


ORIGINAL RESEARCH

# Educational Needs of People Living with Atrial Fibrillation: A Qualitative Study

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**BACKGROUND:** This study explored the educational and self-management needs of adults living with atrial fibrillation (AF).

**METHODS AND RESULTS:** This is a qualitative study of adults living with AF, clinicians, and expert key stakeholders. Interviews were conducted via a one-to-one semistructured videoconference or phone and transcribed verbatim for thematic analysis. A total of 34 participants were recruited and included in analyses (clinicians n=13; experts n=13, patients n=8). Interviews were on average 40 (range 20–70) minutes in duration. Three key themes were identified: (1) “Patient-centered AF education”; (2) “Prioritizing AF education”; and (3) “Timing AF education.” The availability of credible information was perceived as highly variable. Information primarily focused on anticoagulation, or procedural information, as opposed to other aspects of management, such as risk factor reduction. Factors to optimize learning, such as multimedia, apps, case studies, or the use of visuals were perceived as important. Continuity of care, including engagement of caregivers, was important to help develop relationships, and facilitate understanding, while concurrently creating opportunities for timely targeted education. Clinicians described acute care as a suboptimal setting to deliver education. Competing interests aligned with the time-pressured context of acute care were prioritized over patient education. In contrast, patients valued continuity of care. AF education strategies need to pivot from a “one size fits all” approach and modernize to implement a range of approaches.

**CONCLUSIONS:** There remain many unmet needs in the provision of quality AF education to support self-management. Multimodal offerings and the ability to tailor to individual patient needs are important design considerations for new education programs.

**Key Words:** anticoagulation ■ atrial fibrillation ■ education ■ patient education ■ self-management

**A**trial fibrillation (AF) is the most commonly sustained cardiac arrhythmia in adults. AF is a global health concern with significant health care burden and socio-economic cost. Common clinical sequelae of AF include heart failure and stroke.<sup>1,2</sup> Integrated AF care is widely recommended throughout international clinical practice guidelines to optimize patient outcomes, such as reduced rehospitalization and improved quality of life.<sup>2,3</sup> Integrated care comprises 4 fundamental components including patient engagement, a multidisciplinary approach, the use of technology and comprehensive management focused on

AF treatment, complication prevention, multimorbidity reduction, and lifestyle risk modification.<sup>2,4</sup>

Education is a central tenant of integrated AF management that aims to engage, empower, and inform people living with AF, and their family or caregivers, with their AF treatment and management plan.<sup>5</sup> Personalized education is an important strategy towards improving AF outcomes.<sup>6,7</sup> A recent meta-analysis found that patient education for AF was associated with a reduction in serious adverse events, as well as improved mental health and quality of life.<sup>8</sup> These results are similar to those in a Cochrane review,

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## CLINICAL PERSPECTIVE

### What Is New?

- Quality patient education is an important aspect to support atrial fibrillation self-management.
- Patient education for atrial fibrillation was poor, and the availability of credible resources was variable.

### What Are the Clinical Implications?

- There are many unmet patient needs regarding patient education for atrial fibrillation.

which showed that patient education reduced anxiety and depression in those with AF.<sup>6</sup> However, the effects were relatively small, and most studies included in the review were of low-quality evidence, indicating that more high-quality studies are warranted. Education to support self-management for patients with chronic cardiovascular conditions can be delivered through traditional methods (such as nurse-to-patient, face-to-face verbal education) or increasingly through digital education programs, such as websites and smartphone.<sup>9,10</sup>

Providing treatment knowledge about AF to patients and their caregivers are key components of, and predictors of adherence to, pharmacological AF treatments.<sup>11</sup> Risk factor reduction, medication adherence, reducing complications, and advice regarding when to seek medical attention have been identified as educational needs.<sup>12</sup> Stress and anxiety, commonly experienced by individuals with AF, are often related to suboptimal education-tailored learning strategies that promote clear communication of prognosis and knowledge that underpins capacity for management.<sup>13,14</sup> Patients need the opportunity to learn about, and discuss treatment options and to fully engage in shared decision-making processes.<sup>15</sup> Notably, when patients are more active communicators, physicians provide more information.<sup>16</sup> Conversely, patients are more inclined to be involved in decision making when they feel understood and educated in the context of supportive and confirmed learning. With advancement in technology and approaches to provide education in AF, there is an urgent need to understand perspectives of the educational experience across the AF care continuum.

