

Learning What I Need to Know: Experiences of Rural Cardiac Surgery Patients

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Abstract

Purpose: This hermeneutic study expands understandings of rural cardiac surgery patients' experiences of their learning needs following cardiac surgery to inform the provision of patient education for this population.

Sample: Eighteen rural residents provided accounts about their experiences.

Findings: An interpretation as analysis approach revealed three themes: a) Learning: Family History Informing Preventive Care; b) Learning: The Notebook, *Blue's Clues*, and Explanations; and c) Learning: Lifestyle Changes and Confronting Mortality.

Conclusions: The first theme demonstrates needs to ensure patients from rural settings understand that preventing cardiovascular disease is not limited to family members' experiences with secondary and tertiary prevention. The second theme underscores the importance of providing patient education materials that are readable and useable, and considers existential learning needs. The last theme highlights the importance of patients understanding how lifestyle changes involve

embracing new ways of living that are enhanced through cardiac rehabilitation, and yet, can be experienced as life limiting.

Keywords: Cardiovascular disease, Cardiac surgery, Learning experiences, Rural, Hermeneutics

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Cardiovascular disease (CVD) consists of all diseases of the circulatory system, including those that are congenital (Mozaffarian et al., 2015). Cardiac surgery, such as valve replacement and repair and coronary artery bypass graft (CABG), often repairs damage to cardiac function resulting from CVD. Despite the benefits, cardiac surgery is very invasive and has a long and complex recovery process. Patients undergoing cardiac surgery have a multitude of learning needs that, when properly addressed, can contribute to an uncomplicated recovery. Learning needs range from knowing how to manage incisions, pain, and new diet and exercise regimens, to learning ways to alleviate the stress, anxiety, and depression often associated with this surgery. These latter psychological needs powerfully remind cardiac surgery patients of their mortality (Lapum, Church, Yau, Ruttonsha, & David, 2013).

Although the learning needs of cardiac surgery patients are multifaceted, rural cardiac surgery patients in the US recover from the surgery within an array of health and sociocultural risk factors. Compared with their urban counterparts, rural residents are more frequently underinsured or uninsured (Newkirk & Damico, 2014; Mueller, et al., 2018); have higher rates of smoking, obesity, physical inactivity, and chronic health conditions; and are older (> 65 years of age), less educated, and have lower incomes (Bushy, 2012; Meit et al., 2014; United States Department of Agriculture, 2017). In addition, Lee and McDonagh (2018) and Long and Weinert (1989) suggest that rural residents believe health means being productive, and will work even when they are ill. These authors (Lee & McDonagh, 2018; Long & Weinert, 1989) also report that rural residents

are self-reliant and will depend upon themselves, family members, or friends before seeking help from formal health care professionals to address their health issues. These unique health and sociocultural risk factors may affect their ability to learn what they need to know to recover from cardiac surgery without complications.

Despite the risk factors that can impact rural cardiac surgery patients, there is little research about their learning needs. Most studies are limited to CABG patients outside of the US and do not indicate whether patients were from rural or urban areas. The majority of studies are limited to descriptive designs where investigators analyzed correlations between perceived learning needs and demographic characteristics. Fredericks, Guruge, Sidani, and Wan (2009) suggested that, in a sample consisting of lower and higher-context cultures (e.g., Irish, English, and Scottish [lower context]; e.g., Indian, Chinese, and Middle Eastern [higher context]), members of lower-context cultures had fewer perceived learning needs following a CABG compared with those from higher-context cultures. The authors attributed this finding to theoretical propositions that those from lower-context cultures understand and use health information provided through explicit verbal and written messages (e.g., patient education materials and verbal instructions). Conversely, those from higher-context cultures understand health information when it is delivered through nonverbal behaviors and the physical environment. Consequently, perceived learning needs may be impacted when health care providers deliver information only in print or through verbal messages.

Alkubati, Al-Zaru, Khater, and Ammouri (2013) found that gender may influence perception of learning needs. These authors reported Yemeni women may rely on men to help them understand their learning needs or may draw on knowledge gained from social roles in understanding health information, thus ranking information needs low. Similarly, in another study males had greater learning needs compared to females (Fredericks, 2009). The author attributed

this finding to social roles in which females are designated caregivers and better understand the learning needs of those who are ill. Another study by Omari, Al-Zaru, and Al-Yousef (2014) found that, among a sample of Syrian patients, age might influence learning. The authors reported that older patients had greater learning needs than younger patients did because family members typically provided them with information about the illness and self-care, however, they do not receive information from family members considered as ‘other pertinent information’ (p. 1714) such as when to contact the health care provider and where to seek resources for families with loved ones who have had an operation.

