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## Patients' views about screening for atrial fibrillation (AF): a qualitative study in primary care

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## Abstract

### Background

There has been increased interest in screening for Atrial Fibrillation (AF) with commissioned pilot schemes, ongoing large clinical trials and the emergence of inexpensive consumer single-lead ECG devices that can be used to detect AF. This qualitative study aimed to explore patients' views and understanding of AF and AF screening in order to determine acceptability and inform future recommendations.

### Method

15 participants were interviewed from primary care who had taken part in an AF screening trial. A semi-structured interview guide was used flexibly, to enable the interviewer to explore any relevant topics raised by the participants. Interviews were recorded, transcribed verbatim, and analysed using inductive thematic analysis.

### Results

Participants generally had an incomplete understanding of AF and conflated it with other heart problems or with raised blood pressure. With regards to potential drawbacks from screening, some participants considered anxiety and the cost of implementation, but none acknowledged potential harms associated with screening such as side effects of anti-coagulation treatment or the risk of further investigations. The screening were generally well accepted, and participants were generally in favour of engaging with prolonged screening.

### Conclusions

Our study highlights that there may be poor understanding (of both the nature of AF and potential negatives of screening) amongst patients who have been screened for AF. Further work is required to determine if resources including decision aids can address this important knowledge gap, and improve clinical informed consent for AF screening.

## Strengths and limitations of this study

- A strength of this study is that all the interviews were conducted by a single researcher, thus ensuring consistency.
- The study had good representation in terms of a typical screening population aged over 65 years, although there were only four male participants and all participants were from a single GP surgery in England.
- All of the participants had taken part in the SAFETY AF screening trial and those not wishing to be screened for atrial fibrillation may have had different views.
- The participants all had a negative screen which may have affected their attitudes.
- The sample size was appropriate and sufficient to achieve saturation.

## Introduction

Atrial fibrillation (AF) is a common heart rhythm irregularity, characterised by abnormal beating of the atria, and affects around 10% of people aged over 65 in the UK.<sup>1</sup> AF is associated with an increased risk of stroke which is substantially reduced by anticoagulation.<sup>2</sup> As a significant proportion of AF is paroxysmal and can be asymptomatic, it can often go undiagnosed: across England, it is estimated that 425,000 people are living with undiagnosed AF.<sup>3</sup> There has been much recent debate about screening for AF<sup>4</sup> by expert committees and in UK parliament. Currently, no Randomised Controlled Trial (RCT) evidence exists for systematic AF screening for stroke prevention and no country has yet implemented a systematic screening programme. However, the best available evidence does provide a strong case for screening, and the European Cardiac Society currently recommends opportunistic screening in patients aged > 65 and consideration of systematic screening in patients aged > 75 or in those at higher stroke risk.<sup>5</sup> The UK national screening committee is due to review its decision on AF screening imminently.

NHS England has, however, commissioned pilot AF screening schemes in pharmacies and in flu clinics to 'test the treatments and care models of tomorrow.'<sup>6,7</sup> There are ongoing, large RCTs to investigate the cost-effectiveness of AF screening and the outcomes are eagerly awaited.<sup>8</sup> We are also witnessing a shift in healthcare with increased consumerisation of medical devices and the emergence of relatively inexpensive consumer single-lead ECG devices that can be used for AF detection.<sup>9</sup> Consumer watches are now available with ECG capability and the potential to diagnose AF.<sup>10</sup> Hence, there now exists a great need to ensure patients are well informed before undertaking any form of AF screening and to understand patient attitudes towards screening for AF. There is a sparsity of qualitative data in the literature on patient beliefs and attitudes towards screening for AF and in this article, we report on an interview study that aimed to explore patient views on screening for AF.

## Methods

The current qualitative study was nested within the Screening for Atrial Fibrillation using Economical and Accurate Technology (SAFETY) study.<sup>11</sup> 418 participants were recruited to the SAFETY trial from three primary care practices in the Wessex area. Individuals aged over 65 years both with and without a coded diagnosis of AF in their medical records were

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2  
3 invited by their GP to a screening visit in order to test the accuracy of several devices (a  
4 blood pressure meter, a single-lead device and two ECG sensing consumer devices) for the  
5 detection of AF.  
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## 10 **Data collection**

11 For this qualitative study, a convenience sample of 34 of the 418 trial participants not  
12 known to have AF from a single GP surgery were invited to take part in an interview. Of  
13 these, 15 agreed to participate. We only invited participants who did not have AF as they  
14 would likely be more representative of a typical screening population. All the participants  
15 had previously been sent information leaflets as part of the trial invitation with detailed  
16 information on AF, screening for AF, and treatment options if AF were detected. Interviews  
17 were conducted by SH (a senior researcher with considerable qualitative research  
18 experience) via telephone, audio-recorded and transcribed verbatim, assigning ID numbers  
19 to preserve anonymity. A semi-structured interview guide was used flexibly, to enable the  
20 interviewer to explore any relevant topics raised by the participants (Table 1). The interview  
21 guide covered topics such as the patient's understanding of AF, views about AF screening  
22 (including benefits and drawbacks), opinions about the devices trialled (e.g. device comfort)  
23 and opinions about future use of the devices. The interviews were carried out between May  
24 2017 and July 2017 and lasted around 15 minutes.  
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## 38 **Data analysis**

39 Interview transcripts were analysed using inductive thematic analysis<sup>12</sup>. Transcripts were  
40 read and re-read (ML, SH, CW, MS) to identify codes, which were then organised iteratively  
41 into a coding manual. Themes were subsequently developed through further discussions  
42 within the team which included a mix of clinicians and academics with varying degrees of  
43 experience. We assessed the data for saturation of main themes and searched for  
44 disconfirming cases. The sample size was appropriate and sufficient to achieve saturation<sup>13</sup>.  
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## 53 **Patient and public involvement**

54 Patient and public representatives were involved in the design of the study from the funding  
55 application stage and in protocol development. All the study materials were developed with  
56 lay input.  
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## Results

### Participant characteristics

Of the 15 participants who took part in the qualitative study, four were male (26.7%) and the average age was 68 years (SD = 2.74). A number of themes emerged relating to their [1] understanding of AF, [2] attitudes to screening (in general and for AF specifically), [3] attitudes to the screening devices tested during the SAFETY study, and [4] their attitudes to undergoing prolonged screening.

#### *Understanding of atrial fibrillation*

Participants were asked to describe their understanding of AF. In interpreting responses to this question, it needs to be highlighted that participants had previously received an information sheet, which described AF as ‘an irregular heart rhythm that can lead to blood clots forming within the heart which can come loose and cause a stroke.’ Despite this, there was considerable confusion about the nature of the condition. Although the majority of participants said they were aware that AF related to a problem with the heart, many seemed unaware that it related to heart rhythm irregularity, and few acknowledged its association with risk of stroke or developing clots.

*“Something wrong with your heart system...of the atrium and connecting pipes”*  
[P15]

*“Well, to identify a possible stroke and high blood pressure and possible stroke and heart attack.”* [P5]

*“Well if the heart isn’t functioning properly and this is a condition that could be picked up...if you have heart problems”* [P65]

#### *Attitudes to screening*

When asked for their views regarding screening for atrial fibrillation, many of the participants stated positive opinions about health screening in general, with regards to early detection and saving money for the health service.

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3 *"I believe in screening as much as possible...anything that helps with picking up*  
4 *conditions, I think, is a good thing" [P72]*  
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7 *"Having more treatments or monitoring available...can't be a bad thing" [P122]*  
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10 *"Saves the health service a hell of a lot of money...any kind of health screening on the*  
11 *NHS system is a very good idea" [P131]*  
12  
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14 Many participants raised positive opinions regarding early detection and treatment of AF  
15 specifically, and two mentioned prevention of stroke.  
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19 *"I think it's sensible to know if you've got AF, because then it's possible to have some*  
20 *treatment" [P39]*  
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23 In response to the question "What are your thoughts about screening for atrial  
24 fibrillation": *"Well I actually think it's a good idea; there's a lot of heart conditions in*  
25 *my own family on my father's side, and so it's no harm to be monitored every so*  
26 *often, along the way" [P53]*  
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31 *"I think it's an excellent idea; better to catch a condition early if you possibly can,*  
32 *especially if people...[are] not aware they have it...if there's medication or other*  
33 *things to stop it...I know there are so many other calls on the Health Service, but I*  
34 *know stroke and so on being so debilitating; if you can avoid any at all, that would be*  
35 *a good thing" [P125]*  
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43 Most participants didn't describe any potential downsides to screening for AF. Possible  
44 negatives that were raised by participants included anxiety and cost for the health service.  
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47 *"It might make you anxious, but my anxiety on that score would be counteracted by -*  
48 *at least I know and it's now in hand, as opposed to not knowing and then it causing a*  
49 *complication" [P39]*  
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54 *"Perhaps...it might trigger people to be too anxious about their health, perhaps if*  
55 *they were ...that sort of person" [P125]*  
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3 *"I suppose the cost for the NHS but, in the long-term, if you can pick something up*  
4 *early and correct it, it's going to be cheaper than if it's left and then down the road*  
5 *they are going to need more care and intervention" [P72]*  
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9 *"I suspect it's probably desirable...the cost or the complexity might outweigh the*  
10 *benefits; I'm not completely sure on that" [P122]*  
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14 Participants may have misunderstood the scope of the screening test. One participant felt  
15 reassured they had a healthy heart.  
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18 *"Well I suppose it was a chance to see if my heart was healthy; also it reassured me" [P65]*  
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### 21 22 23 **Attitudes to the screening devices**

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25 Some participants stated no particular preference towards any device, and felt that all were  
26 comfortable.  
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28  
29 *"Absolutely no question of them being unpleasant...they were very unintrusive and*  
30 *unobjectionable" [P122]*  
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34 *"They were all comfortable. I could have coped with any of them...if I'd been selected*  
35 *to use a particular type it wouldn't have bothered me" [P72]*  
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38  
39 Others participants had mixed opinions regarding the user-friendliness of the devices, and  
40 stated a preference towards those which were the least uncomfortable, least trouble, and  
41 least time-consuming to use (although their opinion as to which device was preferred  
42 differed between participants).  
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45  
46 *"I think probably the one on the finger was most convenient to use. There was*  
47 *another one where you had to put patches on yourself...[which] I would probably*  
48 *have to force myself to do at home...it would just be one of those irritating things to*  
49 *do. There was another one...that every time you used it, you were going to have to*  
50 *turn on the computer, log into a site and it would upload the data onto the site... at a*  
51 *specific and regular time...[which would be] a bit of a faff." [P45]*  
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*“They were all fine. I think the most difficult one...where you have all the things put on you...that’s the one that takes the time. But all the others seemed very, you know, quick...I think the first one was the simplest, the one with the thumbs” [P76]*

*“The worst one was the blood pressure cuff which was quite uncomfortable. The one...you wore it round your [rib cage] – you weren’t aware you were wearing it and I think that was the best one...The handheld device was quite comfortable but...you were holding it, so whereas wearing the thing around your chest, your hands were free to do other things...and the ECG, obviously, you had to be fully engaged with that and you couldn’t do other things” [P125]*

### **Attitudes towards undertaking prolonged screening**

Many participants stated that they would be happy to undergo prolonged screening using these (or similar) screening devices if it were recommended by their doctor.

*“I just tend to follow advice with that sort of stuff...if it’s because there was a need...it would be in my best interest then I would do yes” [P15]*

*“Even if it was uncomfortable...you would just do what you had to do really...I wouldn’t have any hesitation if it was a health matter” [P125]*

Others were more reserved about the idea of prolonged screening over a number of weeks or had specific concerns, for instance about the time required and the potential of screening to provoke anxiety or ‘take over your life’.