This study was designed to explore perspectives from patients, clinicians, and expert key stakeholders on the educational needs of people living with AF.

## METHODS

Because of the sensitive nature of the data collected for this study, requests to access the data set from qualified

researchers trained in human subject confidentiality protocols may be sent to the corresponding author.

## DESIGN

This exploratory study was conducted through a series of one-to-one semistructured interviews undertaken with cardiovascular clinicians, expert key stakeholders, and people living with AF. The qualitative method of thematic analysis<sup>17</sup> was used to identify, analyze, organize, and report themes found within the interviews to elicit educational perspectives of people living with AF. Research is reported in accordance with the consolidated criteria for reporting qualitative research checklist.<sup>18</sup>

## SITES AND PARTICIPANTS

Purposeful sampling was used to recruit cardiovascular clinicians, expert key stakeholders, and people living with AF, from 2 medium-size (534 and 375 beds), tertiary metropolitan hospitals in diverse areas of Western and South Sydney, New South Wales, Australia. Multidisciplinary clinicians working primarily in the cardiovascular specialty were invited to participate through study posters and flyers placed in cardiology wards and cardiac rehabilitation units. People living with AF admitted to the hospital under the care of specialist cardiology services were invited to be interviewed by a research nurse (who did not have any prior relationship with the patient) following their discharge from acute care. A range of expert key stakeholders from peak organizations were directly invited by email through purposive sampling, to ensure diversity in experience and knowledge of education needs of people living with AF. Inclusion criteria were as follows: participants with a diagnosis of AF (patients); the ability to participate in phone or videoconference interview; and the ability to communicate and consent in English.

## INTERVIEWS

One-to-one semistructured interviews were conducted by 2 research nurses (CF and LL) via videoconference or phone between July 2020 and January 2021. This approach was selected to be consistent with social distancing restrictions during the COVID-19 pandemic and the geographical spread of participants. Interviews were audio recorded and transcribed verbatim by the research team. Example interview questions included “What is your experience of educating patients about their AF?”, “What are the core components of AF education?” and “What could be improved to better educate patients about their AF?”. Standardized interview guides were developed from the research teams’ own experience of working with the patient group, and were

peer reviewed. Refer to Tables S1 through S3 for sample Interview Guides.

## DATA ANALYSIS

Data collection was completed when there were no new concepts revealed and saturation occurred. Thematic analysis was undertaken between March and July 2021 according to the methods proposed by Braun and Clarke.<sup>17</sup> Two researchers independently reviewed transcripts, created meaning units, and generated categories and themes. Disagreements were resolved through discussion and consensus. NVivo v12 (released in March 2020) was used to organize and code data. Rigor in credibility, transferability, and dependability was maintained through discussion of findings among a research team with expertise in AF care, purposeful sampling to include varied sociodemographic and clinical characteristics, and multiple researchers engaging in the analyses (LL, CF, and LH).

## APPROVALS AND ETHICAL CONSIDERATIONS

Each participant received written information and the opportunity to receive verbal information about the research project and provided informed consent before interviews commenced. The research project was approved by Western Sydney Local Health District Human Research Ethical Committee and Western Sydney University Human Research Ethics Committee before study commencement (Approval reference: 2019/ETH12907 and RH13575). The participants were informed about confidentiality and anonymity of the data, and that at any stage they were free to withdraw from the study without any consequences.