The purpose of our study was to use hermeneutics to expand understandings of rural cardiac surgery patients’ experiences of their learning needs following cardiac surgery to inform the provision of patient education for this population. Our study goes beyond the descriptive correlational research described above about relationships between demographic characteristics and learning needs, thus broadening the scope of knowledge about the learning needs of rural cardiac surgery patients living within the US.

Methods

Study Design

We used hermeneutics as described by Gadamer (2003/1960), which is the practice of interpreting experiences to understand phenomena (Moules, McCaffery, Field, & Laing, 2015). Our interpretative work assumed that “life cannot be adequately described in theoretical terms” (Harmon, 2007, p. 25). Rather, interpreting experiences reveals “*hidden* meaning, of bringing what is unknown to light: revelation and disclosure” (Palmer, 1969, p. 147). In using hermeneutics, we generated understandings about rural cardiac surgery patients’ learning needs through interpreting their experiences of learning what they needed to know to recover from their surgeries.

Participants

Following Institutional Review Board approval (IRB #C12-861), a cardiac clinical nurse specialist (CNS) employed at a regional Midwestern medical center recruited participants for the study at the time of their pre-admission testing. Participants needed to be hospitalized for cardiac surgery (valve replacement and/or repair and/or CABG), rural residing, over the age of 18, English speaking, and able to verbalize their learning needs. We trained the CNS to use the Am I Rural? Tool (Rural Health Information Hub [RHIfhub], n.d.a.) to determine if patients were from a Rural Health Clinic (RHC) area. The RHC designation is determined based on the number of people living in a particular area, how many health care providers are in that area, and residents' distance from medical care (RHIfhub, n.d.b.).

The CNS recruited 20 participants. This sample size is sufficient for providing data to interpret the learning needs of rural cardiac surgery patients (Moules et al., 2015). The CNS informed participants that we would collect data through two audiotaped interviews—the first just prior to discharge (within 24 hours) from the medical center, and the second six weeks following their discharge at their home. Participants interviewed at the time of hospital discharge are able to relate learning experiences during the most acute phase of their recovery. This phase of recovery entails the existential meaning of the heart and can influence the extent to which cardiac patients have the capacity to learn what they need to know to recover from cardiac surgery (Martinsen & Moen, 2010). Participants interviewed six weeks following hospital discharge are able to relate learning experiences during the home phase of recovery. This phase often involves introspection on the traumatic, life-changing aspects of cardiac surgery, as well as learning needs pertaining to self-management strategies required for an optimal recovery (e.g., diet, exercise, wound care, pain control and medication, and stress management) (Lapum et al., 2013).

Eighteen of the 20 recruited participants agreed to be in the study. Ten participants had a CABG, one had a CABG and a valve replacement, and seven had a valve replacement. Participants included nine men and nine women, ages 41 to 85. Thirteen participants were married and five were single. All participants were white, with 14 identifying themselves as Christian and four reporting no religion. Four participants had a high school education, ten had some college, one had a college degree, and three had a graduate degree. One participant was unemployed, 10 were retired, and the rest were employed. All but one participant had health insurance.

Data Collection

After obtaining written informed consent from participants, data were collected using non-structured, audiotaped interviews. During the first interview, we asked participants what they were taught about their cardiac surgery prior to and throughout their hospital stay, and how these experiences helped them learn what they needed to know to recover from surgery. During the home interview, we asked them what was most helpful about these experiences in relation to learning what they needed to know to recover from their surgery. In both interviews, we prompted participants to provide detailed accounts of their experiences with questions such as: “What else helped you learn what you needed to know to recover from open-heart surgery?”; “Can you give me a ‘for instance?’”; and “What did that [experience] mean to you?” After the interviews, the principal investigator assigned identification numbers to the audiotapes and submitted them to a transcriptionist with experience in qualitative studies. To ensure confidentiality, the transcriptionist replaced all identifying information with pseudonyms. After the transcriptionist transcribed the interviews, we verified them for accuracy.

Data Analysis

We analyzed the data using the interpretation as analysis approach (Moules et al., 2015).