*“Well I’m not sure. It depends how many weeks we’re talking about...I mean I don’t have any other particular issue other than the timing” [P131]*

*“I’m probably a bit of an anxious person...so I might not be quite at ease...I’m not the sort of person that happily does something and just forgets...it tends to take over your life a bit...so if [it was] for two weeks or so, I might be a bit hesitant” [P130]*

Some participants seemed unclear or doubtful about prolonged screening, i.e. they would be happy to test for AF if there was a definitive need identified by their doctor but not just if it was a matter of their age. This suggests that the test, even if they felt the test was tolerable, they may have reservations about doing this in the absence of symptoms.

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3 *“I mean if there was a valid reason behind it...if it was just oh you’re getting to a*  
4 *certain age and we ought to look at it, I would probably...have a bit of a half-hearted*  
5 *effort at it...but if the doctor...[said that there] might be a problem here and it needs*  
6 *further investigation, then obviously I would take it quite seriously” [P45]*  
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## 14 **Discussion**

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17 In this study, participants seemed to have an incomplete understanding of AF and conflated  
18 it with other heart problems or with raised blood pressure. With regards to potential  
19 drawbacks from screening, some participants did consider anxiety and the cost of  
20 implementation, but none acknowledged potential harms associated with screening such as  
21 side effects of anti-coagulation treatment, the risk of further investigations, or the accuracy  
22 of the diagnostic test and potential for false positive or false negative results. The screening  
23 devices in the SAFETY trial were generally well accepted, however some participants  
24 preferred unobtrusive and more user-friendly devices. Participants were generally in favour  
25 of engaging with prolonged screening (for several weeks) although some said they would  
26 only do so if advised by a health care professional or if they had a ‘health problem’, and had  
27 concerns about time requirement and the potential for the testing to provoke anxiety.  
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38 Despite the fact that participants had received printed information sheets as part of the  
39 SAFETY trial (which included information on AF [including paroxysmal AF], its diagnosis, and  
40 anticoagulation treatment), they still appeared to have limited understanding of AF – a  
41 finding which is consistent with recent literature: previous studies have identified that many  
42 patients with AF were not aware of the name of the condition<sup>14</sup> or that it led to an increased  
43 risk of stroke.<sup>15</sup> Other work has found that patients were uncertain what AF was before and  
44 after out-patient cardiology clinic appointments.<sup>16</sup> They also had difficulty understanding  
45 why they were treated with anti-coagulation, and why treatment was recommended  
46 lifelong.<sup>16</sup> Older patients, in particular, may have a poor understanding of AF, which in turn  
47 may have a negative impact on their life.<sup>17</sup> Furthermore, a lack of knowledge may be a key  
48 barrier to accepting anti-coagulation treatment and future adherence - which is imperative  
49 for stroke risk reduction.<sup>18</sup>  
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3 Some participants did mention the possibility that screening might provoke anxiety, and  
4 although there is a lack of evidence of this for AF screening specifically, data does suggest  
5 that screening can induce anxiety in breast and cervical screening programs.<sup>19-20</sup> The  
6 literature also suggests that there is potential for psychological harm from being labelled  
7 with an unexpected diagnosis through screening for other conditions.<sup>21</sup> However, when  
8 directly asked about potential downsides of screening in this study, participants did not  
9 mention the potential risk of harm from treatment, or the risk of further investigations  
10 when deciding to participate, suggesting that this was not a major concern for them. This is  
11 consistent with other studies showing that many patients are unable to identify potential  
12 harms from screening tests, and of those that did, they were mostly related to the test  
13 itself, not to further testing or treatment.<sup>22</sup> In contrast, patients could name benefits and  
14 tended to overestimate them.<sup>22</sup>

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26 Importantly, when asked for their opinions on any potential drawbacks about screening in  
27 general, participants did not mention the accuracy of the diagnostic test or the possibility  
28 for false positive and/or negative diagnoses, or discuss the potential for over-diagnosis.  
29 Again, there is no AF-specific data in the literature and a general lack of understanding of AF  
30 and treatment options could account for the lack of concerns regarding diagnostic accuracy.  
31 Other work has found many AF patients were unaware that AF could be asymptomatic and  
32 therefore they may not be aware of paroxysmal episodes which could remain  
33 undiagnosed.<sup>23</sup> Patients do have worry about potential false positive results for other  
34 screening tests such as lung cancer tests.<sup>24</sup> There is also concern that patients may not  
35 understand the concept of over-diagnosis<sup>19</sup>. However, evidence suggests that older patients  
36 may be suspicious or resistant to the concept of over-detection of other conditions.<sup>19,25</sup>  
37 Interestingly, there is also evidence that older adults perceived overuse to have occurred  
38 when interventions were used in the absence of symptoms (excluding cancer screening), did  
39 not improve symptoms, or against their preferences.<sup>26</sup>

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52 The screening devices were generally well accepted by the participants and found to be  
53 unobtrusive, but some participants did express concerns about comfort, user-friendliness  
54 and time taken to use the device. AF screening devices have been found to be well-accepted  
55 by participants in previous large-scale trials.<sup>27,28</sup> However, many participants stated they  
56 would be happy to undergo prolonged screening only if recommended by their doctor and  
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3 some participants had specific concerns with respect to the time taken and the potential to  
4 provoke anxiety.  
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### 6 7 **Practice and policy implications** 8

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10 There is a need to provide clear and concise information about AF, and to check patient  
11 understanding, before proceeding with any form of screening. Checklists could be used to  
12 ensure key points have been discussed and considered, and patients may require time to  
13 weigh up the risks and benefits before deciding to proceed with screening. Decision aids  
14 have been implemented for AF treatment but have usually been designed to support  
15 clinician decisions and do not explicitly engage patients.<sup>29</sup> Decision aids could potentially  
16 improve patient knowledge prior to screening and have been used to improve knowledge  
17 for other screening programs.<sup>30-33</sup> Good patient knowledge is required in order to ensure  
18 shared decision-making about screening can take place. Health care professionals could  
19 actively ask about any potential anxiety participants may have prior to screening and be  
20 prepared to discuss these.  
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31 Consent for screening rests on having sufficient information about the procedure and its  
32 potential downsides. Adequate information prior to screening should include the risk of  
33 bleeding with anticoagulation treatment if AF were detected. A discussion of available  
34 treatment options and lifestyle modifications before undergoing testing might also ensure  
35 the potential for future compliance if AF was indeed diagnosed. Patients should also be  
36 informed about the specificity of the screening test, and reminded that screening will not  
37 provide information on general heart function or cardiovascular risk in order to avoid false  
38 reassurance.  
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47 Patients should be well- informed regarding the test accuracy and the potential for false  
48 negatives which could increase compliance if prolonged or repeated screening were offered.  
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50 An understanding of the paroxysmal or asymptomatic nature of AF in patients with  
51 intermittent AF may enhance treatment adherence. If patients have concerns over the time  
52 and effort required for prolonged screening, perhaps discussion of individual risks and  
53 benefits before proceeding could aid decision-making. As participants expressed opinions on  
54 the user-friendliness and comfort of devices, these issues should be considered whenever  
55 new devices are considered for AF screening or detection.  
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3 The emergence of consumer ECG devices and wearable technology such as watches that can  
4 detect pulse irregularity and ECG sensing capability<sup>4</sup>, will inevitably lead to an increase in  
5 asymptomatic patients presenting with suspected irregular pulses or subclinical AF, and we  
6 should ensure patients are well informed before referring for further tests (or to disregard  
7 this functionality until it has been further assessed). Ideally, patients with clinically detected  
8 pulse irregularities should also be fully informed before having further tests. Furthermore,  
9 given the lack of RCT evidence for screening and the heterogeneity in stroke risk estimation  
10 data,<sup>34</sup> clinicians may be required to have discussions around uncertainty and over-  
11 diagnosis, particularly in asymptomatic patients who have effectively self-screened  
12 themselves for AF.  
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## 22 **Conclusions**

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25 Our study highlights that there may be poor understanding (of both the nature of AF and  
26 potential negatives of screening) amongst patients who have been screened for AF. Further  
27 work is required to determine if resources including decision aids can address this important  
28 knowledge gap, and improve clinical informed consent for AF screening.  
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43  
44

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56 Care.  
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5  
6 **Ethics approval:** The study complies with the declaration of Helsinki, and the protocol was  
7 approved by the London - City & East Research Ethics Committee in June 2016 (ref  
8 16/LO/1173). Informed consent was obtained from all participants (trial registration ISRCTN:  
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<b>Interview Schedule</b>
Can you describe your understanding of atrial fibrillation?
What are your views about screening for atrial fibrillation? - What do you think the positives of screening are? - What do you think the negatives of screening are?
What did you think about the study information given to you?
Did you have any reservations about taking part, and if so, can you tell me a bit about them?
Do you have any regrets about taking part? If so, can you tell me a bit about them?
Could you tell me a bit about the devices you tried as part of the SAFETY trial?
How comfortable did you find the devices?
How would you feel about wearing or using the devices for a few weeks for screening?
Is there anything else you'd like to share about your participation in the trial, or your thoughts about AF

**Table 1 – Interview Schedule**

## Standards for Reporting Qualitative Research (SRQR)\*

<http://www.equator-network.org/reporting-guidelines/srqr/>

Page/line no(s).

### Title and abstract

<p><b>Title</b> - 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</p>	1
<p><b>Abstract</b> - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions</p>	2

### Introduction

<p><b>Problem formulation</b> - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement</p>	4
<p><b>Purpose or research question</b> - Purpose of the study and specific objectives or questions</p>	4

### Methods

<p><b>Qualitative approach and research paradigm</b> - 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**</p>	4-5
<p><b>Researcher characteristics and reflexivity</b> - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability</p>	5
<p><b>Context</b> - Setting/site and salient contextual factors; rationale**</p>	5
<p><b>Sampling strategy</b> - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**</p>	5
<p><b>Ethical issues pertaining to human subjects</b> - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues</p>	13
<p><b>Data collection methods</b> - 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**</p>	5

1 2 3 4 5	<b>Data collection instruments and technologies</b> - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	5
6 7 8	<b>Units of study</b> - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	5
9 10 11 12	<b>Data processing</b> - 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/de-identification of excerpts	5
13 14 15 16	<b>Data analysis</b> - 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**	5
17 18 19 20	<b>Techniques to enhance trustworthiness</b> - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	5

### Results/findings

23 24 25 26	<b>Synthesis and interpretation</b> - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	6-9
27 28 29	<b>Links to empirical data</b> - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	6-9

### Discussion

32 33 34 35 36 37	<b>Integration with prior work, implications, transferability, and contribution(s) to the field</b> - Short summary of main 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	10-13
38 39	<b>Limitations</b> - Trustworthiness and limitations of findings	3

### Other

42 43 44	<b>Conflicts of interest</b> - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	13
45 46	<b>Funding</b> - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	13

\*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

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\*\*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.

**Reference:**

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014  
DOI: [10.1097/ACM.0000000000000388](https://doi.org/10.1097/ACM.0000000000000388)

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# BMJ Open

## Patients' views about screening for atrial fibrillation (AF): a qualitative study in primary care

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Secondary Subject Heading:	Qualitative research, General practice / Family practice
Keywords:	atrial fibrillation, QUALITATIVE RESEARCH, screening, general practice

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## Patients' views about screening for atrial fibrillation (AF): a qualitative study in primary care

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## Abstract

### Objectives

There has been increased interest in screening for Atrial Fibrillation (AF) with commissioned pilot schemes, ongoing large clinical trials and the emergence of inexpensive consumer single-lead ECG devices that can be used to detect AF. This qualitative study aimed to explore patients' views and understanding of AF and AF screening in order to determine acceptability and inform future recommendations.