## RESULTS

### Participant Characteristics

A total of 34 phone or virtual interviews were completed with 13 clinicians (12 female/1 male), 13 expert key stakeholders (9 female/4 male) and 8 patients (4 females and 4 males). The clinician cohort comprised nurses with varying qualifications and expertise, ranging from newly registered graduate nurses (RN) to nurse practitioners. Most nurses were engaged in the direct provision of inpatient care; however, a few were engaged in the provision of clinic-based care. Experts included peak body experts with responsibility for local or national support of self-management programs (such as representatives from peak stroke and heart organizations, community-based programs, or associations with oversight of self-management programs). Patients were individuals with AF (primarily chronic,

permanent or paroxysmal AF, not newly diagnosed, and were recruited from the inpatient cardiology setting during an acute hospitalization). Interviews were on average 40 minutes in duration (range 20–70 minutes).

### Themes

Three key themes were identified: (1) “Patient-centered AF education” included 3 categories: (i) Understanding and tailoring education to the diverse needs of patients; (ii) engaging family and caregivers; and (iii) tailoring education to meet patient needs. (2) “Prioritizing AF education” included 3 categories: (i) technology in AF education for patients and clinicians; (ii) multimodal education strategies; and (iii) strengthening AF education across the care continuum to improve management. The third theme “Timing AF education” included 3 categories: (i) patient perspectives on AF education timing; (ii) clinician considerations for improving the timing of AF education; and (iii) every interaction with the patient is an opportunity for education (Table 1).

#### 1. Patient-centered AF education

The first theme “Patient-centered AF education” included 3 categories; (i) Understanding and tailoring education to the diverse needs of patients; (ii) engaging family and caregivers; and (iii) tailoring education to patient needs. Patients, clinicians, and expert stakeholders all identified the need to tailor AF education to the needs of the person and their caregivers.

- (i) Understanding and tailoring education to the diverse needs of patients

Consideration of patient characteristics such as demographics, health literacy, and extra support for patients from culturally and linguistically diverse backgrounds, were identified as important factors to consider when educating patients with AF. The patient and the mechanisms available for content delivery pose challenges for education.

**Table 1. Key Themes and Categories**

Theme	Categories
Patient-centered AF education	(i) Understanding and tailoring education to the diverse needs of patients (ii) Engaging family and caregivers (iii) Tailoring education to patient needs
Prioritizing AF education	(i) Technology in AF education for patients and clinicians (ii) Multi-modal education strategies (iii) Strengthen AF education across the care continuum to improve management
Timing AF education	(i) Patient perspectives on AF education timing (ii) Clinician considerations for improving the timing of AF education and (iii) Every interaction with the patient is an opportunity for education

AF indicates atrial fibrillation.

*Obviously in people with non-English-speaking backgrounds that can take upwards of ...20 minutes so, give or take, ... if they have extra support or if they don't have extra support...that can vary.....and then that includes...checking back with the patient and asking them. (Clinician 4)*

*So the literacy component really needs to be developed because...it's been...at post-grad level, [and] most of the content within the health system is not really going to get the message across.*

*(Expert Stakeholder 10)*

*At that time, he just told me that it was atrial fibrillation in your heart. ... I did not realize that was the top chamber until more recently. To be honest, I could not definitively say where the education [came] from; I probably read a bit, [but] I'm not a fan of Dr Google, but I might have done so. But my GP is one of those GPs that I guess [is] somewhat unique; he will sit and spend time and talk to you. If you ask a question he'll go right through things, and I've got a lot of confidence in what he tells me. (Patient 8)*

## (ii) Engaging family and caregivers

Both patients and clinicians agreed that family members and caregivers play a critical role in the patient's AF care. Tailoring education in response to the individual's family structure, and engaging the family member/caregiver in education, was perceived as contributing to improved outcomes, including knowledge. Caregivers and family members help interpret, reiterate, and make sense of information, provide direct care to the patient, and can influence and support lifestyle behavior change. The educational needs of caregivers should be considered in parallel to patients.