This approach involved reading the transcripts multiple times and making notes about their content. The notes provided conjectures of meanings, which we used to develop initial interpretations. These conjectures were often something notable, or common experiences among participants. We further developed conjectures into more complete interpretations through discussion and writing, and using quotations and relevant literature to expound them. Conducting data analysis in this manner meant our interpretations were not limited to descriptions of participants' experiences. Rather, through using an interpretive process for data analysis, we identified nuances within the data, elucidating understandings about experiences of recovering from cardiac surgery that would not be accessible through description alone. As we interpreted data, we categorized interpretations into themes. We used themes as an approach to organize the interpretive work (Moules et al., 2015). Throughout the interpretive process, we acknowledged our prejudices as conditions in which understanding occurs (Gadamer, 2003/1960): We — the three investigators of this study — were born and raised in rural areas of the US. We considered our upbringing important for understanding and interpreting data in an “informed and committed way” (Moules et al., 2015, p. 121).

Rigor

We maintained rigor throughout our study by drawing on Madison's (1988) principles for evaluating interpretive research. These principles included coherence, comprehensiveness, penetration, contextuality, and agreement. Consistent with Madison (1988), we maintained coherence by presenting data without inappropriate contradictions (e.g., bringing to light and explaining opposing viewpoints) and ensured comprehensiveness by developing interpretations that promoted a unity of meaning. We assured penetration by writing interpretations that made an impact on the reader and were appropriately adherent to the study purpose. We kept contextuality

at the forefront of our interpretive work by being aware that interpretations were within the context of rurality. We addressed agreement by working to achieve consistency among what we conveyed in the methods, interpretations, and conclusions. Madison (1988) contended that good hermeneutics involves creating suggestiveness and potential, which we strove to do by raising new and important questions for future study.

Results

Participants' experiences of learning what they needed to know following cardiac surgery at the time of hospital discharge and six weeks later at home included three themes: a) Learning: Family History Informing Preventive Care; b) Learning: The Notebook, "*Blue's Clues*," and Explanations; and c) Learning: Lifestyle Changes and Confronting Mortality. We led each theme with the word learning because it was the focus of the interview question. In the hermeneutic sense, learning can reflect the fusion between the knowers and what they were learning (Grondin, 1995). In our study, the knowers or the participants frequent references to a family history of cardiac disease reflected a fusion of what they believed they knew about the disease (as transmitted to them by family members) and their understanding of how to prevent cardiac surgery or accept having the surgery. What they learned about cardiac care, however, demonstrated their new understandings about the importance of patient education materials and providers' explanations of what they needed to know to care for themselves following cardiac surgery. They summed up their learning needs through articulating how cardiac surgery meant learning lifelong lifestyle changes, and for some, these changes meant confronting their mortality. Despite the interwoven nature of the themes (Figure1), it is important to point out that, with the exception of the first theme, there was no clear demarcation of learning needs in the hospital versus the home. However, the first theme emerged from hospital interviews whereas the second and third theme emerged from

interviews in both settings.

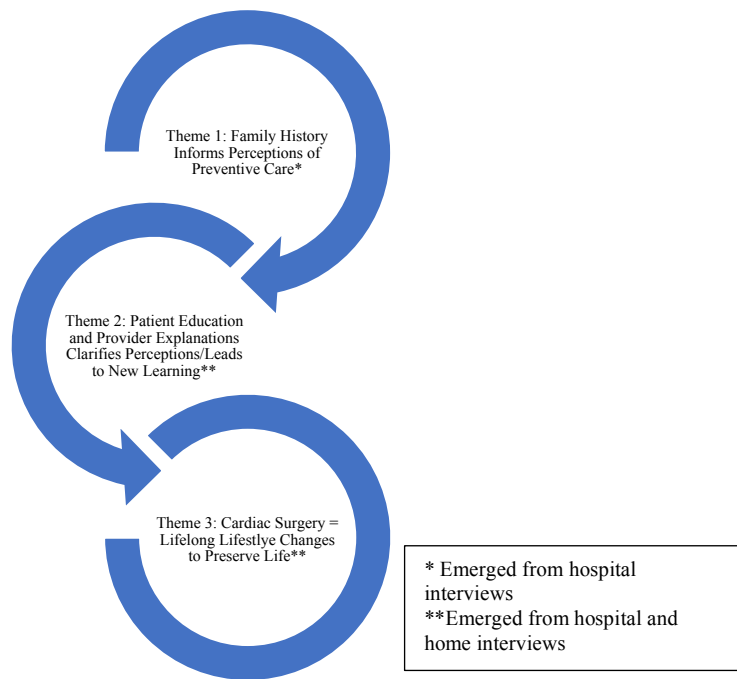


Figure 1. Interwoven Nature of Themes

Learning: Family History Informing Preventive Care

Interviews with participants at the time of hospital discharge revealed that they learned what they needed to know to recover from cardiac surgery through family members' acute cardiac events. Participants' descriptions aligned with secondary and tertiary levels of prevention, which focus on screening for cardiac disease, surgical intervention, and post-surgical convalesce. One participant said that, after his sister died from atrial fibrillation, another sister asked him and his siblings to schedule medical appointments to determine if they had cardiac disease. He said, "I checked out bad, she [my sister] checked out bad, and my brother walked away okay." In his case,

