Naturalistic decision making in everyday self-care among older adults with heart failure

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ABSTRACT

Background: Every day, older adults living with heart failure make decisions regarding their health that may ultimately affect their disease trajectory. Experts describe these decisions as instances of naturalistic decision making influenced by the surrounding social and physical environment and involving shifting goals, high stakes, and the involvement of others.

Objective: This study applied a naturalistic decision-making approach to better understand everyday decision making by older adults with heart failure.

Methods: We present a cross-sectional qualitative field research study using a naturalistic decision-making conceptual model and critical incident technique to study health-related decision making. The study recruited 24 older adults with heart failure and 14 of their accompanying support persons from an ambulatory cardiology center. Critical incident interviews were performed and qualitatively analyzed to understand in depth how individuals made everyday health-related decisions.

Results: Older adults' decision making accorded with a preliminary conceptual model of naturalistic decision making occurring in phases of monitoring, interpreting, and acting, both independently and in sequence, for various decisions. Analyses also uncovered that there are barriers and strategies affecting the performance of these phases, other actors can play important roles, and health decisions are made in context of personal priorities, values, and emotions.

Conclusions: Study findings lead to an expanded conceptual model of naturalistic decision making by older adults with heart failure. In turn, the model bears implications for future research and the design of interventions grounded in the realities of everyday decision making.

Keywords: Aged, Qualitative Research, Cardiology, Heart Failure, Decision Making

INTRODUCTION

Heart failure (HF) is a prevalent, costly, and growing burden experienced by individuals and society and disproportionately affecting older adults. [1,2] Every day, older adults living with HF make decisions regarding their health that potentially impact their illness trajectory. [3] Many of these decisions pertain to typical HF self-care recommendations, such as recording daily weight, adhering to a sodium-restricted diet, limiting fluid intake, and taking medications. [4,5] Patients with HF may delay seeking treatment for symptoms, resulting in avoidable hospitalizations or worsening of their condition. [6] Immediate and long-term consequences of these decisions are symptom burden and quality of life, as well as major events such as unplanned hospitalization and death. [2]

HF research experts characterize everyday decisions of patients with HF as instances of naturalistic decision making. [7,8] Indeed, Riegel et al. define HF self-care as "a naturalistic decision-making process that influences actions that maintain physiologic stability, facilitate the perception of symptoms, and direct the management of those symptoms."[3] Naturalistic decision making is how decisions are made in dynamic, ill-defined and uncertain situations that involve shifting goals, high stakes, and may also involve others.[3,9,10] In contrast to classical models of decision making, which assume a rational decision can be made once the options are well known, naturalistic decision making would imply that applying knowledge in practice is just as important as the knowledge itself. This focus on the actual process of decision making, rather than on knowledge preconditions, is consistent with findings that patients with HF often know what to do but struggle with how to do it, especially in light of ambiguity and uncertainty. [11,12]

Figure 1 depicts a conceptual model comprised of three processes inherent to everyday decisions: monitoring; interpreting; and acting. Whereas the situation specific theory of HF self-

care depicts *what* self-care processes are performed (i.e., symptom perception, maintenance, and management), the processes in Figure 1 help understand *how* self-care decisions are made. The model also proposes how decision-making processes might interact and occur over time, namely, in a stepwise and cyclical fashion. Although the model adopts typical naturalistic decision-making concepts, it has not been used to collect and analyze data from older adults with HF. Thus, applying the conceptual model in the present empirical research study can elucidate the everyday decision-making processes of older adults with HF, to complement what is known about the factors influencing HF self-care outcomes, such as aging, cognitive impairment, comorbidities, health literacy, life experience, and psychosocial factors. [13]

By studying the everyday decision making of older adults with HF, this study can guide future design of interventions grounded in how decision making actually occurs, as opposed to idealized notions of the process. [14,15]

[FIGURE 1]

Figure 1. Conceptual model of the three processes involved in everyday decision making: monitoring, interpreting, and acting.