*So I'd like to talk about things and [get them] explained to me ...if it's something practical. I also like [there to be] instructions ...that I can fall back on. (Patient 8)*

*While it was physical ... you did exercises and might be doing all that kind of stuff*

*[cardiac rehab]. There were also lectures on what you have and what your heart doesn't want... what the medication is, and what your diet should be and all [that] kind of stuff. Your partner, wife, or husband or whatever can sit in on the lectures. (Patient 8)*

*[How] are the needs of the caregiver different from [the needs of] a patient? ... I think that sometimes we sort of lump them in together and say, well, the caregiver would just work this out. But I think that it is different. I think that... all of us need to work a little bit better with caregivers.*

*(Expert Stakeholder 5)*

## (iii) Tailoring education to patient needs

AF education should be tailored to a patient's context, including individual circumstances and preferences, and level of understanding. A patient's readiness and motivation for learning, and the optimal timing of education were important considerations. Education could be perceived as generic to cardiovascular disease and did not necessarily adequately address patients with AF and clinicians' needs. Traditional education materials such as information booklets were unable to be individually tailored to the specific needs of patients with AF.

*I've got that booklet from the [---] Heart Clinic. But it had nothing on AF. (Patient 7)*

*.....when we went to the heart clinic they gave me stuff there; I think they gave that to every patient for your heart. It's a little booklet. But it doesn't say anything about AF. (Patient 4)*

*It was about the do's and don'ts of... what you have to do. When you got a device implanted. You know, like for example, no electric welding, etc. Like that, you know. (Patient 3)*

*We have a very basic information sheet about AF and stroke. (Expert Stakeholder 6)*

*Print resources, it's very hard ...to tailor them to an individual's needs. (Expert Stakeholder 9)*

Patient's preferences regarding the mode of education and the simplicity of messaging were found to be important to ensure that AF education is effective. It was felt that to enhance AF management, a patient's education preferences such as modality of learning; patient motivation; health-seeking behavior; readiness for learning; and timeliness of education delivery had to be evaluated.

*... the patient's motivation and how serious it is.... to strike the right balance between planning [and] how serious it is. But not scaring them .. (Expert Stakeholder 3)*

*Sometimes people will come down and they will be ready for the education, and I can go there, ... other times, I'll wait a little bit because ...sometimes it's just overwhelming to get all this information. And that's the last thing that they want. (Clinician 3)*

*No one really explained to me exactly what it was or how it started...He didn't explain it to me very well, what it was or how I got it. And he just said it's a reasonably common sort of thing. I think he said about 1 in 5 people have it, but a lot of them don't realize they have it. (Patient 4)*

In the absence of adequate information about AF, patients frequently sought information from sources, such as the internet, to educate themselves on AF, which can lead to receiving misinformation.

*But ...one thing ...I did have a problem with, when it first happened, ... was lack of information. I actually went into "Dr Google" and looked up the Mayo Clinic to see what they had to say about it. (Patient 9)*

*A lot of them do their own research and will find it out themselves. So it's best them having a conversation as opposed to "Dr Google" where they may be misinformed. (Expert Stakeholder 7)*

## (2) Prioritizing AF Education

The second theme, "Prioritizing AF education," included 3 categories; (i) technology in AF education for

patients and clinicians; (ii) multimodal education strategies; and (iii) strengthening AF education across the care continuum to improve management. All participant groups identified opportunities to make the AF educational experience more effective for learning and self-management.

- (i) Technology in AF education for both patients and clinicians

Incorporating the use of technology was reported to be critical to provide a scaffolded education framework with wide variety to meet both patients' and clinicians' education needs. Technology use ranged from smartphone apps, podcasts, email listservs, videos, DVDs, USBs, tablets, smartwatches, and video sharing and engagement with social media platforms such as YouTube and Facebook. Tailoring to a person's preference and to their digital proficiency is key to the choice of technology used to support AF education.