### Setting

A single primary care practice in Hampshire, UK.

### Participants

15 participants (11 female) were interviewed from primary care who had taken part in an AF screening trial. A semi-structured interview guide was used flexibly, to enable the interviewer to explore any relevant topics raised by the participants. Interviews were recorded, transcribed verbatim, and analysed using inductive thematic analysis.

### Results

Participants generally had an incomplete understanding of AF and conflated it with other heart problems or with raised blood pressure. With regards to potential drawbacks from screening, some participants considered anxiety and the cost of implementation, but none acknowledged potential harms associated with screening such as side effects of anti-coagulation treatment or the risk of further investigations. The screening was generally well accepted, and participants were generally in favour of engaging with prolonged screening.

### Conclusions

Our study highlights that there may be poor understanding (of both the nature of AF and potential negatives of screening) amongst patients who have been screened for AF. Further work is required to determine if resources including decision aids can address this important knowledge gap, and improve clinical informed consent for AF screening.

**Trial Registration:** ISRCTN: ISRCTN 17495003.

## Strengths and limitations of this study

- A strength of this study is that all the interviews were conducted by a single researcher, thus ensuring consistency.
- The study had good representation in terms of a typical screening population aged over 65 years, although there were only four male participants and all participants were from a single GP surgery in England.
- All of the participants had taken part in the SAFETY AF screening trial and those not wishing to be screened for atrial fibrillation may have had different views.
- Participants were recruited from a single surgery and may have had similar views, not representative of the wider population. However, they were from an area of low deprivation and as they had taken part in a trial were likely to be more health literate than the wider population who may have a poorer understanding of AF.
- The participants all had a negative screen which may have affected their attitudes.

## Introduction

Atrial fibrillation (AF) is a common heart rhythm irregularity, characterised by abnormal beating of the atria, and affects around 10% of people aged over 65 in the UK.<sup>1</sup> AF is associated with an increased risk of stroke which is substantially reduced by anticoagulation.<sup>2</sup> As a significant proportion of AF is paroxysmal and can be asymptomatic, it can often go undiagnosed: across England, it is estimated that 425,000 people are living with undiagnosed AF.<sup>3</sup> There has been much recent debate about screening for AF<sup>4</sup> by expert committees and in UK parliament. Currently, no Randomised Controlled Trial (RCT) evidence exists for systematic AF screening for stroke prevention and no country has yet implemented a systematic screening programme. However, the best available evidence does provide a strong case for screening, and the European Cardiac Society currently recommends opportunistic screening in patients aged > 65 and consideration of systematic screening in patients aged > 75 or in those at higher stroke risk.<sup>5</sup> The UK national screening committee is due to review its decision on AF screening imminently.

NHS England has, however, commissioned pilot AF screening schemes in pharmacies and in flu clinics to 'test the treatments and care models of tomorrow.'<sup>6,7</sup> There are ongoing, large RCTs to investigate the cost-effectiveness of AF screening and the outcomes are eagerly awaited.<sup>8</sup> We are also witnessing a shift in healthcare with increased consumerisation of medical devices and the emergence of relatively inexpensive consumer single-lead ECG devices that can be used for AF detection.<sup>9</sup> Consumer watches are now available with ECG capability and the potential to diagnose AF.<sup>10</sup> Hence, there now exists a great need to ensure patients are well informed before undertaking any form of AF screening and to understand patient attitudes towards screening for AF. There is a sparsity of qualitative data in the literature on patient beliefs and attitudes towards screening for AF and in this article, we report on an interview study that aimed to explore patient views on screening for AF.

## Methods

The current qualitative study was nested within the Screening for Atrial Fibrillation using Economical and Accurate Technology (SAFETY) study.<sup>11</sup> 418 participants were recruited to the SAFETY trial from three primary care practices in the Wessex area. Individuals aged over 65 years both with and without a coded diagnosis of AF in their medical records were

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3 invited by their GP to a single nurse-led screening visit in order to test the accuracy of  
4 several devices (a blood pressure meter, a single-lead device and two ECG sensing consumer  
5 devices) for the detection of AF. Research nurses explained how to use the devices and  
6 participants were able to ask questions about AF and the devices during the visit.  
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## 10 11 **Data collection**

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13 For this qualitative study, a convenience sample (Participants were) of 34 of the 418 trial  
14 participants not known to have AF from a single GP surgery were invited to take part in an  
15 interview. Participants who consented to the qualitative study were approached sequentially  
16 (in order of randomisation to the main study) by telephone. Of these, 15 agreed to participate.  
17 We only invited participants who did not have AF as they would likely be more  
18 representative of a typical screening population. We did not record reasons for declining to  
19 participate. All the participants had previously been sent information leaflets as part of the  
20 trial invitation with detailed information on AF, screening for AF, and treatment options if  
21 AF were detected. Interviews were conducted by SH (a senior researcher with considerable  
22 qualitative research experience) via telephone, audio-recorded and transcribed verbatim,  
23 assigning ID numbers to preserve anonymity. A semi-structured interview guide was used  
24 flexibly, to enable the interviewer to explore any relevant topics raised by the participants  
25 (Table 1). The interview guide covered topics such as the patient's understanding of AF,  
26 views about AF screening (including benefits and drawbacks), opinions about the devices  
27 trialled (e.g. device comfort) and opinions about future use of the devices. The interviews  
28 were carried out between May 2017 and July 2017 and lasted around 15 minutes.  
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## 44 **Data analysis**

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46 Interview transcripts were analysed using inductive thematic analysis (this approach aims to  
47 generate new theory from patterns or themes of meaning within data as there is little data  
48 in the literature on patient view on AF screening)<sup>12</sup>. Transcripts were read and re-read (ML,  
49 SH, CW, MS) to identify codes, which were then organised iteratively into a coding manual  
50 by ML and CW. Main themes and sub-themes were generated independently by ML and CW  
51 then reviewed and refined through further discussions within the team, which included a  
52 mix of clinicians and academics with varying degrees of experience. We assessed the data  
53 for saturation of main themes and searched for disconfirming cases (the authors reviewed  
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3 themes emerging during coding and were confident saturation had been reached when no  
4 new themes of interest were arising.) The sample size was appropriate and sufficient to  
5 achieve saturation<sup>13</sup>.  
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## 9 **Patient and public involvement**

10 Patient and public representatives were involved in the design of the study from the funding  
11 application stage and in protocol development. All the study materials were developed with  
12 lay input.  
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## 18 **Results**

### 19 **Participant characteristics**

20 Of the 15 participants who took part in the qualitative study, four were male (26.7%) and  
21 the average age was 68 years (range = 65-73) (SD = 2.74). The index of multiple deprivation  
22 score for the participating GP practice was 18.2 and the income deprivation score affecting  
23 older people (> 60 years) index was 17.2, reflecting low levels of deprivation. All participants  
24 were fluent in English. A number of themes emerged relating to their [1] understanding of  
25 AF, [2] attitudes to screening (in general and for AF specifically), [3] attitudes to the  
26 screening devices tested during the SAFETY study, and [4] their attitudes to undergoing  
27 prolonged screening.  
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#### 40 ***Understanding of atrial fibrillation***

41 Participants were asked to describe their understanding of AF. In interpreting responses to  
42 this question, it needs to be highlighted that all participants had received an information  
43 sheet, which described AF as 'an irregular heart rhythm that can lead to blood clots forming  
44 within the heart which can come loose and cause a stroke.' Despite this, there was  
45 considerable confusion about the nature of the condition. Although the majority of  
46 participants said they were aware that AF related to a problem with the heart, many (6/15)  
47 seemed unaware that it related to heart rhythm irregularity, and few acknowledged its  
48 association with risk of stroke or developing clots (2/15).  
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57 *"Something wrong with your heart system...of the atrium and connecting pipes"*

58 [P15]  
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3 *“Well, to identify a possible stroke and high blood pressure and possible stroke and*  
4 *heart attack.” [P5]*  
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7 *“it’s a condition that is related to the blood circulation” [P43]*  
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10 *“Well if the heart isn’t functioning properly and this is a condition that could be*  
11 *picked up...if you have heart problems” [P65]*  
12  
13

#### 14 **Attitudes to screening**

15  
16 When asked for their views regarding screening for atrial fibrillation, many of the  
17 participants stated positive opinions about health screening in general, with regards to early  
18 detection and saving money for the health service.  
19  
20

21  
22 *“I believe in screening as much as possible...anything that helps with picking up*  
23 *conditions, I think, is a good thing” [P72]*  
24  
25

26 *“Having more treatments or monitoring available...can’t be a bad thing” [P122]*  
27  
28

29 *“Saves the health service a hell of a lot of money...any kind of health screening on the*  
30 *NHS system is a very good idea” [P131]*  
31  
32

33 Many participants raised positive opinions regarding early detection and treatment of AF  
34 specifically, and two mentioned prevention of stroke.  
35  
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37  
38 *“I think it’s sensible to know if you’ve got AF, because then it’s possible to have some*  
39 *treatment” [P39]*  
40  
41

42 In response to the question “What are your thoughts about screening for atrial  
43 fibrillation”: *“Well I actually think it’s a good idea; there’s a lot of heart conditions in*  
44 *my own family on my father’s side, and so it’s no harm to be monitored every so*  
45 *often, along the way” [P53]*  
46  
47  
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49  
50 *“I think it’s an excellent idea; better to catch a condition early if you possibly can,*  
51 *especially if people...[are] not aware they have it...if there’s medication or other*  
52 *things to stop it...I know there are so many other calls on the Health Service, but I*  
53 *know stroke and so on being so debilitating; if you can avoid any at all, that would be*  
54 *a good thing” [P125]*  
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3 Most participants didn't describe any potential downsides to screening for AF. Possible  
4  
5 negatives that were raised by participants included anxiety and cost for the health service.  
6

7 *"It might make you anxious, but my anxiety on that score would be counteracted by -*  
8 *at least I know and it's now in hand, as opposed to not knowing and then it causing a*  
9 *complication"* [P39]  
10  
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12  
13 *"Perhaps...it might trigger people to be too anxious about their health, perhaps if*  
14 *they were ...that sort of person"* [P125]  
15  
16

17  
18 *"I suppose the cost for the NHS but, in the long-term, if you can pick something up*  
19 *early and correct it, it's going to be cheaper than if it's left and then down the road*  
20 *they are going to need more care and intervention"* [P72]  
21  
22

23  
24 *"I suspect it's probably desirable...the cost or the complexity might outweigh the*  
25 *benefits; I'm not completely sure on that"* [P122]  
26  
27

28 Participants may have misunderstood the scope of the screening test. One participant felt  
29 reassured they had a healthy heart.  
30  
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32 *"Well I suppose it was a chance to see if my heart was healthy; also it reassured me"* [P65]  
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### 38 **Attitudes to the screening devices**

39 Some participants stated no particular preference towards any device, and felt that all were  
40 comfortable.  
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43  
44 *"Absolutely no question of them being unpleasant...they were very unintrusive and*  
45 *unobjectionable"* [P122]  
46  
47

48 *"They were all comfortable. I could have coped with any of them...if I'd been selected*  
49 *to use a particular type it wouldn't have bothered me"* [P72]  
50  
51

