a. Which role you think the community pharmacist can take at this moment and in the future concerning efficacy and safety of antithrombotic therapy?
- 6b. Which opportunities do you see for this role?
- 6c. And which barriers you see?

**Questions for experts (pharmacists):**

- 1a. What important issues do you see regarding efficacy and safety in antithrombotic therapy for the pharmacist?
- 1b. What important issues in general for antithrombotic therapy?
- 2a. Which high risk groups do you identify for antithrombotic therapy?

**Exploring the pharmacists' role in optimising antithrombotic therapy in primary care: a qualitative study**

Jacqueline G. van Paassen

2b. And what do you think is important for pharmaceutical care around antithrombotic treatment in these high risk groups? (monitoring, balance of efficacy and safety, .....)

3. Can you elaborate on one recent case of a patient treated with antithrombotics for primary and secondary prevention of venous and arterial thromboembolism in which it was difficult to balance efficacy and safety?

4. Which role you think the community pharmacist can take at this moment and in the future concerning efficacy and safety of antithrombotic therapy?

5. And which responsibility do you see the community pharmacist can take at this moment and in the future concerning efficacy and safety of antithrombotic therapy?

6. Do you see a difference between the role and responsibility of the pharmacist?

7a. Which opportunities do you see for the pharmacist in taking on the role/responsibility?

7b. And which barriers do you see?

8. Which reasons do you have to contact the prescriber regarding antithrombotic treatment? Can you prescribe this moment of contact?

9a. To what extent is the patient involved in this contact with the prescriber?

9b. To what extent do you inform other healthcare professionals about the moment of contact with the prescriber? And which healthcare professionals will be informed?

9c. What are reasons to inform or not inform other healthcare professionals?

10. In this study we want to interview community pharmacists by one-by-one interviews to investigate their role in antithrombotic therapy. In your opinion, which (demographic) factors of the pharmacist can influence the results of the interview?

Exploring the pharmacists’ role in optimising antithrombotic therapy in primary care: a qualitative study

Jacqueline G. van Paassen

Supplementary Information (SI) :

Supplementary information 5 – coding tree:

D1 Knowledge
Pharmaceutical knowledge of antithrombotic therapy
Knowledge of the GP
Knowledge of guidelines
Knowledge of medication
Knowledge of patient characteristics
Shift of education over the years
Knowledge of the medical specialist
Knowledge of guidelines
Knowledge of medication
Knowledge of patient characteristics
Knowledge of the pharmacist
Knowledge of clinical risk management
Knowledge of guidelines
Knowledge of medication
Knowledge of patient characteristics
Shift of education over the years
Knowledge of the pharmacist technician
Knowledge of clinical risk management
Knowledge of guidelines
Knowledge of medication
Knowledge of patient characteristics
D2 Skills
Ability to implement or change an intervention
Ability to perform clinical medication reviews
Ability to perform clinical risk management
Ability to perform patient counselling

Exploring the pharmacists’ role in optimising antithrombotic therapy in primary care: a qualitative study

Jacqueline G. van Paassen  
Identification of patients with complex antithrombotic therapy  
  
Leadership in the pharmacy

D3 Social or professional role and identity

- Image of the pharmacist
  - From the perspective of other healthcare professionals
  - From the perspective of other pharmacists
  - From the perspective of patients
- Leadership in the pharmacy
- Multidisciplinary collaboration
  - Confidence in other healthcare professionals
  - Hierarchy
  - Professional boundaries
- Responsibility for treatment outcomes
  - Responsibility for deprescribing
  - Responsibility to perform clinical risk management
  - Responsibility to perform patient counselling

D4 Beliefs about capabilities

- Certainty about own performance

D5 Optimism

- Expectations of provision of information

D6 Beliefs about consequences

- Multidisciplinary collaboration
  - Outcome expectancies (when consulting a GP or medical specialist)

D7 Reinforcement

- Change of business model
- Financial compensation
  - Fee structures
- Interest of other stakeholder
- Quality requirements