The objective of this study was to understand how older adults with HF make everyday decisions about their health using a critical incident technique (CIT) interview. The CIT interview is a systematic method of uncovering thought processes, feelings, and interactions in a specific event or situation [16] and is a technique used in naturalistic decision making research. [17]

METHODS

We present a cross-sectional qualitative field research study exploring health-related decision making among older adults with HF from an ambulatory cardiology clinic, part of a large not-for-profit hospital system in the Midwestern United States. The study design is optimal

for obtaining a high-level of description, depth of understanding, and context-rich insights about phenomena experienced by individuals. [18] All study activities were approved by the hospital's Institutional Review Board and all participants provided informed consent. This work expands our prior interim analysis on a sub-set of 12 interviews. [19]

Procedure

Patients were screened from the HF clinic visits in the hospital's electronic medical record by a research nurse coordinator. Patients were eligible if they spoke English, were age 65 or older, diagnosed with systolic or diastolic HF, New York Heart Association class II-IV, with or without an implanted device, and were able to provide informed consent. Patients were determined ineligible if they were in hospice or had a life expectancy of less than six months.. After eligible patients were approved for recruitment by the study Principal Investigator, a researcher called patients by phone and invited them to participate in the study at the research center near the main hospital campus. Recruitment ended after a total of 24 patients were enrolled in the study. The sample size was determined based on estimates of theoretical saturation. [20] Patients were invited to participate with a support person such as a friend or family member if they preferred. Support persons provided informed consent prior to any study activities, so that if they wanted to share, their contribution could be recorded, and the data used in analysis. However, the support persons were neither encouraged nor discouraged to actively participate in the interview. Each participant (or dyad) received a $20 Visa gift card.

The study took place in a private room of a research center affiliated with the medical center. Participants also completed a demographics form and surveys measuring technology use, health locus of control, HF knowledge and other HF related constructs; we report participant demographics here and not the other survey data.

Interviews

Participants engaged in audio-recorded, semi-structured interviews led by two researchers. Semi-structured interviews involve open discussion facilitated by prompts to capture information in the realm of the study objectives. The interview consisted of two components: critical incident technique (CIT) and a fictitious scenario. The CIT component applied a systematic approach to examine a real-life situation or event. [16] CIT and similar techniques, such as critical decision method, have been used to study naturalistic decision making because they involve focused, detailed retrospection of a specific event or occurrence. [9,10,21] Even though this entails retrospective self-report, CIT best practices are available to help respondents recall the event, for example, focusing on a salient (memorable) event and using structured probes to recreate the event from memory. [22]

The CIT interview began with a verbal prompt to elicit a memory of a relatively recent (within the past year or two), minor, health-related event that resulted in taking an action. We encouraged participants to describe a health-related incident most recent and retrievable by memory as a CIT best practice for eliciting sufficient detail to lend credibility to the findings. While some participants described events related to HF management, participants were encouraged to describe any type of health-related instance. The interviewer used a large white board for mapping the events as the participants shared their experiences to facilitate discussion and keep track of details. The CIT interview involved prompts regarding what participants were thinking, feeling, and doing around the time of the health-related instance. The CIT interview lasted approximately 30-45 minutes and was audio-recorded. Prior to study activities, we pilot-tested the interview with six individuals age 60 or older. The pilot tests indicated that older

adults could confidently recall health-related events and undergo the mapping process to elicit details.

The second component of the interview involved a fictitious device based on real cardiac implanted devices. The purpose of this portion of the interview was to describe decision making based on a new, hypothetical scenario rather than characterize decision making using a real-life event. The findings from this portion of the interview are not included in this paper and are published elsewhere. [23-25] The entire interviews were recorded and lasted approximately 70 minutes.