*....but information in no matter what form it wouldn't matter, ... even if I got an email or an update on an email. That's probably a fairly easy and efficient way of keeping people informed. But, ...that's going to be your problem ... disseminating information and people's preferences. (Patient 10)*

*I'm not a big downloader of apps, but you know if there was one I'd probably use it. (Patient 9)*

*Well, I haven't got an iPhone, I've just got a little phone here that's probably 20 years old and that does me. I can get in and out and ring out, receive phone calls. (Patient 8)*

*...You can put [information about AF] on YouTube, you can put it on ... webinars. You can... give someone a video or DVD or put it on a USB and ... put [it] on a computer at home so they can they can just see it, but other family members can look at it [also]. (Expert Stakeholder 3)*

*...need to look at different ways ...of ... delivering the education again through videos. I don't think there's going to be one set way of delivering the education, given that everyone is different... (Expert Stakeholder 7)*

... if it's something sharp, short, and succinct that could possibly happen in a hospital setting. If it's something lengthy depending on how much education the person needs. Then they probably would be good to do in a group based environment in the community.

(Expert Stakeholder 10)

...there's so many platforms... It's just a matter of personal preference.

(Clinician 2)

So, ... there's multiple formats [that are] available.

(Expert Stakeholder 6)

## (ii) Effective multimodal education strategies

Participants expressed the view that AF education strategies needed to pivot from a “one size fits all” approach and modernize to implement a range of different approaches to education, and that this could include incorporating different technology modalities in teaching, tailoring teaching strategies for the setting and seizing the benefits of peer support, workshops, and group education in the community. Optimizing the expertise of clinicians in the community such as community pharmacists and community nurses to deliver education would be beneficial.

... if it was the ideal world having some face-to-face options obviously complemented with written education or written material, ... and maybe like videos. Little, little snapshots. A little video on what a person needs to do. For example, ... a text message on their phone or a video on their phone or on the internet that they could watch and if they've had that session with the health professional just key messages in a video setting...

(Expert Stakeholder 10)

Print resources, it's very hard ... to tailor them to an individual's needs. ...So that's why we're moving more towards things like being able to offer support. So that's our helpline calling somebody up and saying, How can I support you? What's important to you and then being able to send resources from there. Or to start a program, whether it's a text-me program, [or] whether it's an online peer support group for atrial fibrillation. (Expert Stakeholder 5)

Peer Support is about we'll facilitate but everyone else,... the patients talk among each other. So it's about, someone will [say] I've had five bypasses and then the next one goes I've had six and it's like trump you, I've got seven...things like that. So, they understand.

(Expert Stakeholder 4)

I guess with ...the living well program. The evaluation was really, really good; ... patients actually felt really supported there. We did a health literacy questionnaire as well in terms of...the workshops and it was like they love that idea of coming together sharing experiences with each other, etc.

(Expert Stakeholder 10)

And sometimes...patients would not be able to manage at home by themselves, especially... most of the time they are of the elderly population. So follow-up care with community nurses would be good,... sometimes if we know that they could not manage at home. We do refer them to community nurses to follow up with them that they take their medication. (Clinician 2)

## (iii) Strengthening AF education across the care continuum

AF education needs to be strengthened across the care continuum to improve AF management and support the retention of learning about AF. Optimizing initial teaching, providing time for information to be processed and understood, with follow-up either to reintroduce key points or utilizing teach back to ensure patients have understood what has been taught is necessary. This could be delivered either one-on-one or in a small-group learning environment. Participants suggest that a spread-out varied learning approach could help patients retain more information and be better equipped to apply their learning when living in the community.

They should be giving us the information and then sort of saying well let it have time to sink in, and then come back with something. ....

(Patient 9)

... many opportunities to just ...constantly reinforce, and sometimes that reinforcing of the same message over and over again

*eventually gets through to some. It's not just a one-time education, and it's maybe all retained.* (Clinician 3)

*.. the most important part would be the initial assessment. ...* (Expert Stakeholder 8)

*.. when [patients are] ... coming back as outpatients, you could have running ... education sessions ... Then you can go and you see your doctor at the outpatient clinic or you go to the cardiac rehab. ... Hospitals also have a responsibility. ... Just generally proactive following up would be good. ...proactive follow-up checking that the patients are understanding... AF.*  
(Expert Stakeholder 12)