D8 intentions

- Specific interest of the pharmacist



Exploring the pharmacists’ role in optimising antithrombotic therapy in primary care: a qualitative study

Jacqueline G. van Paassen  
Motivation to invest in (new) role  
  
Emphasizing the necessity for attention <sup>a</sup>

D9 Goals

Role as a treating healthcare professional in collaboration with others

D10 memory attention and decision processes

-

D11 Environmental context and resources

- Availability of a pharmaceutical expert in antithrombotic therapy
- Available time
- Characteristics of patient population
- Extent of knowledge
  - Accessibility of literature or reference books
  - Information on prescription
- Financial compensation
  - Fee structures
- General Data Protection Regulation
- Innovation in pharmaceutical care
- Multidisciplinary collaboration
  - Ability to view medical records
  - Accessibility of healthcare professionals
  - Division of roles between healthcare professionals
  - Feedback on patient outcomes
- Organization of work processes
- Policy of healthcare insurances
- Possibilities of ICT-systems
- Staff occupation
- Supply chain of medication
- Support of professional pharmaceutical organisations
- Support of the professional association

D12 Social influences

Patient willingness

Exploring the pharmacists’ role in optimising antithrombotic therapy in primary care: a qualitative study

Jacqueline G. van Paassen  
Role as a treating healthcare professional in collaboration with others  
  
Personal trust or confidence  
  
Relationship

D13 Emotion

*Job satisfaction*  
  
*Situations that invoke emotion*

D14 Behavioural regulation

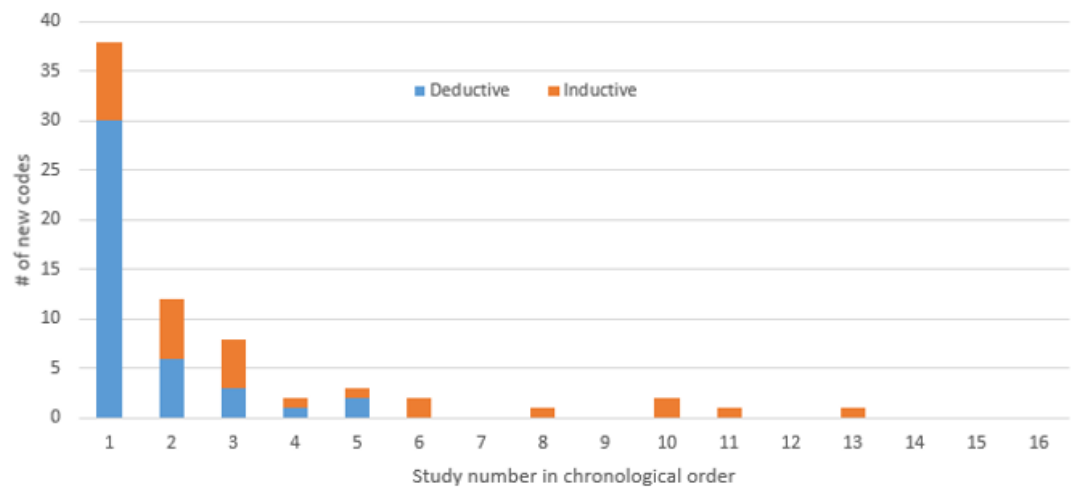
Multidisciplinary collaboration  
  
Willingness to change a practice or implement a new one.

GP = general practitioner ; Italics = new (inductive) code ; <sup>a</sup> first in D10, during analysis moved to D8.