secondary prevention involved a need for him to undergo tertiary prevention through a valve replacement and cardiac bypass to repair damage from cardiac disease. Similarly, another participant wanted to undergo cardiac surgery as a mechanism of tertiary prevention. His father died of a myocardial infarction. He looked forward to the surgery viewing it as “the lesser of two evils” through describing cardiac surgery as easier to recover from than a myocardial infarction. He said:

I have always wanted to [have a cardiac bypass] because I never had a heart attack and I don't want to have one. It sets you so far back. I wanted to be younger to recover faster. I wanted to get it over with. I've been planning on [cardiac surgery] since my dad died [of a heart attack].

Some participants said they had control over the disease by assuming through, witnessing family members with the disease, that they knew when and how they would seek tertiary prevention to avoid mortality from the disease. One participant said at the onset of cardiac symptoms, he drove himself to the emergency room, and when he arrived, he “walked back and forth in front of the emergency room” without going in for care. He said, “I went through a list of 40 things, like don't do this. What do you want to get cut up for? You're not that bad.” Upon returning to his vehicle to go home, he said he had “the knife in the back.” This participant's reflection could be interpreted as the pain signifying confrontation with his fate or “a powerless superior power”, creating a readiness for adversity (Heidegger, 1962/1927, p. 436), which compelled him to return to the emergency room for treatment where he subsequently underwent CABG surgery.

Another participant said he had chest pain three months before having a myocardial infarction. He said he knew about cardiac disease from family members' medical history and their

experience with the disease. He said:

I could tell from the front chest part, there wasn't a problem, but from the back, as far as moving property and persons [in my job], I'd have to stop and breathe for a little bit. The legs would go numb, I'd have to crack my fingers. But I would overlook the [signs and symptoms] to make sure everything else was in control as far as how much time I have left—sick time. I planned to go out and rest if I was going to have [back pain]. And then finally the day I had [the myocardial infarction], I could feel it right through my legs and my back, but I continued what I was doing. And finally, at a certain point, I said enough is enough. It's time to get checked out.

This participant had a precarious sense of mastery over managing signs and symptoms (Gadamer, 1996) of a myocardial infarction. He thought he knew how to manage when he was having a myocardial infarction and when he was not because of witnessing family members with cardiac disease. He subsequently made the determination about how to circumvent medical interventions for as long as possible, assuming he had the ability to control when he needed medical intervention such as through “planning” when he needed to rest and when he needed to seek medical care.

Learning: The Notebook, *Blue's Clues*, and Explanations

The majority of participants described the patient education materials they received as essential to learning what they needed to know to recover from cardiac surgery. Many of them said they thoroughly read the information, sometimes multiple times during their hospital stay, and again when they were at home. One participant said she read the material from “end-to-end many times over” and another said he “read it, absorbed it, and used it.”

In discussing patient education materials, participants referenced material they thought

offered the best source of information. The source they most frequently discussed was titled *Notebook on Heart Surgery*, which many of them simply called *the notebook*. The notebook is a three-ring binder containing six sections with information about the health care center where they had their surgery. It contained pre-surgery instructions, cardiac conditions and procedures, post-procedure care, discharge planning, and other resources. Some of the content was copyrighted by companies and organizations producing patient education materials (e.g., StayWell, the American Dietetic Association, and Pritchett & Hull Associates). Other content was created by the health care facility. The pages in the notebook had large, colorful illustrations, bolded statements, varied font sizes, and short sentences for ease of reading and comprehension.

One participant who underwent heart valve replacement referred to the notebook as the *Blue's Clues* of heart surgery. *Blue's Clues*, was a preschool television series in the US from the late 1990s. He said:

There was a big binder to read through, which broke [heart surgery] down into some very simple illustrations. That was a lot more helpful for me to read than technical terms. It's like the *Blue's Clues* of heart valve replacement. The little pictures with captions, which made it simple because most don't know they have an aortic valve in the heart, let alone what it does and where the blood goes.