*...Just a continual reinforcing every day [is needed] that this patient cannot go home without education and... how, if they don't take the medication... they can come back with another heart attack, because of ... thrombosis.* (Expert Stakeholder 5)

*At about 6 to 12 weeks it's individualized. [In the] 4- to 12-weeks program, we would reinforce a lot of the [patient education] at that postprogram assessment. And at 6 months and 12 months on their follow-up, we'd do the same. So we asked them what they understand ...[regarding]... self-management strategies and then if they get it right, that's great we say,...you're on top of that. If they don't, then we reinforce it.*  
(Expert Stakeholder 4)

### (3) Timing AF education

The third theme, "Timing AF education," included 3 categories; (i) patient perspectives on AF education timing; (ii) clinician considerations for improving the timing of AF education; and (iii) every interaction with the patient is an opportunity for education. All participant groups identified key time constraints across the care continuum that could impact the AF educational experience.

#### (i) Patient perspectives on AF education timing

AF education should be prioritized to ensure that patients, families, and caregivers are engaged early. Patients felt that time-poor clinicians often provided fragmented or suboptimal education that was not

tailored to meet their needs, nor improved their understanding of AF treatment or management including their medication regimens.

*And he said, "Well, I think it's AF" and then he then explained to me what the dangers were, and I thought I was going on ... that horrible blood thinner where you have to have blood tests all the time.* (Patient 8)

*You leave, you get your discharge sheet, which is from the doctor. And they give you the run down, tell you what to do, but ... I think that's about it really. [They] try to get the information to people as early as possible and ... explain what's going on. Which I would say generally doesn't get done and that's because of how busy these poor ... doctors and nurses are; ... it's almost another job, ...getting together resources for someone to come in and sit with people and explain what's going to happen to them.* (Patient 10)

Clinicians indicated that patient's lack of understanding of AF treatments can contribute to anxiety, stress, and worry about the long-term impacts of medication management.

*...they're always pretty scared about it all. [Regarding] the anti-arrhythmic and amiodarone, they're concerned about the long-term side effects and ... they also want to understand whether that anticoagulant is long term or not. So ... they often don't quite understand what's happened to them and why they've got AF and why they're on the treatment for it and things like that.* (Expert Stakeholder 12)

*A lot of them, the doctors and the nurses, obviously they're stretched, ...but they haven't got time to sit down [and explain AF and its treatment to patients]. and hold your hand and say, look, this is what's going on.* (Patient 10)

#### (ii) Clinician considerations for improving the timing of AF education

In the context of the tertiary acute care setting, there are competing clinical priorities that take precedence.

Experienced clinicians reported that limited “protected time” for patient education impacted on their capacity to tailor teaching. Junior clinicians often lacked the knowledge, skills, and confidence to educate patients, shifting this important responsibility to more experienced clinicians. At either end of the spectrum of experience, time pressures underpinned the recognition that alternative opportunities for education during the patient’s hospitalization must be sought.

*... you really just do not have the time on top of all your other nursing work and ... there’s really nothing to help us. (Clinician 11)*

*Unfortunately, ... there are a lot of really junior staff and we do educate them regarding ... atrial fibrillation; ... [It is the] responsibility of the nurse ... to explain it, but a lot of the new staff that we have do have these confidence issues regarding the knowledge ... we [have] with atrial fibrillation, ... to explain it fully to the patient. (Clinician 2)*

*[Clinicians have] 20 minutes with each patient if they’re lucky...[for] an ongoing conversation about risk factor management and all lifestyle management ... (Expert Stakeholder 7)*

*...It’s definitely going to be pushed back to nurses to do that education. (Expert Stakeholder 13)*

*So usually what the juniors would do is ask someone more senior, for example, like our CNC or me as the educator for the floor or our CNS ... or people who ... usually just work in the coronary care unit to be able to discuss it with the patient. (Clinician 2)*

(iii) Every interaction with the patient is an opportunity for education

AF education was thought to be a collective responsibility of all clinicians, regardless of setting and profession, and the need for this to be consistently delivered throughout the care continuum was emphasized.