Data Analysis

Interview recordings were transcribed verbatim. Analysis began with a bottom-up coding approach using the framework of monitor, interpret and act to guide the process and allowing for new codes to emerge. [26] Four student researchers and research scientist read the first transcript together, line by line, identifying instances where the participant described monitoring health information, interpreting health information, and acting upon health information and created subcategories as related concepts emerged. Other segments of transcript related to health-related decision making were highlighted and sorted into categories, labeled: goals, fears, motivations, positive emotions, and negative emotions. The researchers coded two additional transcripts as a group, defining and re-iterating on existing codes using a constant comparative method; an iterative process of comparing coded segments, further defining the codes until a codebook is established. [27] The codebook was considered stable when no new codes emerged from the transcripts coded by the group. The researchers then coded remaining transcripts individually, meeting to review any segments of transcript that required group discussion or augmentation of the codebook. One researcher (CD) reviewed each category for consistency, noting discrepancies

and discussing with the group until consensus was reached. The categories were then abstracted into broader themes and subthemes related to monitor, interpret, and act, and contextual factors which impact health-related decision making. In the results section that follows, exemplar quotes include pseudonyms, gender, and age of the participants.

RESULTS

Participant Characteristics

Twenty-four patient participants and 14 support persons completed this study. The patient participants were predominately male (66.7%), 100% white, and one person reported Hispanic or Latino ethnicity (see Table 1 for additional characteristics).

[TABLE 1]

Interview themes

Monitor phase of decision making

Participants described monitoring in terms of keeping track of health information, either collecting, recording, tracking, or watching. Monitoring involved measuring quantitative information such as weight, blood pressure, and blood sugar and logging information such as sodium intake. For example, one participant described using a blood pressure machine and he would check in the morning and again at noon, noticing a drop (120/80) to (95/65) (Ronald, m, 81). Symptoms were also monitored qualitatively by watching or observing, such as leg swelling, fatigue, and shortness of breath. Rather than comparing values as a measure, participants described noticing shortness of breath in everyday activities: "*picking things up like a basket of clothes or something like that, lifting and picking it up, and walking a distance with it*" (John, m, 76).

Interpret phase of decision making

Interpretation involved synthesizing information and attributing causes or indications to a symptom, as described by participants in this study. For example, one participant (Sally, f, 69) synthesized information when noticing a symptom (swelling in her feet), by combining that observation with her knowledge of fluid retention. Another participant (Betty, f, 77) attributed the cause swelling in her feet to more walking than normal and eating out the night before.

Act phase of decision making

The act phase of the cycle included what participants did in response to or because of their health information. Decisions such as going to the doctor, taking medication, or choosing to "do nothing" were represented in the data. For example, one participant noticed that he had shortness of breath during a soccer game and subsequently "*dropped out of the soccer game and went home… took a shower and went to bed*" (Harold, m, 82). Another participant described a time when he was noticing symptoms and he decided to visit his primary doctor who immediately followed up with an echocardiogram, a diuretic, and sent him to the hospital.

How the Phases Interact

We observed in the data that the phases of monitor, interpret and act repeat as a cycle, however not always in the same order. In the following example, the participant describes monitoring and acting:

> I was experiencing shortness of breath, it gradually became worse [MONITOR], I called the doctor [ACT]. I didn't find much out… I continued…[MONITOR]… (John, m, 76).

In another example, the participant described engaging in a pattern of monitoring and interpreting before describing an action:

One time I check myself (blood pressure) [MONITOR]– I'm fine [INTERPRET]. The next time I check myself [MONITOR] and then it's just kind of funky [INTERPRET] and actually that was a question my wife said, well what does funky mean? And I said, that's what I told the cardiologist. [ACT] (Charles, m, 72).

The following quote exemplifies the pattern of monitoring and observing worsening of a symptom, leading to a change in action:

It (shortness of breath) kept getting worse and worse [MONITOR]. And then when I was taking a breath it wasn't giving me ah, enough oxygen in my system to, to do anything so [INTERPRET]… I just relaxed… then took deep breaths [ACT]. Some few times I thought I was going to probably pass out…. it was that bad [INTERPRET]… I decided I gotta go, do something. [ACT] (Earl, m, 85).

The phases of monitor, interpret, and act were evident parts of health-related decision making. In addition to the patterns as exemplified above, the data revealed barriers, strategies, and collaboration with others across each phase, described in the following section.

Barriers Impacting Decision Making

Barriers to monitoring, interpreting or acting in the decision-making process most commonly involved lack of information. For example, one participant (Stanley, m, 74) did not know he was only supposed to weigh himself in the morning and called the nurse because he was gaining weight during the day. Other information gaps included not knowing how much sodium is in certain foods, which inhibited the ability to keep track of sodium accurately.