Despite the large binder, this participant seems to convey how the simplicity (e.g., nontechnical terms) of the material provided a “luminous spot” where the unknown could be known (Dewey, 2009/1916, p. 260). This luminosity helped him learn what laypersons generally do not know about cardiac surgery.

Other participants echoed the *Blue's Clues* description by talking about how the information in the notebook was displayed in a manner that facilitated their learning. One participant recounted

how the material provided her with step-by-step instructions about what to expect, know, and do pre- and postoperatively. It was also common for participants to comment on the illustrations and white space, with one participant summing up the material by describing it as friendly.

While the appearance and readability of the notebook were important to participants, many of them remarked on the value of health care providers' explanations of learning what they needed to know to recover from cardiac surgery. One participant said, "They explained the [cardiac surgery procedure] to me so well that half the time I didn't have questions. But if I had a question, I could always ask them later. No problem." Another participant said the nurse "was terrific; I mean, she was explaining stuff to me all this and that." Another said, "They've been great explaining different things or why I'm getting certain medicines, or different ways I need to move." When asked about the meaning of the explanations, some participants said they felt supported, reassured, and confident in knowing what they needed to know to care for themselves postoperatively.

Participants' reflections on health care providers' explanations reveal the importance of the relational aspects of patient education. To the participants, explanation was an act of caring by a provider that exemplified the artful practice of patient education. Polkinghorne (2004) writes that practice involves two entities, "the one to whom the practice is directed is a person, and so is the entity who performs the practice" (p. 89). Practitioners are not mechanical or formulaic but rather use judgment and improvisation to help others achieve their goals. Such practice conveys a caring attitude that promotes participants' receptivity to patient education (Noddings, 2013).

Despite the quality of the patient education and value of explanations, a few participants said they were initially frightened by the information they received. One participant said that receiving the notebook "scared me to death" to the point it interfered with her sleep. Another participant said

he was frightened that, upon reading the patient education materials, he had a “two to five percent chance you don’t make it,” and “even though it’s only two to five percent, any chance is scary, even if it’s half a percent.” Family members tried to decrease participants’ fears by attempting to console them, and health care providers attempted to alleviate their fears with further explanation. Nonetheless, these participants’ preoperative learning experiences seemed to involve existential uncertainty and an obvious sense of vulnerability (Dahlberg, 2018).

Learning: Lifestyle Changes and Confronting Mortality

In nearly all narratives (hospital and home), participants remarked on types of lifestyle changes they needed to make following cardiac surgery, with a number of them indicating they gained the most comprehensive knowledge in cardiac rehabilitation. In some instances, however, their accounts involved deep reflections on the meaning of lifestyle changes in relation to their mortality.

Regarding types of changes, many participants understood the need to adhere to new regimens that defied habitual ways of living; they had to get used to new things and acquire new habits. Merleau-Ponty (1962) writes, “[H]abit has been cultivated when it has absorbed a new meaning, and assimilated a fresh core of significance” (p. 146). Upon reflecting on integrating new lifestyle habits into her life, one participant said, “It’s just that remembering these little things along the way or the things you just take for granted and are used to.” Another participant said she needed to “be careful and take it easy and not be the woman that I am.” She further explained she did “manly chores versus woman chores” and she needed to modify “cutting wood and cutting the grass,” perhaps permanently. For her, cultivating new habits meant yielding to gendered expectations of women’s work, which did not entail strenuous outdoor activities. Some participants said they learned they needed to grocery shop around the perimeter of the store where

healthier foods typically are located. Others learned new ways to manage sodium intake, such as draining a can of beans or corn to remove excess sodium. Some talked about avoiding particular restaurants, some of which they used to patronize frequently, because, as one participant said, “[name of town] is not the healthiest community in the world by any stretch of the imagination. People love their fried food here.”

Participants who elaborated on learning what they needed to know in cardiac rehabilitation often reflected on the multifaceted aspects of recovery. This participant explained his experience in cardiac rehabilitation:

The first hour of the day is education. It’s all about your heart and your body and what’s happened to you and how to take care of yourself. And then the next hour is your exercise. I’ve done stuff on the treadmill before but I didn’t think I could because I can’t walk very much with my legs. I’m spending fifteen minutes on there at a nice, fast pace for me without my legs killing me. And that makes me feel good. They have a person come and tell you everything you need to know. What’s going on that day, whether it’s about your heart, if it’s about sugar, if it’s about nutrition, or if it’s about exercises you’re going to do or if it’s about whatever.