52 Others participants had mixed opinions regarding the user-friendliness of the devices, and  
53 stated a preference towards those which were the least uncomfortable, least trouble, and  
54 least time-consuming to use (although their opinion as to which device was preferred  
55 differed between participants).  
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3 *"I think probably the one on the finger was most convenient to use. There was*  
4 *another one where you had to put patches on yourself...[which] I would probably*  
5 *have to force myself to do at home...it would just be one of those irritating things to*  
6 *do. There was another one...that every time you used it, you were going to have to*  
7 *turn on the computer, log into a site and it would upload the data onto the site... at a*  
8 *specific and regular time...[which would be] a bit of a faff."* [P45]  
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15 *"They were all fine. I think the most difficult one...where you have all the things put*  
16 *on you...that's the one that takes the time. But all the others seemed very, you know,*  
17 *quick...I think the first one was the simplest, the one with the thumbs"* [P76]  
18  
19  
20

21 *"The worst one was the blood pressure cuff which was quite uncomfortable. The*  
22 *one...you wore it round your [rib cage] – you weren't aware you were wearing it and I*  
23 *think that was the best one...The handheld device was quite comfortable but...you*  
24 *were holding it, so whereas wearing the thing around your chest, your hands were*  
25 *free to do other things...and the ECG, obviously, you had to be fully engaged with*  
26 *that and you couldn't do other things"* [P125]  
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### 33 **Attitudes towards undertaking prolonged screening**

34 Many participants stated that they would be happy to undergo prolonged screening using  
35 these (or similar) screening devices if it were recommended by their doctor.  
36  
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38  
39 *"I just tend to follow advice with that sort of stuff...if it's because there was a need...it*  
40 *would be in my best interest then I would do yes"* [P15]  
41  
42

43 *"Even if it was uncomfortable...you would just do what you had to do really...I*  
44 *wouldn't have any hesitation if it was a health matter"* [P125]  
45  
46

47 Others were more reserved about the idea of prolonged screening over a number of weeks  
48 or had specific concerns, for instance about the time required and the potential of screening  
49 to provoke anxiety or 'take over your life'.  
50  
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52  
53 *"Well I'm not sure. It depends how many weeks we're talking about...I mean I don't*  
54 *have any other particular issue other than the timing"* [P131]  
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3 *"I'm probably a bit of an anxious person...so I might not be quite at ease...I'm not the*  
4 *sort of person that happily does something and just forgets...it tends to take over*  
5 *your life a bit...so if [it was] for two weeks or so, I might be a bit hesitant"* [P130]  
6  
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9 Some participants seemed unclear or doubtful about prolonged screening, i.e. they would  
10 be happy to test for AF if there was a definitive need identified by their doctor but not just if  
11 it was a matter of their age. This suggests that the test, even if they felt the test was  
12 tolerable, they may have reservations about doing this in the absence of symptoms.  
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16  
17 *"I mean if there was a valid reason behind it...if it was just oh you're getting to a*  
18 *certain age and we ought to look at it, I would probably...have a bit of a half-hearted*  
19 *effort at it...but if the doctor...[said that there] might be a problem here and it needs*  
20 *further investigation, then obviously I would take it quite seriously"* [P45]  
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## 28 Discussion

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31 In this study, participants seemed to have an incomplete understanding of AF and conflated  
32 it with other heart problems or with raised blood pressure. Patients expressed positive  
33 opinions towards screening, diagnosing AF at an early stage and the potential to save costs.  
34 Additionally, more than half of those invited for screening responded and were willing to  
35 take part in the SAFETY trial.<sup>14</sup> With regards to potential drawbacks from screening, some  
36 participants did consider anxiety and the cost of implementation, but none acknowledged  
37 potential harms associated with screening such as side effects of anti-coagulation  
38 treatment, the risk of further investigations, or the accuracy of the diagnostic test and  
39 potential for false positive or false negative results. The screening devices in the SAFETY trial  
40 were generally well accepted, however some participants preferred unobtrusive and more  
41 user-friendly devices. Participants were generally in favour of engaging with prolonged  
42 screening (for several weeks) although some said they would only do so if advised by a  
43 health care professional or if they had a 'health problem', and had concerns about time  
44 requirement and the potential for the testing to provoke anxiety.  
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57 Despite the fact that participants had received printed information sheets as part of the  
58 SAFETY trial (which included information on AF [including paroxysmal AF], its diagnosis, and  
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3 anticoagulation treatment), they still appeared to have limited understanding of AF – a  
4 finding which is consistent with recent literature: previous studies have identified that many  
5 patients with AF were not aware of the name of the condition<sup>15</sup> or that it led to an increased  
6 risk of stroke.<sup>16</sup> Although a blood pressure meter was employed as one of the screening  
7 devices, the other 3 devices used in the trial measured ECG signals and participants had a  
8 12-Lead ECG and were informed that it was a definitive diagnostic test. Other work has  
9 found that patients were uncertain what AF was before and after out-patient cardiology  
10 clinic appointments.<sup>17</sup> They also had difficulty understanding why they were treated with  
11 anti-coagulation, and why treatment was recommended lifelong.<sup>17</sup> Older patients, in  
12 particular, may have a poor understanding of AF, which in turn may have a negative impact  
13 on their life.<sup>18</sup> Furthermore, a lack of knowledge may be a key barrier to accepting anti-  
14 coagulation treatment and future adherence - which is imperative for stroke risk  
15 reduction.<sup>19</sup>

16  
17  
18 Some participants did mention the possibility that screening might provoke anxiety, and  
19 although there is a lack of evidence of this for AF screening specifically, data does suggest  
20 that screening can induce anxiety in breast and cervical screening programs.<sup>20-21</sup> The  
21 literature also suggests that there is potential for psychological harm from being labelled  
22 with an unexpected diagnosis through screening for other conditions.<sup>22</sup> However, when  
23 directly asked about potential downsides of screening in this study, participants did not  
24 mention the potential risk of harm from treatment, or the risk of further investigations  
25 when deciding to participate, suggesting that this was not a major concern for them. This is  
26 consistent with other studies showing that many patients are unable to identify potential  
27 harms from screening tests, and of those that did, they were mostly related to the test  
28 itself, not to further testing or treatment.<sup>23</sup> In contrast, patients could name benefits and  
29 tended to overestimate them.<sup>23</sup>

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32 Importantly, when asked for their opinions on any potential drawbacks about screening in  
33 general, participants did not mention the accuracy of the diagnostic test or the possibility  
34 for false positive and/or negative diagnoses, or discuss the potential for over-diagnosis.  
35 Again, there is no AF-specific data in the literature and a general lack of understanding of AF  
36 and treatment options could account for the lack of concerns regarding diagnostic accuracy.  
37 Other work has found many AF patients were unaware that AF could be asymptomatic and  
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3 therefore they may not be aware of paroxysmal episodes which could remain  
4 undiagnosed.<sup>24</sup> Patients do have worry about potential false positive results for other  
5 screening tests such as lung cancer tests.<sup>25</sup> There is also concern that patients may not  
6 understand the concept of over-diagnosis<sup>20</sup>. However, evidence suggests that older patients  
7 may be suspicious or resistant to the concept of over-detection of other conditions.<sup>20,26</sup>  
8 Interestingly, there is also evidence that older adults perceived overuse to have occurred  
9 when interventions were used in the absence of symptoms (excluding cancer screening), did  
10 not improve symptoms, or against their preferences.<sup>27</sup>

11  
12 The screening devices were generally well accepted by the participants and found to be  
13 unobtrusive, but some participants did express concerns about comfort, user-friendliness  
14 and time taken to use the device. AF screening devices have been found to be well-accepted  
15 by participants in previous large-scale trials.<sup>28,29</sup> However, many participants stated they  
16 would be happy to undergo prolonged screening only if recommended by their doctor and  
17 some participants had specific concerns with respect to the time taken and the potential to  
18 provoke anxiety.

### 31 **Practice and policy implications**

32  
33 There is a need to provide clear and concise information about AF, and to check patient  
34 understanding, before proceeding with any form of screening. Checklists could be used to  
35 ensure key points have been discussed and considered, and patients may require time to  
36 weigh up the risks and benefits before deciding to proceed with screening. Decision aids  
37 have been implemented for AF treatment but have usually been designed to support  
38 clinician decisions and do not explicitly engage patients.<sup>30</sup> Decision aids could potentially  
39 improve patient knowledge prior to screening and have been used to improve knowledge  
40 for other screening programs.<sup>31-34</sup> They could be used to explain the diagnostic test,  
41 conditions that could be diagnosed, quantitative information relating to diagnostic accuracy  
42 and the risks and benefits of treatment. They could also be used to promote clarification of  
43 patients' preferences about the screening and potential consequences in order to improve  
44 patient knowledge. Health care professionals could actively ask about any potential anxiety  
45 participants may have prior to screening and be prepared to discuss these.

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3 Consent for screening rests on having sufficient information about the procedure and its  
4 potential downsides. Adequate information prior to screening should include the risk of  
5 bleeding with anticoagulation treatment if AF were detected. A discussion of available  
6 treatment options and lifestyle modifications before undergoing testing might also ensure  
7 the potential for future compliance if AF was indeed diagnosed. Patients should also be  
8 informed about the specificity of the screening test, and reminded that screening will not  
9 provide information on general heart function or cardiovascular risk in order to avoid false  
10 reassurance. If patients have concerns over the time and effort required for prolonged  
11 screening, perhaps discussion of individual risks and benefits before proceeding could aid  
12 decision-making.  
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22 Patients should be well- informed regarding the test accuracy and the potential for false  
23 negatives which could increase compliance if prolonged or repeated screening were offered.  
24 An understanding of the paroxysmal or asymptomatic nature of AF in patients with  
25 intermittent AF may enhance treatment adherence. As participants expressed opinions on  
26 the user-friendliness and comfort of devices, these issues should be considered whenever  
27 new devices are considered for AF screening or detection. The emergence of consumer ECG  
28 devices and wearable technology such as watches that can detect pulse irregularity and ECG  
29 sensing capability<sup>4</sup>, will inevitably lead to an increase in asymptomatic patients presenting  
30 with suspected irregular pulses or subclinical AF, and we should ensure patients are well  
31 informed before referring for further tests (or to disregard this functionality until it has been  
32 further assessed). Furthermore, given the lack of RCT evidence for screening and the  
33 heterogeneity in stroke risk estimation data,<sup>35</sup> clinicians may be required to have discussions  
34 around uncertainty and over-diagnosis, particularly in asymptomatic patients who have  
35 effectively self-screened themselves for AF.  
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## 49 **Conclusions**

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51 Our study highlights that there may be poor understanding (of both the nature of AF and  
52 potential negatives of screening) amongst patients who have been screened for AF. Further  
53 work is required to determine if resources including decision aids can address this important  
54 knowledge gap, and improve clinical informed consent for AF screening.  
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## Word count 3685

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**Data availability statement:** No data are available.

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<b>Interview Schedule</b>
Can you describe your understanding of atrial fibrillation?
What are your views about screening for atrial fibrillation? - What do you think the positives of screening are? - What do you think the negatives of screening are?
What did you think about the study information given to you?
Did you have any reservations about taking part, and if so, can you tell me a bit about them?
Do you have any regrets about taking part? If so, can you tell me a bit about them?
Could you tell me a bit about the devices you tried as part of the SAFETY trial?
How comfortable did you find the devices?
How would you feel about wearing or using the devices for a few weeks for screening?
Is there anything else you'd like to share about your participation in the trial, or your thoughts about AF

**Table 1 – Interview Schedule**

## Standards for Reporting Qualitative Research (SRQR)\*

<http://www.equator-network.org/reporting-guidelines/srqr/>

Page/line no(s).