Lack of information about what causes symptoms inhibited interpretation and ability to detect certain symptoms or understand the nature of symptoms. One participant was concerned about her heart rate getting too high and causing her defibrillator to deliver a shock:

I don't know how it's (heart rate) supposed to feel when it gets that high. I don't feel anything different in as far as my heart beating is concerned (Rose, f, 75).

Another type of barrier was insufficient tools or resources to monitor, interpret, or act. For example, monitoring was difficult when devices did not work, such as a faulty international normalized ratio (INR) monitor. Another participant described barriers to taking blood pressure:

When I would grab my blood pressure cuff or you know, stuff like that, sometimes it was right and then sometimes it was kinda out of whack… (Charles, m, 72).

This participant did not trust his blood pressure cuff to take an accurate reading. In another example a spouse of a participant described insufficient salt substitutes as a barrier to limiting sodium in their diet:

I said I use one called No Salt. And they said, oh no, you can't use that… it's too high in potassium! [slaps leg] So what are you supposed to use? (Cathy, f, 72, spouse of Jack).

Such barriers emerged in the data, making it difficult in the circumstances to collect information, make meaning out of it, or act appropriately.

Strategies to Help Decision Making

Participants described strategies based upon a combination of knowledge and experience for monitoring, interpreting, and acting. Strategies were also developed to accomplish a personal goal. For example, one participant described taking their blood sugar in the morning even though they believed they were supposed to take it throughout the day, because having a high reading in the morning was "motivation" for them. Strategies which helped reinforce health decisions included learning from experience and sensing what was happening in the body when symptoms occurred. As one participant described,*"it's like a cloak on ya, it just- it wears on you! Tells you*

something's not right" (Jack, m, 73). Another type of strategy involved skill-building, or combining experience with knowledge about their condition. Before having heart issues, one participant thought he was "getting fat" because of the weight gain versus retaining water. However, with knowledge obtained after diagnosis, he was able to link his symptoms (i.e, swelling) to HF-related clinical meanings (fluid retention). Learning from experience allows older adults to predict and avoid exacerbations of HF symptoms:

> *…warm air and sunshine, intense sun, really, really is something that, that I know that I need to avoid… I can get wore down a lot quicker on a 90-degree humid day than you know before all this happened, you know, several years ago now* (Charles, m, 72).

The use of tools and artifacts were used to help with interpreting, such as using the internet or using a HF guidebook from the clinic. In the following example, the participant applied strategies of doing research ahead going out to restaurant to eat, as well as requesting no salt:

> *We went to a new restaurant the other day… luckily I had looked ahead and I knew just exactly what I was going to order. And since I also have to watch salt, then I take that into consideration. And I will ask the chef not to add additional salt* (Sally, f, 69).

Role of Others in Decision Making

Informal (support persons such as family or friends) and formal (such as doctors and nurses) caregivers played a role in monitoring, interpreting, and acting. The roles of others contributed to collaboration in the forms of sharing knowledge, assisting in self-care tasks, observing, providing interpretations of symptoms, and/or giving recommendations. Support came from close partners, such as a spouse or member of the nuclear family, and from those less directly or frequently involved such as a friend or neighbor.

Informal caregivers took initiative to voice their concern when monitoring and interpreting symptoms. For example, a participant described how his spouse tells him when she notices a little swelling in his foot, but that he himself can't tell (Ronald, m, 81), an example of the role of an informed caregiver in monitoring. In another interview, an informal caregiver interpreted the cause of her spouse's cough to be due to forgetting to take his diuretic for two days. In addition to including informal caregivers in decision making, participants considered their health care providers, such as clinicians and nurses, as experts and relied on them for interpretation of symptoms and instructions for how to take action.

> *I call the doctor, I don't mess around, and see what he thinks about this other diuretic pill that I can take that's my backup plan* (Sally, f, 69).