This participant recounts his experience in cardiac rehabilitation as time well spent, reflecting on the many dimensions of recovery and associated benefits, such as improved endurance. His comments on feeling good reflect the essence of recovery as the “miraculous process of convalescence” (Gadamer, 1996, p. 42). Nonetheless, not all participants were positive about adopting new lifestyles following cardiac surgery. A few participants said that learning what they needed to know meant grieving the loss of previous lifestyles and confronting their mortality. During the home interview, this participant, who developed atrial fibrillation following his surgery,

reflected on the meaning of lifestyle changes:

I was a sixty-five-year-old man who could catch bullets in his teeth. [Now] any change, any quirk, any thump. . .Is this it? I've got to learn [to live] with the fear of this arrhythmia. I've got to learn how to re-eat. I've got this heart-healthy diet and what that means to me is, if it tastes good, you can't eat it. And other things I've given up or have to change. Cardiac rehab. I started out the first day with a seminar and it was sort of like a cold shower. The instructor made a statement that I really didn't know, hadn't researched. That these bypasses are only good for 10 to 15 years. And prior to that, I thought a lot of doctors said you have two good decades, three decades, live to ninety. On Wednesday's class, which again, I mean it was a good class, but not one of my favorites. It was on advance directives. We all have to face the inevitable, but that's hard facing. The instructor did a very good job on that, but I guess it's boom, boom, boom, and these aren't the things you want to hear after coming out of cardiac surgery.

This participant paints a bleak picture of his perceptions about the realities of learning what he needed to know to recover from cardiac surgery. He reflects on who he used to be—a strong man who was nearly invincible. He lives in fear of unmanaged arrhythmias, and views lifestyle changes following cardiac surgery as a loss. He sees little pleasure, for example, in eating a heart-healthy diet. He laments that doctors misled him about the expected lifespan following cardiac surgery, vividly describing how shocking it was to learn he may not live decades. The session on advance directives intensified his negative learning experiences as it compellingly imposed the need for him to confront his mortality. He cogently summarizes his concerns about learning by emphasizing what he did not want to learn following cardiac surgery.

This participant gives voice to learning experiences that can be overlooked in the midst of

providing patient education. His experience can be interpreted as patient education services acting as oppressor, wherein he experiences some degree of harm in learning what he needs to know and feels repressed and vulnerable through the educational messages he receives (Redman, 2002; 2011). He sees no escape from surgical outcomes, using obligatory statements such as “I’ve got to...”, which, in his case, reflect little sense of power and control over learning what he needs to know to recover. Patient education is imposed upon him, furthering his suffering from his cardiac condition.

Discussion

In our study, we broadened understandings of rural cardiac surgery patients’ learning experiences following cardiac surgery to inform the provision of patient education for this population. Our study extended research that has primarily focused on the correlation between the learning needs of cardiac surgery patients and demographic variables.

The first theme, Learning: Family History Informing Preventive Care, discusses participants learning what they needed to know through witnessing family members’ cardiac events. They used this knowledge to understand their own condition, articulating it within the context of secondary and tertiary prevention, rather than through primary prevention. This finding is consistent with other studies, which demonstrate that rural residents treated for preventable outcomes of chronic disease can rely on knowledge from family members to understand their own condition and its treatments (Liu et al., 2018; Lohri-Posey, 2006).

This way of knowing, however, may result in participants’ abdicating their personal role in prevention and perpetuating their understanding that cardiac disease is resolved through medication and surgical intervention alone (King, Thomlinson, Sanguins, & LeBlanc, 2006), rather than through preventive health care. Nevertheless, participants’ reliance on family

knowledge must be considered in relation to other factors where research explains rural residents' lack of primary prevention may be due to insufficient knowledge about primary prevention (Hamner & Wilder, 2010) and distance decay (access to care impeded by long travel distances to health care providers) (Wong & Regan, 2009). The lack of primary prevention may also be related to rural primary care providers' heavy workloads where they are required to spend time addressing acute health care needs, rather than providing primary prevention services (Khoong, Gibbert, Garbutt, Sumner, & Brownson, 2014). Cohen, Manuel, and Sanmartin (2015), in fact, suggest that rural residents at risk for an acute myocardial infarction are better served by secondary prevention services because cardiac symptoms trigger diagnostic services.

The second theme, Learning: The Notebook, *Blue's Clues*, and Explanations, illuminates participants' health literacy levels. Health literacy is "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (Institute of Medicine, Committee on Health Literacy, 2004, p. 4). There is a paucity of research about the learning needs of rural cardiac surgery patients in relation to health literacy. There are, however, a few closely related studies about the health literacy needs of surgical patients. One systematic review and meta-analysis reported heterogeneity in health literacy among surgical patients (Roy et al., 2019). A qualitative systematic review indicated a possible association between low health literacy and low comprehension of surgical procedures, and poor adherence to preoperative instructions (Oliveira, McCarthy, Wolf, & Holl, 2015).