### Title and abstract

<p><b>Title</b> - 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</p>	1
<p><b>Abstract</b> - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions</p>	2

### Introduction

<p><b>Problem formulation</b> - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement</p>	4
<p><b>Purpose or research question</b> - Purpose of the study and specific objectives or questions</p>	4

### Methods

<p><b>Qualitative approach and research paradigm</b> - 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**</p>	4-5
<p><b>Researcher characteristics and reflexivity</b> - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability</p>	5
<p><b>Context</b> - Setting/site and salient contextual factors; rationale**</p>	5
<p><b>Sampling strategy</b> - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**</p>	5
<p><b>Ethical issues pertaining to human subjects</b> - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues</p>	13
<p><b>Data collection methods</b> - 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**</p>	5

<b>Data collection instruments and technologies</b> - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	5
<b>Units of study</b> - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	5
<b>Data processing</b> - 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/de-identification of excerpts	5
<b>Data analysis</b> - 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**	5
<b>Techniques to enhance trustworthiness</b> - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	5

### Results/findings

<b>Synthesis and interpretation</b> - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	6-9
<b>Links to empirical data</b> - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	6-9

### Discussion

<b>Integration with prior work, implications, transferability, and contribution(s) to the field</b> - Short summary of main 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	10-13
<b>Limitations</b> - Trustworthiness and limitations of findings	3

### Other

<b>Conflicts of interest</b> - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	13
<b>Funding</b> - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	13

\*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

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\*\*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.

**Reference:**

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014  
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## Patients' views about screening for atrial fibrillation (AF): a qualitative study in primary care

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## Patients' views about screening for atrial fibrillation (AF): a qualitative study in primary care

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## Abstract

### Objectives

There has been increased interest in screening for Atrial Fibrillation (AF) with commissioned pilot schemes, ongoing large clinical trials and the emergence of inexpensive consumer single-lead ECG devices that can be used to detect AF. This qualitative study aimed to explore patients' views and understanding of AF and AF screening in order to determine acceptability and inform future recommendations.

### Setting

A single primary care practice in Hampshire, UK.

### Participants

15 participants (11 female) were interviewed from primary care who had taken part in an AF screening trial. A semi-structured interview guide was used flexibly, to enable the interviewer to explore any relevant topics raised by the participants. Interviews were recorded, transcribed verbatim, and analysed using inductive thematic analysis.

### Results

Participants generally had an incomplete understanding of AF and conflated it with other heart problems or with raised blood pressure. With regards to potential drawbacks from screening, some participants considered anxiety and the cost of implementation, but none acknowledged potential harms associated with screening such as side effects of anti-coagulation treatment or the risk of further investigations. The screening was generally well accepted, and participants were generally in favour of engaging with prolonged screening.

### Conclusions

Our study highlights that there may be poor understanding (of both the nature of AF and potential negatives of screening) amongst patients who have been screened for AF. Further work is required to determine if resources including decision aids can address this important knowledge gap, and improve clinical informed consent for AF screening.

**Trial Registration:** ISRCTN: ISRCTN 17495003.



### Strengths and limitations of this study

- A strength of this study is that all the interviews were conducted by a single researcher, thus ensuring consistency.
- The study had good representation in terms of a typical screening population aged over 65 years although the high proportion of female participants may have affected the results.
- All of the participants had taken part in the SAFETY AF screening trial and those not wishing to be screened for atrial fibrillation may have had different views.
- Participants were recruited from a single surgery and may have had similar views, not representative of the wider population. However, they were from an area of low deprivation and as they had taken part in a trial were likely to be more health literate than the wider population who may have a poorer understanding of AF, although we did not record individual demographic data.
- The participants all had a negative screen which may have affected their attitudes.

## Introduction

Atrial fibrillation (AF) is a common arrhythmia affecting around 10% of people aged over 65 in the UK<sup>1</sup> and is associated with an increased risk of stroke which is substantially reduced by anticoagulation.<sup>2</sup> Across England, it is estimated that 425,000 people are living with undiagnosed AF<sup>3</sup> and there has been much recent debate about screening for AF.<sup>4</sup> The European Cardiac Society currently recommends opportunistic screening in patients aged > 65 and consideration of systematic screening in patients aged > 75 or in those at higher stroke risk.<sup>5</sup> No country has yet implemented a systematic screening programme although NHS England has commissioned pilot AF screening schemes in pharmacies and in flu clinics to 'test the treatments and care models of tomorrow'.<sup>6,7</sup>

There are ongoing, large RCTs to investigate the cost-effectiveness of AF screening and the outcomes are eagerly awaited.<sup>8</sup> We are also witnessing a shift in healthcare with increased consumerisation of medical devices and the emergence of relatively inexpensive consumer single-lead ECG devices and watches that can be used for AF detection.<sup>9,10</sup> Hence, there now exists a great need to ensure patients are well informed before undertaking any form of AF screening and to understand patient attitudes towards screening for AF. In this article, we report on an interview study that aimed to explore patient views on screening for AF.

## Methods

The current qualitative study was nested within the Screening for Atrial Fibrillation using Economical and Accurate Technology (SAFETY) study.<sup>11</sup> 418 participants were recruited to the SAFETY trial from three primary care practices in the Wessex area. Individuals aged over 65 years both with and without a coded diagnosis of AF in their medical records were invited by their GP to a single nurse-led screening visit in order to test the accuracy of several devices (a blood pressure meter, a single-lead device and two ECG sensing consumer devices) for the detection of AF. Research nurses explained how to use the devices and participants were able to ask questions about AF and the devices during the visit.

## Data collection

For this qualitative study, a convenience sample (Participants were) of 34 of the 418 trial participants not known to have AF from a single GP surgery were invited to take part in an

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2  
3 interview. Participants who consented to the qualitative study were approached sequentially  
4 (in order of randomisation to the main study) by telephone (from the first recruiting site of 3 which  
5 all had low levels of deprivation). Of these, 15 agreed to participate. We only invited  
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7 participants who did not have AF as they would likely be more representative of a typical  
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9 screening population. We did not record reasons for declining to participate. All the  
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11 participants had previously been sent information leaflets as part of the trial invitation with  
12  
13 detailed information on AF, screening for AF, and treatment options if AF were detected.  
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15 Interviews were conducted by SH (a senior researcher with considerable qualitative  
16  
17 research experience) via telephone, audio-recorded and transcribed verbatim, assigning ID  
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19 numbers to preserve anonymity. A semi-structured interview guide was used flexibly, to  
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21 enable the interviewer to explore any relevant topics raised by the participants (Table 1).  
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23 The interview guide covered topics such as the patient's understanding of AF, views about  
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25 AF screening (including benefits and drawbacks), opinions about the devices trialled (e.g.  
26  
27 device comfort) and opinions about future use of the devices. The interviews were carried  
28  
29 out between May 2017 and July 2017 and lasted around 15 minutes.

### 31 **Data analysis**

32  
33 Interview transcripts were analysed using inductive thematic analysis (as we had little prior  
34  
35 data or predetermined theory on AF.)<sup>12</sup> Transcripts were read and re-read (ML, SH, CW, MS) to  
36  
37 identify codes, which were then organised iteratively into a coding manual by ML and CW.  
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39 Main themes and sub-themes were generated independently by ML and CW then reviewed  
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41 and refined through further discussions within the team, which included a mix of clinicians  
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43 and academics with varying degrees of experience. We assessed the data for saturation of  
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45 main themes and searched for disconfirming cases (the authors reviewed themes emerging  
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47 during coding and were confident saturation had been reached when no new themes of  
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49 interest were arising.) The sample size was appropriate and sufficient to achieve  
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51 saturation<sup>13</sup>.

### 52 **Patient and public involvement**

53  
54 Patient and public representatives were involved in the design of the study from the funding  
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56 application stage and in protocol development. All the study materials were developed with  
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58 lay input.  
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## Results

### Participant characteristics

Of the 15 participants who took part in the qualitative study, four were male (26.7%) and the average age was 68 years (range = 65-73) (SD = 2.74). The average age of the participants in the SAFETY trial was 73.9 years and 43% were female. The index of multiple deprivation score for the participating GP practice was 17.7 (2<sup>nd</sup> quintile in England (from low levels of deprivation to high)) and the income deprivation score affecting older people (> 60 years) index was 17.3 (middle quintile). All participants were fluent in English. A number of themes emerged relating to their [1] understanding of AF, [2] attitudes to screening (in general and for AF specifically), [3] attitudes to the screening devices tested during the SAFETY study, and [4] their attitudes to undergoing prolonged screening.

#### *Understanding of atrial fibrillation*

Participants were asked to describe their understanding of AF. In interpreting responses to this question, it needs to be highlighted that all participants had received an information sheet, which described AF as ‘an irregular heart rhythm that can lead to blood clots forming within the heart which can come loose and cause a stroke.’ Despite this, there was considerable confusion about the nature of the condition. Although the majority of participants said they were aware that AF related to a problem with the heart, many (6/15) seemed unaware that it related to heart rhythm irregularity, and few acknowledged its association with risk of stroke or developing clots (2/15).

*“Something wrong with your heart system...of the atrium and connecting pipes”*

[P15]

*“Well, to identify a possible stroke and high blood pressure and possible stroke and heart attack.”* [P5]

*“it’s a condition that is related to the blood circulation”* [P43]

*“Well if the heart isn’t functioning properly and this is a condition that could be picked up...if you have heart problems”* [P65]

#### *Attitudes to screening*

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3 When asked for their views regarding screening for atrial fibrillation, many of the  
4 participants stated positive opinions about health screening in general, with regards to early  
5 detection and saving money for the health service.  
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9 *"I believe in screening as much as possible...anything that helps with picking up*  
10 *conditions, I think, is a good thing" [P72]*  
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13 *"Having more treatments or monitoring available...can't be a bad thing" [P122]*  
14

15 *"Saves the health service a hell of a lot of money...any kind of health screening on the*  
16 *NHS system is a very good idea" [P131]*  
17  
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19  
20 Many participants raised positive opinions regarding early detection and treatment of AF  
21 specifically, and two mentioned prevention of stroke.  
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24 *"I think it's sensible to know if you've got AF, because then it's possible to have some*  
25 *treatment" [P39]*  
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28  
29 In response to the question "What are your thoughts about screening for atrial  
30 fibrillation": *"Well I actually think it's a good idea; there's a lot of heart conditions in*  
31 *my own family on my father's side, and so it's no harm to be monitored every so*  
32 *often, along the way" [P53]*  
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35 *"I think it's an excellent idea; better to catch a condition early if you possibly can,*  
36 *especially if people...[are] not aware they have it...if there's medication or other*  
37 *things to stop it...I know there are so many other calls on the Health Service, but I*  
38 *know stroke and so on being so debilitating; if you can avoid any at all, that would be*  
39 *a good thing" [P125]*  
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49 Most participants didn't describe any potential downsides to screening for AF. Possible  
50 negatives that were raised by participants included anxiety and cost for the health service.  
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53 *"It might make you anxious, but my anxiety on that score would be counteracted by -*  
54 *at least I know and it's now in hand, as opposed to not knowing and then it causing a*  
55 *complication" [P39]*  
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*"Perhaps...it might trigger people to be too anxious about their health, perhaps if they were ...that sort of person" [P125]*

*"I suppose the cost for the NHS but, in the long-term, if you can pick something up early and correct it, it's going to be cheaper than if it's left and then down the road they are going to need more care and intervention" [P72]*

*"I suspect it's probably desirable...the cost or the complexity might outweigh the benefits; I'm not completely sure on that" [P122]*

Participants may have misunderstood the scope of the screening test. One participant felt reassured they had a healthy heart.

*"Well I suppose it was a chance to see if my heart was healthy; also it reassured me" [P65]*

### **Attitudes to the screening devices**

Some participants stated no particular preference towards any device, and felt that all were comfortable.

*"Absolutely no question of them being unpleasant...they were very unintrusive and unobjectionable" [P122]*

*"They were all comfortable. I could have coped with any of them...if I'd been selected to use a particular type it wouldn't have bothered me" [P72]*

Others participants had mixed opinions regarding the user-friendliness of the devices, and stated a preference towards those which were the least uncomfortable, least trouble, and least time-consuming to use (although their opinion as to which device was preferred differed between participants).