*I think my GP [and the chemists] are very well placed for it [ie, AF education], ... [In] the last lot of tablets that I was on I wanted to know a bit more about that tablet*

*[anticoagulant] I didn’t know anything about it. So I ... asked the chemist about it and he gave me the information sheet on it and then ...told me a few things, ... so I have a complete readout of what the do’s and don’ts were on taking this tablet. (Patient 9)*

*...from my experience when I [am] in the emergency [room], patients are really not exactly sure what’s happening and what the treatment involves. So I think you can give them information when they come in because [they are] ... in the emergency [room] waiting for hours anyway... (Clinician 7)*

*... [The] best education would be at the bedside, especially when the families [are] around so that at least the family knows what’s going on, [and] what’s the plan, ... what are the effects of ... the procedure, the medication, or [the] prognosis... . (Clinician 13)*

*When I was handing out medications, that would have been the prime opportunity to be enforcing this is why you’re taking this, remember this is going to be important when you get home. (Clinician 3)*

Repeating key messages in educational interactions was proposed to ensure the reinforcement of relevant information to support patients’ management of their AF, including medication adherence and persistence. Every interaction with the patient, despite the commonly shared perception that these were never of sufficient length, was acknowledged as an opportunity for education.

*...education should be consistent and across the board, and it should be really reiterated across the board...[with]...consistent messaging (Expert Stakeholder 7)*

*I’m thinking some educators [such as] a nurse educator, a CNS or CNCs should be there ... in the AF clinic. [They can provide patients with] full knowledge about their medication .... [Patients can] sit there before seeing the doctors. It is better for the nurse to ... really educate patients ...and their families. It will be a very good option. (Clinician 1)*



## DISCUSSION

Key findings from this study highlight the need for patient-centered approaches to education, the need to tailor education messaging, and the need to engage family and caregivers in educational interactions. Common to all participants was the recognition that AF education should be a priority in the management of patients with this burden. Also common was the collective recognition that there is a need to consider new ways of educating patients across the care continuum, while concurrently creating opportunities for timely targeted education. A sample of educational strategies is presented in Table 2 and Figure in the AF Education Toolkit, developed from results of this study.

These findings are similar to existing evidence that highlights gaps in quality education provision and needs for people living with AF.<sup>19–22</sup> These gaps contribute to poor outcomes, suboptimal disease management, and poor quality of life as a consequence of excessive stress and anxiety related to unfamiliarity of disease trajectory, risks, and prognosis.<sup>23</sup> The gaps are not unique to patients and ultimately also impact caregivers. It is imperative that those with the capacity to provide education consider caregiver engagement and partnership that can be an important strategy to contribute to improving patient outcomes in AF.<sup>24</sup>

Other research has explored patients’ preferences for AF education. Our findings are similar to those of McCabe and colleagues, who identified that verbal and written resources were the most commonly used tools to educate patients about their AF, along with video and multimedia resources.<sup>19</sup> Participants who were familiar with accessing digital resources, endorsed modules, or professionally moderated virtual



**Figure 1. Atrial Fibrillation (AF) education toolkit.**

discussion groups described these as potentially beneficial.<sup>19</sup> However, there have been varied attitudes towards engagement with web or app-based learning modules within the literature.<sup>19,23</sup>

Our study revealed a disconnect between simplicity of information, and basic education versus patients wanting to learn more. A key feature of patient education is listening to how the patient is receiving and responding to the information provided, and building on that, in contrast to conveying lots of information and letting patients make sense of it. Patients said they needed clear and simple messages; however, they also expressed a need to access more detailed information to help understand how the basic messages impact on them and their lives. Education should be an articulated process, starting with basics, and then building on them. Clinicians inferred an understanding of the education process; however, they expressed challenges to prioritize. There is a need for patient education to receive greater recognition as a therapeutic intervention.