Unlike these studies, our study reflects qualitative homogeneity among participants' reports of health literacy; for example, they commented on the readability of patient education materials and the practice of rereading content numerous times to ensure they understood the information. The practice of rereading is consistent with another qualitative study, which showed that rural

residents understand patient education materials through frequently referencing and rereading them as an approach to understanding and using health information (Scheckel et al., 2012). Scheckel et al. (2012) also inferred a possible link between health literacy and the value that rural residents place on self-reliance (e.g., being informed equates to self-sufficiency), which is a concept consistent with literature on rural culture (Lee & McDonagh, 2018).

Although our study is not consistent with research on health literacy and surgical procedures, it is consistent with practice guidelines and standards on support systems and effective interpersonal communication, which is necessary to facilitate health literacy (Brega et al., 2015; Office of Disease Prevention and Health Promotion Health Communication Activities, n.d.; The Joint Commission, 2007). In our study, participants said that health care providers' explanations were an effective form of support and communication, which helped inform their health literacy needs. This finding mirrors another study in which rural participants saw health care providers' facilitation of health literacy as a caring act, giving participants "know-how to endure their illness, overcome it, and care for themselves once again" (Scheckel et al., p. 117). Although there is little research about the role of support and effective communication in relation to health literacy for rural cardiac surgery patients, there are a number of studies that suggest empathy (Mammen, Sano, Braun, & Maring, 2018) and psychosocial support (Hardman, Lawn, & Tsourtos, 2018), facilitate health literacy for those in rural areas, giving credence to the significance of these dimensions of care in promoting health literacy among rural cardiac surgery patients.

Despite the positive findings of our study, which indicated that participants understood the information they received and the value of support systems in augmenting health literacy, it is important to address participants' comments about being frightened by the information, particularly in relation to cardiac surgery mortality rates. Some participants thought even a small

mortality rate was of great concern. This finding differs from a narrative inquiry study about patients' experiences of technology in open-heart surgery and recovery where participants saw cardiac surgery as a technological fix, which "averted dwelling on the possibilities of death" (Lapum, Angus, Peter, & Watt-Watson, 2010, p. 757). It also differs from a study showing that cardiac surgery patients did not feel frightened by the education they received (Ivarsson, Larsson, Lührs, & Sjöberg, 2005). However, our findings align with a qualitative, descriptive-exploratory study that suggested those undergoing a CABG need more information about the existential needs of recovery (Martinsen & Moen, 2010).

The third theme, Learning: Lifestyle Changes and Confronting Mortality, discusses participants' learning about the importance of confidently embracing new ways of living, such as changing dietary and activity regimens, which is consistent with other studies. Lapum et al.'s (2010) narrative inquiry study used a metaphor from Elbow (2007) to describe how open-heart surgery patients move away from dependence on technology toward being competent and active participants who "began to sing themselves into their recovery" (Lapum, et al., 2010, p. 760) by re-engaging in normal activities of daily living. Lapum et al. (2013), in using an arts-informed narrative study, portrayed a figure in an open field in the winter with foliage emerging to show how a patient recovering from cardiac surgery "stands with confidence and readiness to move forward" (p. E696). Similarly, Martinsen and Moen's (2010) descriptive-exploratory study drew on Antonovsky's salutogenic model to understand how "sense of coherence" illuminates CABG patients' need for support in adopting new lifestyle changes during recovery from cardiac surgery.

The third theme also highlights the importance of cardiac rehabilitation when participants described its utility in meeting their learning needs following cardiac surgery. Studies about cardiac rehabilitation in rural settings are predominantly limited to investigating barriers to

accessing services (Field, Franklin, Barker, Ring, & Leggat, 2018; Sangster et al., 2013; Shanmugasegaram, Oh, Reid, McCumber, & Grace, 2013). However, a few studies focused on rural populations report findings similar to our study, which indicate positive associations between cardiac rehabilitation and learning about diet and self-management (Fletcher, Burley, Thomas, & Mitchell, 2014), achieving a sense of accomplishment and increased understandings about cardiac health (Austin, 2013), and understanding cardiac rehabilitation as important for the “evolution and continuity of the educational process” (Erdmann, Lanzoni, Callegaro, Baggio, & Koerich, 2013, p. 337).