*"I think probably the one on the finger was most convenient to use. There was another one where you had to put patches on yourself...[which] I would probably have to force myself to do at home...it would just be one of those irritating things to do. There was another one...that every time you used it, you were going to have to turn on the computer, log into a site and it would upload the data onto the site... at a specific and regular time...[which would be] a bit of a faff." [P45]*

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*“They were all fine. I think the most difficult one...where you have all the things put on you...that’s the one that takes the time. But all the others seemed very, you know, quick...I think the first one was the simplest, the one with the thumbs” [P76]*

*“The worst one was the blood pressure cuff which was quite uncomfortable. The one...you wore it round your [rib cage] – you weren’t aware you were wearing it and I think that was the best one...The handheld device was quite comfortable but...you were holding it, so whereas wearing the thing around your chest, your hands were free to do other things...and the ECG, obviously, you had to be fully engaged with that and you couldn’t do other things” [P125]*

### **Attitudes towards undertaking prolonged screening**

Many participants stated that they would be happy to undergo prolonged screening using these (or similar) screening devices if it were recommended by their doctor.

*“I just tend to follow advice with that sort of stuff...if it’s because there was a need...it would be in my best interest then I would do yes” [P15]*

*“Even if it was uncomfortable...you would just do what you had to do really...I wouldn’t have any hesitation if it was a health matter” [P125]*

Others were more reserved about the idea of prolonged screening over a number of weeks or had specific concerns, for instance about the time required and the potential of screening to provoke anxiety or ‘take over your life’.

*“Well I’m not sure. It depends how many weeks we’re talking about...I mean I don’t have any other particular issue other than the timing” [P131]*

*“I’m probably a bit of an anxious person...so I might not be quite at ease...I’m not the sort of person that happily does something and just forgets...it tends to take over your life a bit...so if [it was] for two weeks or so, I might be a bit hesitant” [P130]*

Some participants seemed unclear or doubtful about prolonged screening, i.e. they would be happy to test for AF if there was a definitive need identified by their doctor but not just if it was a matter of their age. This suggests that the test, even if they felt the test was tolerable, they may have reservations about doing this in the absence of symptoms.

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*“I mean if there was a valid reason behind it...if it was just oh you’re getting to a certain age and we ought to look at it, I would probably...have a bit of a half-hearted effort at it...but if the doctor...[said that there] might be a problem here and it needs further investigation, then obviously I would take it quite seriously” [P45]*

## Discussion

Patients expressed positive opinions towards screening for AF at an early stage and the potential to save costs. Additionally, more than half of those invited for screening responded and were willing to take part in the SAFETY trial.<sup>14</sup> The participants seemed to have an incomplete understanding of AF (despite receiving printed information sheets about AF, paroxysmal AF and anticoagulation treatment) and conflated it with other heart problems or with raised blood pressure. Although a sphygmomanometer device was employed as one of the screening devices, the other devices used in the trial measured ECG signals and participants were informed that the 12-Lead ECG they had was a definitive diagnostic test.

Previous studies have identified that many patients with AF were not aware of the name of the condition<sup>15</sup> or that it led to an increased risk of stroke.<sup>16</sup> Other work has found that patients were uncertain what AF was before and after out-patient cardiology clinic appointments.<sup>17</sup> They also had difficulty understanding why they were treated with anti-coagulation, and why treatment was recommended lifelong.<sup>17</sup> Older patients, in particular, may have a poor understanding of AF<sup>18</sup>. This may be a key barrier to accepting anti-coagulation treatment and to future treatment adherence, which is imperative for stroke risk reduction.<sup>19</sup> Other work has found many patients were unaware that AF could be asymptomatic and therefore they may not be aware of paroxysmal episodes which could remain undiagnosed.<sup>20</sup>

Some participants in our study mentioned that screening might provoke anxiety, and data does suggest that screening can induce anxiety in other screening programmes including breast and cervical screening<sup>21-22</sup> and the potential for psychological harm from being labelled with an unexpected diagnosis.<sup>23</sup> However, when directly asked about potential



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3 downsides of screening in this study, participants did not mention the potential risk of harm  
4 from anti-coagulation treatment, or the risk of further investigations when deciding to  
5 participate, suggesting that this was not a major concern for them. This is consistent with  
6 other studies showing that many patients are unable to identify potential harms from other  
7 screening tests, and of those that did, they were mostly related to the test itself, not to  
8 further testing or treatment.<sup>24</sup> In contrast, patients could name benefits and tended to  
9 overestimate them.<sup>23</sup>

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17 Importantly, when asked for their opinions on any potential drawbacks, participants did not  
18 mention the accuracy of the diagnostic test or the potential for over-diagnosis. Patients do  
19 worry about potential false positive results for other screening tests such as lung cancer  
20 tests.<sup>25</sup> There is also concern that patients may not understand the concept of over-  
21 diagnosis<sup>20</sup>. However, evidence suggests that older patients may be suspicious or resistant  
22 to the concept of over-detection of other conditions.<sup>20,26</sup> Interestingly, there is also evidence  
23 that older adults perceived overuse to have occurred when interventions were used in the  
24 absence of symptoms (excluding cancer screening), did not improve symptoms, or against  
25 their preferences.<sup>27</sup>

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34 The screening devices were generally well accepted by the participants and found to be  
35 unobtrusive, but some participants expressed concerns about comfort, user-friendliness and  
36 time taken to use the device. AF screening devices have been found to be well-accepted by  
37 participants in previous large-scale trials.<sup>28,29</sup> However, many participants in our study  
38 stated they would be happy to undergo prolonged screening only if recommended by their  
39 doctor and some participants had specific concerns with respect to the time taken.

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Patients who chose not to participate in the trial may have had different views with respect  
to the usability and acceptance of the devices or may have chosen not to participate due to  
concerns over anticoagulation treatment or had greater anxiety regarding the screening  
process. Participants from differing areas and backgrounds may also have expressed  
markedly different views. We were unable to explore the views of screen positive patients.

### Practice and policy implications

There is a need to provide clear and concise information about AF, and to check patient understanding, before proceeding with any form of screening. Checklists could be used to ensure key points have been discussed and considered, and patients may require time to weigh up the risks and benefits before deciding to proceed with screening. Decision aids have been implemented for AF treatment but have usually been designed to support clinician decisions and do not explicitly engage patients.<sup>30</sup> Decision aids could potentially improve patient knowledge prior to screening and have been used to improve knowledge for other screening programs.<sup>31-34</sup> They could be used to explain the diagnostic test, conditions that could be diagnosed, quantitative information relating to diagnostic accuracy and the risks and benefits of treatment. They could also be used to promote clarification of patients' preferences about the screening and potential consequences in order to improve patient knowledge. Health care professionals could actively ask about any potential anxiety participants may have prior to screening and be prepared to discuss these.

Adequate information prior to screening should include the risk of bleeding with anticoagulation treatment if AF were detected. A discussion of available treatment options and lifestyle modifications before undergoing testing might also ensure the potential for future treatment adherence if AF was diagnosed. Patients should also be informed about the specificity of the screening test, and reminded that screening will not provide information on general heart function or cardiovascular risk in order to avoid false reassurance.

Patients should be well-informed regarding the test accuracy and the potential to miss paroxysmal AF which could increase compliance if prolonged or repeated screening were offered. An understanding of the paroxysmal and asymptomatic nature of AF in patients with intermittent AF may enhance treatment adherence. The emergence of consumer ECG devices and watches that can detect AF<sup>4</sup> will inevitably lead to an increase in asymptomatic patients presenting with suspected irregular pulses or subclinical AF, and we should ensure patients are well informed before referring for further tests (or to disregard this functionality until it has been further assessed). Furthermore, given the lack of RCT evidence for screening and the heterogeneity in stroke risk estimation data,<sup>35</sup> clinicians may be

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3 required to have discussions around uncertainty and over-diagnosis, particularly in  
4 asymptomatic patients who have effectively self-screened themselves for AF.  
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## 7 **Conclusions**

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10 Our study highlights that, even amongst patients who have been screened for AF, there may  
11 be poor understanding of both the nature of AF and potential negatives of screening.  
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13 Further work is required to determine if resources including decision aids can address this  
14 important knowledge gap, and improve clinical informed consent for AF screening.  
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28  
29

30  
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35  
36  
37

38  
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42  
43

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45

46  
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49 16/LO/1173). Informed consent was obtained from all participants (trial registration ISRCTN:  
50 17495003).  
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55 **Data availability statement:** No data are available.  
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<b>Interview Schedule</b>
Can you describe your understanding of atrial fibrillation?
What are your views about screening for atrial fibrillation? - What do you think the positives of screening are? - What do you think the negatives of screening are?
What did you think about the study information given to you?
Did you have any reservations about taking part, and if so, can you tell me a bit about them?
Do you have any regrets about taking part? If so, can you tell me a bit about them?
Could you tell me a bit about the devices you tried as part of the SAFETY trial?
How comfortable did you find the devices?
How would you feel about wearing or using the devices for a few weeks for screening?
Is there anything else you'd like to share about your participation in the trial, or your thoughts about AF

**Table 1 – Interview Schedule**

## Standards for Reporting Qualitative Research (SRQR)\*

<http://www.equator-network.org/reporting-guidelines/srqr/>

Page/line no(s).

### Title and abstract

<p><b>Title</b> - 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</p>	1
<p><b>Abstract</b> - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions</p>	2

### Introduction

<p><b>Problem formulation</b> - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement</p>	4
<p><b>Purpose or research question</b> - Purpose of the study and specific objectives or questions</p>	4

### Methods

<p><b>Qualitative approach and research paradigm</b> - 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**</p>	4-5
<p><b>Researcher characteristics and reflexivity</b> - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability</p>	5
<p><b>Context</b> - Setting/site and salient contextual factors; rationale**</p>	5
<p><b>Sampling strategy</b> - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**</p>	5
<p><b>Ethical issues pertaining to human subjects</b> - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues</p>	13
<p><b>Data collection methods</b> - 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**</p>	5

1 2 3 4 5	<b>Data collection instruments and technologies</b> - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	5
6 7 8	<b>Units of study</b> - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	5
9 10 11 12	<b>Data processing</b> - 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/de-identification of excerpts	5
13 14 15 16	<b>Data analysis</b> - 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**	5
17 18 19 20	<b>Techniques to enhance trustworthiness</b> - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	5

### Results/findings

23 24 25 26	<b>Synthesis and interpretation</b> - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	6-9
27 28 29	<b>Links to empirical data</b> - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	6-9

### Discussion

32 33 34 35 36 37	<b>Integration with prior work, implications, transferability, and contribution(s) to the field</b> - Short summary of main 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	10-13
38 39	<b>Limitations</b> - Trustworthiness and limitations of findings	3

### Other

42 43 44	<b>Conflicts of interest</b> - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	13
45 46	<b>Funding</b> - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	13

\*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.



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\*\*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.

**Reference:**

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014  
DOI: [10.1097/ACM.0000000000000388](https://doi.org/10.1097/ACM.0000000000000388)

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# BMJ Open

## Patients' views about screening for atrial fibrillation (AF): a qualitative study in primary care

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<b>Primary Subject Heading</b>:	Cardiovascular medicine
Secondary Subject Heading:	Qualitative research, General practice / Family practice
Keywords:	atrial fibrillation, QUALITATIVE RESEARCH, screening, general practice

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4 **Patients' views about screening for atrial fibrillation (AF): a**  
5 **qualitative study in primary care**  
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## Abstract

### Objectives

There has been increased interest in screening for Atrial Fibrillation (AF) with commissioned pilot schemes, ongoing large clinical trials and the emergence of inexpensive consumer single-lead ECG devices that can be used to detect AF. This qualitative study aimed to explore patients' views and understanding of AF and AF screening in order to determine acceptability and inform future recommendations.