Actions from informal caregivers included calling the doctor or driving to the hospital. In several examples, the participants decided to tell someone – particularly a non-medical, non-technical person – as the first step when noticing a symptom.

Health decision making in context of personal priorities, values, and emotions

Participants described factors that influenced decision making that included personal priorities and values. A participant described living alone and the importance of having social outings with friends. Although he struggled to adhere to a sodium-restricted diet when eating out socially, it was more important to him not to give up or change the social outings even at the risk of consuming too much sodium. Thus, decisions were largely influenced by what is personally important to the individual and not necessarily in line with medical goals, for example: *"I'm not sure there's anything [that would get me to exercise]… I'm 74. I'm not. You know they'd like me to get off Diet Pepsi too. I'll never do that. That's my main vice"* (Stanley, m, 74). On the other hand, some participants prioritized their health and were willing to take actions even if they

strongly opposed the action: "*(the doctor) said you're going to have to shoot yourself with insulin, I absolutely hated that… I couldn't object, I mean, it's my health!"* (Pete, m, 80).

Other instances revealed the motivators that influenced action. For example, two participants made decisions that were motivated by care and concern for their loved ones. Charles described making the decision to go to the hospital primarily to give his spouse and adult daughter peace of mind. Andy described making decisions with the goal of alleviating the stress of a spouse: *"Whenever she (wife) is stressed, it stresses me somewhat… I do what I can to help her"* (Andy, m, 78). Life events such as a daughter's wedding, or church gatherings, motivated participants to focus on healthy habits or push forward even when feeling tired. For example, one participant explained that he should have gone to the doctor because he was "near death", however he had to continue farming. His passion and purpose were taking care of his farm, as he explained:

> *I had a real high fever and sweat just rolling off of me and I, was trying to get some farm ground ready to plant crops and I was still out here on this tractor and I couldn't hardly sit down anymore. I… climbed off, threw up on the dirt and get back on and drive some more* (Dave, m, 75).

Emotions play a role in decision making that can overpower the ability to take action based on interpretation. For example, one participant described doing things that he "*shouldn't do*" (from a self-care regimen standpoint) because he was having difficulty realize that perhaps he was not "*as strong as I used to be*" (Ronald, m, 81). When stressed about symptoms, one participant explained that he immediately loses his appetite. Another participant who had a cardiac device explained that after a month or so with the device, he realized that worrying about it every day it would make him sick. Accepting the device as preventative medicine helped

him… "*after a while you just think, well I know it's gonna do it (shock). I ain't worrying about it and you go on with your life"* (Phil, m, 66).

Frustrations or disappointment with monitoring could be a deterrent, as one participant explained that she no longer uses the blood pressure monitor because "*it just doesn't seem to give me what answer I want*" (Jane, f, 66). Conversely, positive emotions related to monitoring was a motivator, as with two participants who described feeling "*comfortable*" and "*confident*" with telehealth, resulting in their consistent use of the home monitor.

DISCUSSION

The findings from this study showed that health-related decision making among older adults with HF includes phases of monitor, interpret and act. Within these phases, individuals face barriers, adapt strategies, and collaborate with others. Importantly, we add to this framework the contextual factors which were observed in monitor, interpret, and act phases of decision making. Our findings highlight the importance of how naturalistic decision making takes place in a holistic context of everyday experiences.

The Decision-making Cycle of Monitor, Interpret, and Act

The findings revealed the phases of monitor, interpret, and act as not always in this order (and not always a continuous cycle). The nature of naturalistic decision making in terms of these three phases involves shifting or repeating phases in order to cope with uncertain or changing circumstances as experienced in the 'real world.' [10] Skillful use of these phases, observed in every day decision making, may contribute to expertise in health management as has been shown in diabetes self-care. [17]

Challenges in Health-related Decision Making

Our findings revealed that some patients lacked information about how to monitor and interpret symptoms. The phenomenon of delaying treatment until symptoms are so severe that hospitalization is inevitable has been attributed to lack of knowledge about one's condition and how to recognize symptoms. [28,29] However, there are other personal factors which may delay seeking medical help, such as treatment burden and wanting to avoid the hospital, or the motivation to persevere through in the hopes of recovering on one's own.