Future research should consider targeting patients and caregivers in combination to promote adherence to treatment regimens, and improve everyday life with AF. Education is a mechanism that can activate patient engagement to motivate patients and their families to be proactive in their care, and the options for delivery require careful consideration.<sup>25,26</sup> New approaches to learning through the use of multimedia are gaining popularity, including the use of avatars, gaming, and apps.<sup>27</sup> Although digital micro-learning and other digital therapeutics hold promise for people living with chronic disease, it is important to evaluate these in the context of AF.<sup>28–30</sup> It is also incumbent upon developed nations to ensure that we acknowledge and address the “digital divide” given the global burden of AF. These approaches must not increase inequalities of access to technology-supported care, particularly for those with frailty, cognitive dysfunction, economic disadvantage, or poor technological literacy.

**Table 2. AF Education Toolkit**

Education videos/resources delivered via different technology	Reputable, recommended/endorsed credible and high-quality websites DVDs YouTube, Facebook and other social media USB sticks/portable hard drives with textual information or multi-media Podcasts Email distribution lists Live and pre-recorded webinars
Self-management tools	Smartphone applications Wearable and implantable devices Tablets
Print resources	AF specific material, personalized information Different languages available, styles and formats
Group learning	Online peer support Face to face peer support Workshops Group education Engaging of family in group learning

AF indicates atrial fibrillation; DVD, Digital Video Disc; and USB, Universal Serial Bus.

## LIMITATIONS

The limitations of this study should be acknowledged. First, there was the potential for participant bias, including technological literacy, and the ability to speak English. Purposeful sampling was used, and this has implications for the perspectives these findings report. Although multidisciplinary clinicians were invited to participate, the clinicians included in our analyses represent the nursing discipline. Sampling a diverse range of clinicians may have revealed different perspectives and experiences. We included patients with chronic, permanent, or paroxysmal AF, not newly diagnosed. These patient's perspective and experiences may differ from those recently diagnosed with new-onset AF. A standardized interview guide was peer reviewed to minimize leading questions, phrasing of questions, and question order, to minimize bias. Recall and social desirability bias, and transferability are also important considerations in interpreting these findings.

## CONCLUSIONS

Although patients sought credible, quality information, this was highly variable. Current resources primarily focus on anticoagulation or procedural information, as opposed to other aspects of management such as risk factor reduction. Factors to address educational needs included the ability to tailor information, self-pace learning, different learning tools such as multi-media, apps, case studies, or the use of visuals and props. Continuity of care, along with engagement of family caregivers, was important to help develop relationships and facilitate understanding to address educational needs. Other educational models such as group-based learning and peer support were valued, as well as increasing AF education focus in other programs, such as cardiac rehabilitation or acute stroke units.

## ARTICLE INFORMATION

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### Disclosures

None.

### Supplemental Material

Tables S1–S3

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# **Supplemental Material**

## **Table S1. Interview Guide – Clinicians**

1. What is your experience of educating patients about their AF?
2. How would you define AF self-management?
3. What do you think would help increase self-care amongst patients with AF?
4. How are patients currently educated about their atrial fibrillation?
5. What are the core components of AF education?
6. What do you think are important things for AF patients to know about?
7. How do you think AF patients would like to be educated? (what modality and at what time point?)
8. What would 'the ideal' AF education program/ model look like?

## **Table S2. Interview Guide – Expert Key Stakeholders**

1. What are some of your key insights of the current landscape of AF education for patients?
2. Is it done well, why (why not)? How could it be improved?
3. How should AF education be delivered?
4. By whom and when?
5. What are the core components of AF education? (what should be addressed?)
6. What in your opinion is AF –self management, what does this comprise of?
7. If you had to the opportunity to design ‘the ideal’ AF education program – what would this look like?
8. What would this include?

### **Table S3. Interview Guide - Patients**

1. What is your experience of living with atrial fibrillation?
2. What would help you better manage your heart condition?
3. What do you think is important information to know about your heart condition and its treatments?
4. How have you been educated about atrial fibrillation in the past?
5. What could be improved to better educate patients about their atrial fibrillation?
6. If you were to design a new education brochure, what would it include?
7. How would you like to be educated?
  - a. At what timepoint?
  - b. Using what method or style?