### Setting

A single primary care practice in Hampshire, UK.

### Participants

15 participants (11 female) were interviewed from primary care who had taken part in an AF screening trial. A semi-structured interview guide was used flexibly, to enable the interviewer to explore any relevant topics raised by the participants. Interviews were recorded, transcribed verbatim, and analysed using inductive thematic analysis.

### Results

Participants generally had an incomplete understanding of AF and conflated it with other heart problems or with raised blood pressure. With regards to potential drawbacks from screening, some participants considered anxiety and the cost of implementation, but none acknowledged potential harms associated with screening such as side effects of anti-coagulation treatment or the risk of further investigations. The screening was generally well accepted, and participants were generally in favour of engaging with prolonged screening.

### Conclusions

Our study highlights that there may be poor understanding (of both the nature of AF and potential negatives of screening) amongst patients who have been screened for AF. Further work is required to determine if resources including decision aids can address this important knowledge gap, and improve clinical informed consent for AF screening.

**Trial Registration:** ISRCTN: ISRCTN 17495003.

## Strengths and limitations of this study

- A strength of this study is that all the interviews were conducted by a single researcher, thus ensuring consistency.
- The study had good representation in terms of a typical screening population aged over 65 years although the high proportion of female participants may have affected the results.
- All of the participants had taken part in the SAFETY AF screening trial and those not wishing to be screened for atrial fibrillation may have had different views.
- Participants were recruited from a single surgery and may have had similar views, not representative of the wider population. However, they were from an area of low deprivation and as they had taken part in a trial were likely to be more health literate than the wider population who may have a poorer understanding of AF, although we did not record individual demographic data.
- The participants all had a negative screen which may have affected their attitudes.

## Introduction

Atrial fibrillation (AF) is a common arrhythmia affecting around 10% of people aged over 65 in the UK<sup>1</sup> and is associated with an increased risk of stroke which is substantially reduced by anticoagulation.<sup>2</sup> Across England, it is estimated that 425,000 people are living with undiagnosed AF<sup>3</sup> and there has been much recent debate about screening for AF.<sup>4</sup> The European Cardiac Society currently recommends opportunistic screening in patients aged > 65 and consideration of systematic screening in patients aged > 75 or in those at higher stroke risk.<sup>5</sup> No country has yet implemented a systematic screening programme although NHS England has commissioned pilot AF screening schemes in pharmacies and in flu clinics to 'test the treatments and care models of tomorrow'.<sup>6,7</sup>

There are ongoing, large RCTs to investigate the cost-effectiveness of AF screening and the outcomes are eagerly awaited.<sup>8</sup> We are also witnessing a shift in healthcare with increased consumerisation of medical devices and the emergence of relatively inexpensive consumer single-lead ECG devices and watches that can be used for AF detection.<sup>9,10</sup> Hence, there now exists a great need to ensure patients are well informed before undertaking any form of AF screening and to understand patient attitudes towards screening for AF. In this article, we report on an interview study that aimed to explore patient views on screening for AF.

## Methods

The current qualitative study was nested within the Screening for Atrial Fibrillation using Economical and Accurate Technology (SAFETY) study.<sup>11</sup> 418 participants were recruited to the SAFETY trial from three primary care practices in the Wessex area. Individuals aged over 65 years both with and without a coded diagnosis of AF in their medical records were invited by their GP to a single nurse-led screening visit in order to test the accuracy of several devices (a blood pressure meter, a single-lead device and two ECG sensing consumer devices) for the detection of AF. Research nurses explained how to use the devices and participants were able to ask questions about AF and the devices during the visit.

## Data collection

For this qualitative study, a convenience sample of 34 of the 418 trial participants not known to have AF from a single GP surgery were invited to take part in an interview.

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3 Participants who consented to the qualitative study were approached sequentially (in order of  
4 randomisation to the main study) by telephone (from the first recruiting site of 3 which all had low  
5 levels of deprivation). Of these, 15 agreed to participate. We only invited participants who did  
6 not have AF as they would likely be more representative of a typical screening population.  
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8 We did not record reasons for declining to participate. All the participants had previously  
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10 been sent information leaflets as part of the trial invitation with detailed information on AF,  
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12 screening for AF, and treatment options if AF were detected. Interviews were conducted by  
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14 SH (a senior researcher with considerable qualitative research experience) via telephone,  
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16 audio-recorded and transcribed verbatim, assigning ID numbers to preserve anonymity. A  
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18 semi-structured interview guide was used flexibly, to enable the interviewer to explore any  
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20 relevant topics raised by the participants (Table 1). The interview guide covered topics such  
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22 as the patient's understanding of AF, views about AF screening (including benefits and  
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24 drawbacks), opinions about the devices trialled (e.g. device comfort) and opinions about  
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26 future use of the devices. The interviews were carried out between May 2017 and July 2017  
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28 and lasted around 15 minutes.  
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### 30 31 **Data analysis**

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33 Interview transcripts were analysed using inductive thematic analysis (as we had little prior  
34 data or predetermined theory on AF.)<sup>12</sup> Transcripts were read and re-read (ML, SH, CW, MS) to  
35  
36 identify codes, which were then organised iteratively into a coding manual by ML and CW.  
37  
38 Main themes and sub-themes were generated independently by ML and CW then reviewed  
39  
40 and refined through further discussions within the team, which included a mix of clinicians  
41  
42 and academics with varying degrees of experience. The study team held regular meetings  
43  
44 during the data collection phase and assessed the data for saturation of main themes and  
45  
46 searched for disconfirming cases (the authors reviewed themes emerging during coding and  
47  
48 were confident saturation had been reached when no new themes of interest were arising  
49  
50 approximately half way through the interviews.) The sample size was appropriate and  
51  
52 sufficient to achieve saturation of main themes<sup>13</sup>.  
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## Patient and public involvement

Patient and public representatives were involved in the design of the study from the funding application stage and in protocol development. All the study materials were developed with lay input.

## Results

### Participant characteristics

Of the 15 participants who took part in the qualitative study, four were male (26.7%) and the average age was 68 years (range = 65-73) (SD = 2.74). The average age of the participants in the SAFETY trial was 73.9 years and 43% were female. The index of multiple deprivation score for the participating GP practice was 17.7 (2<sup>nd</sup> quintile in England (from low levels of deprivation to high)) and the income deprivation score affecting older people (> 60 years) index was 17.3 (middle quintile). All participants were fluent in English. A number of themes emerged relating to their [1] understanding of AF, [2] attitudes to screening (in general and for AF specifically), [3] attitudes to the screening devices tested during the SAFETY study, and [4] their attitudes to undergoing prolonged screening.

#### *Understanding of atrial fibrillation*

Participants were asked to describe their understanding of AF. In interpreting responses to this question, it needs to be highlighted that all participants had received an information sheet, which described AF as 'an irregular heart rhythm that can lead to blood clots forming within the heart which can come loose and cause a stroke.' Despite this, there was considerable confusion about the nature of the condition. Although the majority of participants said they were aware that AF related to a problem with the heart, many (6/15) seemed unaware that it related to heart rhythm irregularity, and few acknowledged its association with risk of stroke or developing clots (2/15).

*"Something wrong with your heart system...of the atrium and connecting pipes"*

[P15]

*"Well, to identify a possible stroke and high blood pressure and possible stroke and heart attack." [P5]*

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2  
3 *"it's a condition that is related to the blood circulation" [P43]*  
4

5 *"Well if the heart isn't functioning properly and this is a condition that could be*  
6 *picked up...if you have heart problems" [P65]*  
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### 10 **Attitudes to screening**

11  
12 When asked for their views regarding screening for atrial fibrillation, many of the  
13 participants stated positive opinions about health screening in general, with regards to early  
14 detection and saving money for the health service.  
15  
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17  
18 *"I believe in screening as much as possible...anything that helps with picking up*  
19 *conditions, I think, is a good thing" [P72]*  
20  
21

22 *"Having more treatments or monitoring available...can't be a bad thing" [P122]*  
23

24 *"Saves the health service a hell of a lot of money...any kind of health screening on the*  
25 *NHS system is a very good idea" [P131]*  
26  
27  
28

29 Many participants raised positive opinions regarding early detection and treatment of AF  
30 specifically, and two mentioned prevention of stroke.  
31  
32

33 *"I think it's sensible to know if you've got AF, because then it's possible to have some*  
34 *treatment" [P39]*  
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38 In response to the question "What are your thoughts about screening for atrial  
39 fibrillation": *"Well I actually think it's a good idea; there's a lot of heart conditions in*  
40 *my own family on my father's side, and so it's no harm to be monitored every so*  
41 *often, along the way" [P53]*  
42  
43  
44

45 *"I think it's an excellent idea; better to catch a condition early if you possibly can,*  
46 *especially if people...[are] not aware they have it...if there's medication or other*  
47 *things to stop it...I know there are so many other calls on the Health Service, but I*  
48 *know stroke and so on being so debilitating; if you can avoid any at all, that would be*  
49 *a good thing" [P125]*  
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58 Most participants didn't describe any potential downsides to screening for AF. Possible  
59 negatives that were raised by participants included anxiety and cost for the health service.  
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3 *"It might make you anxious, but my anxiety on that score would be counteracted by -*  
4 *at least I know and it's now in hand, as opposed to not knowing and then it causing a*  
5 *complication"* [P39]  
6  
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8  
9 *"Perhaps...it might trigger people to be too anxious about their health, perhaps if*  
10 *they were ...that sort of person"* [P125]  
11  
12

13 *"I suppose the cost for the NHS but, in the long-term, if you can pick something up*  
14 *early and correct it, it's going to be cheaper than if it's left and then down the road*  
15 *they are going to need more care and intervention"* [P72]  
16  
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18 *"I suspect it's probably desirable...the cost or the complexity might outweigh the*  
19 *benefits; I'm not completely sure on that"* [P122]  
20  
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23  
24 Participants may have misunderstood the scope of the screening test. One participant felt  
25 reassured they had a healthy heart.  
26

27  
28 *"Well I suppose it was a chance to see if my heart was healthy; also it reassured me"* [P65]  
29  
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### 31 32 33 **Attitudes to the screening devices**

34  
35 Some participants stated no particular preference towards any device, and felt that all were  
36 comfortable.  
37

38  
39 *"Absolutely no question of them being unpleasant...they were very unintrusive and*  
40 *unobjectionable"* [P122]  
41  
42

43 *"They were all comfortable. I could have coped with any of them...if I'd been selected*  
44 *to use a particular type it wouldn't have bothered me"* [P72]  
45  
46

47  
48 Others participants had mixed opinions regarding the user-friendliness of the devices, and  
49 stated a preference towards those which were the least uncomfortable, least trouble, and  
50 least time-consuming to use (although their opinion as to which device was preferred  
51 differed between participants).  
52  
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54  
55 *"I think probably the one on the finger was most convenient to use. There was*  
56 *another one where you had to put patches on yourself...[which] I would probably*  
57 *have to force myself to do at home...it would just be one of those irritating things to*  
58  
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3 do. There was another one...that every time you used it, you were going to have to  
4 turn on the computer, log into a site and it would upload the data onto the site... at a  
5 specific and regular time...[which would be] a bit of a faff." [P45]  
6  
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8  
9 "They were all fine. I think the most difficult one...where you have all the things put  
10 on you...that's the one that takes the time. But all the others seemed very, you know,  
11 quick...I think the first one was the simplest, the one with the thumbs" [P76]  
12  
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14  
15 "The worst one was the blood pressure cuff which was quite uncomfortable. The  
16 one...you wore it round your [rib cage] – you weren't aware you were wearing it and I  
17 think that was the best one...The handheld device was quite comfortable but...you  
18 were holding it, so whereas wearing the thing around your chest, your hands were  
19 free to do other things...and the ECG, obviously, you had to be fully engaged with  
20 that and you couldn't do other things" [P125]  
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### 26 27 **Attitudes towards undertaking prolonged screening**