In spite of the research on positive experiences of rural cardiac surgery patients’ participation in cardiac rehabilitation, our study brought to light how learning what one needs to know about recovery can be discouraging. This finding is congruent with Anderson, McAllister, and Moyle’s (2002) discourse analysis of a pacemaker implantation booklet, which conveyed preferred meanings of surgical outcomes such as health and happiness, when in fact such discourse can be misleading through omission of important information about the unanticipated and unpleasant realities of recovery. Our findings indicate that some cardiac surgery patients feel ill-informed about the psychosocial impact of lifestyle changes following cardiac surgery. Numerous studies support variations of the psychosocial impact of cardiac surgery, such as depression (Hwang et al., 2015), anxiety (Tully et al., 2011), and quality of life (Perrotti et al., 2019). In the context of rural health, rural residents’ disclosure of the psychosocial impact of cardiac surgery is important to consider in relation to the rural health concept of anonymity. Rural residents may be reluctant to reach out for psychosocial support for conditions such as depression, because they fear others known to them may see them seeking out mental health services (Swan & Hobbs, 2018).

Our study demonstrates the imperative need to ensure patients from rural settings understand

what preventive health care is and its relation to preventing cardiac disease. It is alarming that participants in this study equate prevention or cure of cardiac disease with surgical intervention. More research is necessary to learn ways to change perceptions of prevention among those from rural areas, including perceptions generated from within families. This research can facilitate ways to increase engagement with and adherence to cardiac disease prevention activities. Our study also reinforces the importance of providing patient education materials that are readable and useable. These materials are treasured tools for those recovering from surgery. The materials must be accompanied by the human touch, which is invaluable to rural residents in promoting their understanding of learning needs following cardiac surgery.

Further research is needed on health literacy, specifically for rural residents undergoing cardiac surgery, to extend understandings about the utility of patient education materials for this patient population. It is also important to consistently address in a person-centered manner the existential needs of those undergoing cardiac surgery. Participants' comments in our study are a significant reminder that a learning need involves the existential experience of the surgery. Health care providers can easily overlook this experience as a learning need amid the array of teaching that must occur around lifestyle changes. Further research on existential learning needs can supplement existing studies on depression, anxiety, and quality of life following cardiac surgery. In addition, better understanding and knowing how to address existential learning needs has the potential to prevent patients from being frightened by patient education and feeling as though receiving the education resulted in harm through both knowing and not knowing what they needed to learn to recover from cardiac surgery. Finally, it is important to study rural health concepts of self-reliance and anonymity in relation to rural cardiac surgery patients. Study of self-reliance is important in gaining understanding about motivation for the utilization of patient education

material, adoption of lifestyle changes, and cardiac rehabilitation use among rural cardiac surgery patients. Understanding the need for anonymity is important in identifying ways to ensure these patients receive mental health support when they experience acute or chronic psychosocial problems following cardiac surgery.

Our study does have some limitations in that the research was based in the US and thus is a lower-context culture (Yamazaki, 2005). This lower context culture may explain why patient education materials were so useful to participants, which may not be the case for a similar study in a high-context culture. The education level of our participants suggests that health literacy may not have been a barrier to understanding and using patient education information. Thus, it is important to keep in mind avoid assuming those from rural areas have low levels of health literacy. Finally, our study is qualitative and has value in conveying experiences, which cannot be generalized. Some studies cited in the discussion include quantitative research designs with systematic reviews. These studies provided a benchmark for the usefulness of our findings. However, our findings must be considered in relation to how they resonate with others to improve understandings about learning needs. Herein lies the value of qualitative research where the researcher is, according to Denzin and Lincoln (2008), a bricoleur or quilt maker, providing “a pieced-together set of representations that is fitted to the specifics of a complex situation” (p. 5). Our study did indeed piece together rural participants’ representations of the complex trajectory of their learning needs following cardiac surgery.

Conclusion

The participants in our study revealed three important themes underscoring the learning needs of rural cardiac surgery patients: prevention, health literacy, and lifestyle changes. Within these themes were important nuances, such as the influence of family knowledge on learning

needs, reported high levels of health literacy and its possible link to the rural concept of self-reliance, and the emergence of existentialism as a learning need. In addition, some participants were keenly aware of the psychosocial impact of patient education, showing clearly how important it is for health care providers to understand how patients experience learning about recovery from cardiac surgery. For rural residents, this experience can either be empowering or dispiriting, and it is crucial to gauge where patients are on this continuum to address their individual learning needs as they recover from cardiac surgery.

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