Adaptive Strategies to Enhance Health-related Decisions

Older adults can demonstrate expertise in self-care of HF. [30] Our data showed that by learning through experience, older adults adapted strategies that align with becoming experts in self-care. Importantly, the strategies involve intuition and one's sense that something may be the matter. This may be related to a belief in naturalistic decision making research that intuition is gained from experiences over time that result in the ability to quickly assess a situation and make a decision without weighing options systematically or logically. [31] Expertise involves knowledge and skill, or applied knowledge. There is opportunity to support patients through leveraging their intuition along with knowledge and skill to enhance expertise. [30] Further, patients with HF have demonstrated adaptive strategies for medication management, [32] which help build expertise. Strategies help patients be a step ahead of their symptoms, as in the example where a participant avoided eating a high sodium meal out at a restaurant by researching the menu online and asking the chef not to add salt.

Roles of Others in Decision Making

The findings suggested that family, friends, and health care professionals help patients make health-related decisions. A large body of work shows that a positive support network

enhances HF self-care behavior. [33,34] The degree to which others are involved varies from having a social network of friends for emotional support, to living with someone that helps directly monitor symptoms and make sense of health information. [35] Importantly, our findings suggest that the effect of health-related decisions on a support person, such as spouse or family member, can be appraised as just as important (or more) as the effect of the decisions on the person with a condition.

The Impact of Personal Goals, Values and Emotions on Health-related Decision Making

Health-related decision making may involve conflict or synergy with personal goals. [8,32] Our findings showed that people may prioritize their goals and values over their health condition or self-care task, which presents a conflict for medical goals. Recent research shows that some patients do not take medications as prescribed in order to fulfill other personal self-care needs. [36] Dedication and passion for work, or church, or other responsibilities may keep people from taking the rest that they need from a clinical perspective. On the other hand, personal goals and values may be in synergy with medical goals, as in the example of the participant who was motivated to have healthy behaviors in order to be healthy for his daughter's wedding. It is important to understand what is important to patients, in terms of bigger life goals, to design appropriate self-care regimens. [37]

Implications

The findings provide an expanded conceptual model of naturalistic decision making among patients with HF (Figure 2).

[FIGURE 2]

Figure 2. Augmentation of the conceptual model based on findings in this study, showing the phases of monitor, interpret, act with cross-cutting themes that affect each phase

Importantly, we find the naturalistic decision-making process situated in the context of priorities, values, and emotions that influence monitoring, interpreting, and acting. Everyday decisions are guided by these contextual factors at the monitor, interpret, and act stages. The more aware that people are of these factors, the easier it is to integrate the factors into the monitor, interpret and act cycle. For example, knowing that worry can cause a physical reaction can help the person distinguish between physical symptoms related to worry and physical symptoms directly resulting from worsening HF. Understanding personal priorities can help clinicians design self-care regimens that reinforce comfort and confidence and avoid frustration and discouragement. Importantly, interventions for patients managing cardiac conditions may require personalization and tailoring in order to be meaningful. [38,39] Table 2 summarizes the findings and implications.

[TABLE 2]

Limitations

The study sample includes predominantly White, male participants and therefore our findings are not reflective of the greater population of older adults with HF. The CIT method is usually performed with healthy, younger adults. In our experience, it appears feasible with older adults with HF when using probes about memorable events and a whiteboard to map the details. However, the method has limitations of all retrospective self-report methods, such as social desirability bias or recall errors, which may be exacerbated in individuals with cognitive dysfunction, for which patients with HF are at greater risk. [40]

Conclusion

Examining patients' health-related decision making in detail revealed barriers, strategies, collaboration with others, and contextual factors such as personal goals, values, and emotions.

This study provides a detailed description of naturalistic decision making among patients with HF to understand how they make health-related everyday decisions. Further research should systematically examine the impact of contextual factors on decision making to better understand their roles and how to optimize clinical and personal goals. Findings of this and similar investigations should also guide the design and testing of interventions such as patient-facing technologies to aid everyday naturalistic decision making among older adults with HF.