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29 Many participants stated that they would be happy to undergo prolonged screening using  
30 these (or similar) screening devices if it were recommended by their doctor.  
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33 "I just tend to follow advice with that sort of stuff...if it's because there was a need...it  
34 would be in my best interest then I would do yes" [P15]  
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37  
38 "Even if it was uncomfortable...you would just do what you had to do really...I  
39 wouldn't have any hesitation if it was a health matter" [P125]  
40  
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42 Others were more reserved about the idea of prolonged screening over a number of weeks  
43 or had specific concerns, for instance about the time required and the potential of screening  
44 to provoke anxiety or 'take over your life'.  
45  
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48  
49 "Well I'm not sure. It depends how many weeks we're talking about...I mean I don't  
50 have any other particular issue other than the timing" [P131]  
51

52  
53 "I'm probably a bit of an anxious person...so I might not be quite at ease...I'm not the  
54 sort of person that happily does something and just forgets...it tends to take over  
55 your life a bit...so if [it was] for two weeks or so, I might be a bit hesitant" [P130]  
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3 Some participants seemed unclear or doubtful about prolonged screening, i.e. they would  
4 be happy to test for AF if there was a definitive need identified by their doctor but not just if  
5 it was a matter of their age. This suggests that the test, even if they felt the test was  
6 tolerable, they may have reservations about doing this in the absence of symptoms.  
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10  
11 *“I mean if there was a valid reason behind it...if it was just oh you’re getting to a*  
12 *certain age and we ought to look at it, I would probably...have a bit of a half-hearted*  
13 *effort at it...but if the doctor...[said that there] might be a problem here and it needs*  
14 *further investigation, then obviously I would take it quite seriously” [P45]*  
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## 22 Discussion

### 23 Principal findings

24  
25 Participants expressed positive opinions towards screening for AF at an early stage and the  
26 potential to save costs although some participants mentioned that screening might provoke  
27 anxiety. The participants seemed to have an incomplete understanding of AF (despite  
28 receiving printed information sheets about AF, paroxysmal AF and anticoagulation  
29 treatment) and conflated it with other heart problems or with raised blood pressure.  
30 Although a sphygmomanometer device was employed as one of the screening devices, the  
31 other devices used in the trial measured ECG signals and participants were informed that  
32 the 12-Lead ECG they had was a definitive diagnostic test. However, more than half of those  
33 invited for the screening trial were willing to take part in the SAFETY trial<sup>14</sup> with the  
34 information we provided.  
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46 Importantly, when asked for their opinions on any potential drawbacks, participants did not  
47 mention the accuracy of the diagnostic test or the potential for over-diagnosis. The  
48 screening devices were generally well accepted by the participants and found to be  
49 unobtrusive, but some participants expressed concerns about comfort, user-friendliness and  
50 time taken to use the device.  
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### 56 Strengths and weaknesses of the study

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3 A strength of this study is that participants were representative of a typical AF screening  
4 population aged over 65 years and had received information about AF and participated in  
5 screening. Patients who chose not to participate in the screening trial may however have  
6 had different views with respect to the usability and acceptance of the devices or may have  
7 chosen not to participate due to concerns over anticoagulation treatment or anxiety  
8 regarding the screening process.  
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11  
12 A further limitation is that participants were recruited from a single surgery and may  
13 therefore hold similar views. However, as they had taken part in a trial of AF screening, were  
14 likely to have a better understanding of AF than the general population, making our finding  
15 of confusion around the topic particularly interesting.  
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18  
19 The high proportion of female participants is a common occurrence in qualitative studies  
20 and may have affected the findings so is also a limitation. Furthermore, we were unable to  
21 explore the views of screen positive patients who may have felt they could have been better  
22 informed prior to screening and may have had different opinions on screening in general.  
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### 25 26 27 28 29 30 31 **Findings in relation to other studies**

32  
33 Previous studies have identified that many patients with AF were not aware of the name of  
34 the condition<sup>15</sup> or that it led to an increased risk of stroke.<sup>16</sup> Other work has found that  
35 patients were uncertain what AF was before and after out-patient cardiology clinic  
36 appointments.<sup>17</sup> They also had difficulty understanding why they were treated with anti-  
37 coagulation, and why treatment was recommended lifelong.<sup>17</sup> Older patients, in particular,  
38 may have a poor understanding of AF<sup>18</sup>. This may be a key barrier to accepting anti-  
39 coagulation treatment and to future treatment adherence, which is imperative for stroke  
40 risk reduction.<sup>19</sup> Other work has found many patients were unaware that AF could be  
41 asymptomatic and therefore they may not be aware of paroxysmal episodes which could  
42 remain undiagnosed.<sup>20</sup>  
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46 Other data suggests that screening can induce anxiety in other screening programmes  
47 including breast and cervical screening<sup>21-22</sup> and the potential for psychological harm from  
48 being labelled with an unexpected diagnosis.<sup>23</sup> However, when directly asked about  
49 potential downsides of screening in this study, participants did not mention the potential  
50 risk of harm from anti-coagulation treatment, or the risk of further investigations when  
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3 deciding to participate, suggesting that this was not a major concern for them. This is  
4 consistent with other studies showing that many patients are unable to identify potential  
5 harms from other screening tests, and of those that did, they were mostly related to the  
6 test itself, not to further testing or treatment.<sup>24</sup> In contrast, patients could name benefits  
7 and tended to overestimate them.<sup>23</sup>  
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13 Patients do worry about potential false positive results for other screening tests such as lung  
14 cancer tests.<sup>25</sup> There is also concern that patients may not understand the concept of over-  
15 diagnosis<sup>20</sup>. However, evidence suggests that older patients may be suspicious or resistant  
16 to the concept of over-detection of other conditions.<sup>20,26</sup> Interestingly, there is also evidence  
17 that older adults perceived overuse to have occurred when interventions were used in the  
18 absence of symptoms (excluding cancer screening), did not improve symptoms, or against  
19 their preferences.<sup>27</sup>  
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26 AF screening devices have been found to be well-accepted by participants in previous large-  
27 scale trials.<sup>28,29</sup> However, many participants in our study stated they would be happy to  
28 undergo prolonged screening only if recommended by their doctor and some participants  
29 had specific concerns with respect to the time taken.  
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### 34 **Practice and policy implications**

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37 There is a need to provide clear and concise information about AF, and to check patient  
38 understanding, before proceeding with screening. Checklists could be used to ensure key  
39 points have been discussed and considered, and patients may require time to weigh up the  
40 risks and benefits before deciding to proceed with screening. Decision aids have been  
41 implemented for AF treatment but have usually been designed to support clinician decisions  
42 and do not explicitly engage patients.<sup>30</sup> Decision aids could potentially improve patient  
43 knowledge prior to screening and have been used to improve knowledge for other  
44 screening programs.<sup>31-34</sup> They could be used to explain the diagnostic test, conditions that  
45 could be diagnosed, quantitative information relating to diagnostic accuracy and the risks  
46 and benefits of treatment. They could also be used to promote clarification of patients'  
47 preferences about the screening and potential consequences in order to improve patient  
48 knowledge. Health care professionals could actively ask about any potential anxiety  
49 participants may have prior to screening and be prepared to discuss these.  
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3 Although participants in this study did not raise concerns regarding a lack of clear  
4 information, the importance of providing information of risks as well as benefits of  
5 screening is well-established in other screening programmes.<sup>35</sup> For patients considering  
6 screening for AF, healthcare professionals could consider providing information about the  
7 risk of bleeding with anticoagulation treatment if AF were detected, in addition to potential  
8 benefits. A discussion of available treatment options and lifestyle modifications before  
9 undergoing testing might also ensure the potential for future treatment adherence if AF was  
10 diagnosed. Patients could also be informed about the specificity of the screening test, and  
11 reminded that screening will not provide information on general heart function or  
12 cardiovascular risk in order to avoid false reassurance.  
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### 22 **Future research**

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24 Further research should focus on screen positive patients to determine their views on  
25 information provision prior to screening and their wider opinions on screening for AF.  
26  
27 Future research should also include a wider demographic of patients. There is also a need to  
28 understand how pre-screening information and discussions influence patients' decisions to  
29 undergo screening for AF.  
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### 34 **Conclusions**

35  
36 Our study highlights that, even amongst patients who have been screened for AF, there may  
37 be poor understanding of both the nature of AF and potential negatives of screening.  
38  
39 Further work is required to determine if resources including decision aids can address this  
40 important knowledge gap, and help patients make informed decisions around AF screening.  
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### 48 **Word count 3296**

49  
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51 this study: without them this study would not have been possible.  
52  
53

54  
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56 coded and analysed the interview data. ML, CW, SH & MS contributed to the interpretation  
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58  
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of the data. ML drafted the manuscript and all authors contributed to the review and editing of the manuscript.

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For peer review only

<b>Interview Schedule</b>
Can you describe your understanding of atrial fibrillation?
What are your views about screening for atrial fibrillation? - What do you think the positives of screening are? - What do you think the negatives of screening are?
What did you think about the study information given to you?
Did you have any reservations about taking part, and if so, can you tell me a bit about them?
Do you have any regrets about taking part? If so, can you tell me a bit about them?
Could you tell me a bit about the devices you tried as part of the SAFETY trial?
How comfortable did you find the devices?
How would you feel about wearing or using the devices for a few weeks for screening?
Is there anything else you'd like to share about your participation in the trial, or your thoughts about AF

**Table 1 – Interview Schedule**

## Standards for Reporting Qualitative Research (SRQR)\*

<http://www.equator-network.org/reporting-guidelines/srqr/>

Page/line no(s).

### Title and abstract

<p><b>Title</b> - 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</p>	1
<p><b>Abstract</b> - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions</p>	2

### Introduction

<p><b>Problem formulation</b> - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement</p>	4
<p><b>Purpose or research question</b> - Purpose of the study and specific objectives or questions</p>	4

### Methods

<p><b>Qualitative approach and research paradigm</b> - 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**</p>	4-5
<p><b>Researcher characteristics and reflexivity</b> - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability</p>	5
<p><b>Context</b> - Setting/site and salient contextual factors; rationale**</p>	5
<p><b>Sampling strategy</b> - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**</p>	5
<p><b>Ethical issues pertaining to human subjects</b> - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues</p>	13
<p><b>Data collection methods</b> - 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**</p>	5

<b>Data collection instruments and technologies</b> - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	5
<b>Units of study</b> - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	5
<b>Data processing</b> - 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/de-identification of excerpts	5
<b>Data analysis</b> - 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**	5
<b>Techniques to enhance trustworthiness</b> - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	5

### Results/findings

<b>Synthesis and interpretation</b> - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	6-9
<b>Links to empirical data</b> - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	6-9

### Discussion

<b>Integration with prior work, implications, transferability, and contribution(s) to the field</b> - Short summary of main 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	10-13
<b>Limitations</b> - Trustworthiness and limitations of findings	3

### Other

<b>Conflicts of interest</b> - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	13
<b>Funding</b> - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	13

\*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

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\*\*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.

**Reference:**

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014  
DOI: [10.1097/ACM.0000000000000388](https://doi.org/10.1097/ACM.0000000000000388)

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