**Exploring the pharmacists’ role in optimising antithrombotic therapy in primary care: a qualitative study**  
Jacqueline G. van Paassen

**Supplementary Information (SI) :**

**Supplementary information 6 – figure data saturation:**



# = number ; study number = interview number

Exploring the pharmacists’ role in optimising antithrombotic therapy in primary care: a qualitative study

Jacqueline G. van Paassen

Supplementary Information (SI) :

Supplementary information 7 – table major themes with corresponding TDF-domains and codes:

Major themes	TDF-domains and codes				
Capabilities of the pharmacist	D1: knowledge <ul style="list-style-type: none"><li>- knowledge of the GP</li><li>- knowledge of the medical specialist</li><li>- knowledge of the pharmacist</li><li>- knowledge of the pharmacist technician</li></ul>		D2: skills <ul style="list-style-type: none"><li>- ability to implement or change an intervention</li><li>- ability to perform clinical risk management</li><li>- ability to perform patient counselling</li><li>- identification of patients with complex antithrombotic therapy</li></ul>		D4: beliefs about capabilities <ul style="list-style-type: none"><li>- certainty about own performance</li></ul>
Responsibility of the pharmacist	D3: social or professional role and identity <ul style="list-style-type: none"><li>- responsibility for treatment outcomes</li><li>- responsibility to perform clinical risk management</li><li>- responsibility to perform patient counselling</li></ul>			D4: beliefs about capabilities <ul style="list-style-type: none"><li>- certainty about own performance</li></ul>	
Intention and motivation	D5: optimism <ul style="list-style-type: none"><li>- expectations on provision of patient information</li></ul>	D7: reinforcement <ul style="list-style-type: none"><li>- change of business model</li><li>- financial compensation (including fee structures)</li><li>- quality requirements</li><li>- interest of other stakeholder</li></ul>	D8: intentions <ul style="list-style-type: none"><li>- emphasizing the necessity for attention</li><li>- motivation to invest in (new) role</li><li>- specific interest of the pharmacist</li></ul>	D9: goals <ul style="list-style-type: none"><li>- role as a treating HCP in collaboration with others</li></ul>	D13: emotion <ul style="list-style-type: none"><li>- job satisfaction</li><li>- situations that invoke emotion</li></ul>
Multidisciplinary collaboration	D3: social or professional role and identity <ul style="list-style-type: none"><li>- confidence in other HCP</li><li>- hierarchy</li><li>- professional boundaries</li></ul>	D6: beliefs about consequences <ul style="list-style-type: none"><li>- outcome expectancies when consulting a GP or medical specialist</li></ul>	D11: environmental context and resources <ul style="list-style-type: none"><li>- accessibility of HCP</li><li>- division of roles between HCP</li></ul>	D12: social influences <ul style="list-style-type: none"><li>- personal trust or confidence</li><li>- relationship</li></ul>	D14: behavioural regulation <ul style="list-style-type: none"><li>- willingness to change a practice or implement a new one</li></ul>
Image of the pharmacist	D3: social or professional role and identity <ul style="list-style-type: none"><li>- from the perspective of other HCP</li><li>- from the perspective of other pharmacists</li><li>- from the perspective of patients</li></ul>			D12: social influences <ul style="list-style-type: none"><li>- patient willingness</li></ul>	

Exploring the pharmacists’ role in optimising antithrombotic therapy in primary care: a qualitative study

Jacqueline G. van Paassen

External influencing factors and resources	<i>D11: environmental context and resources</i> <ul style="list-style-type: none"><li>- availability of a (pharmaceutical) expert in antithrombotic therapy</li><li>- available time</li><li>- characteristics of patient population</li><li>- accessibility of literature or reference books</li><li>- general data protection regulation (GDPR)</li><li>- innovation in pharmaceutical care</li><li>- organisation of work processes</li><li>- policy of healthcare insurances</li><li>- possibilities of ICT-systems</li><li>- supply chain of medication</li><li>- support of the professional pharmaceutical organisation</li><li>- support of the professional association</li></ul>
Availability of clinical data	<i>D11: environmental context and resources</i> <ul style="list-style-type: none"><li>- information on prescription</li><li>- ability to view medical records</li><li>- feedback on patient outcomes</li></ul>

TDF = Theoretical Domains Framework ; D = domain ; GP = general practitioner ; HCP = healthcare professionals