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What's New:

- Older adults with heart failure experience barriers, strategies and collaboration with others when engaging in naturalistic decision making for self-care
- Contextual factors such as personal goals, values, and emotions influence health-related, day to day decision making among older adults with heart failure
- Interventions related to helping patients with self-care, especially for managing complex chronic disease such as heart failure, should address barriers, leverage strategies, involve others appropriately, and take into account the personal, contextual factors of the patient.

Tables

Table 1. Patient participant characteristics (n=24)

Age (years) M (SD), range	76.6 (7.0), 66-90+
Gender n (%) male	16 (66.7)
Informal caregiver n (%)	
Yes, at home	14 (58.3)
Yes, not at home	6 (35.0)
No	1 (4.2)
Not reported	4 (16.7)
Income n (%)	
< 25,000	7 (29.1)
25,000-50,000	6 (25.0)
50,000+	7 (29.1)
Not reported	4 (16.7)
Education n (%)	
High School	10 (41.7)
Some college	4 (16.7)
College	2 (8.3)
Graduate school	5 (20.8)
Not reported	3 (12.5)
Cardiac implanted electronic device n (%) yes	13 (54.1)
Years of heart failure diagnosis (n=19): M (SD), range	1.73 (1.57), <1-30

Table 2. Main findings and possible implications

Main findings	**Implications**
Older adults with HF monitor, interpret and act as part of the naturalistic decision-making process.	Interventions must account for each step in the process and ensure smooth transitions between steps. Mastery of one step (e.g., monitoring) does not necessarily facilitate a helpful decision (e.g., when interpretations are wrong or actions hard to perform).
There are barriers, such as lack of information, that hinder everyday decision making.	Barriers to decision making must be further studied to determine the relative prevalence and effect of each as well as combinations of co-occurring barriers. Interventions should be designed to alleviate barriers, thereby improving downstream impacts (e.g., lack of information for monitoring inhibits people from being able to make informed, health-related decisions).
There are strategies to everyday decisions, mostly developed over time as new information is integrated into the decision-making process.	Targets for interventions include: • Helping older adults learn from prior decisions to create new strategies • Leveraging the inventive and adaptive instincts among older adults for their self-care Interventions can include forums for sharing decision-making strategies that have worked for some and could work for others.

Everyday decisions among older adults with HF involve others (such as informal and formal caregivers).	The target of decision-making interventions must be the older adult and their network, not just the individual older adult. Further research should include in-depth investigations of individuals in a care network, as studying and intervening on individual characteristics of older adults such as knowledge or tools is inadequate when there are multiple agents contributing to everyday decisions. Tools may be needed to assist family caregivers in monitoring, interpreting, and acting on behalf of or with the older adults with HF.
Everyday decisions among older adults with HF are made in context of personal priorities, values, and emotions.	Decision making is a social-cognitive process that cannot be decomposed into economic elements such as “costs and benefits”. Interventions need to be tailored to address unique personal influences on decision making rather than one-size-fits-all solutions.

HF=heart failure

Figure legends

Figure 1. Conceptual model of the three processes involved in everyday decision making: monitoring, interpreting, and acting.

Figure 2. Augmentation of the conceptual model based on findings in this study, showing the phases of monitor, interpret, act with cross-cutting themes that affect each phase

Figures

Figure 1:

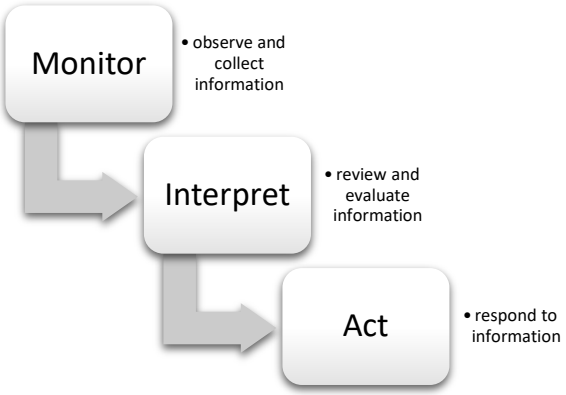

Figure 2: