Older Patients' Perception and Experience with Lifestyle Changes Following Cardiac Revascularization

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Abstract

Objective: To describe patients' perception and experience related to lifestyle change after coronary revascularization.

Background: Engaging in lifestyle change is crucial to realizing the benefits of cardiac revascularization. However, patients often fail to adhere to lifestyle change recommendations after cardiac revascularization.

Method: A qualitative study of 30 patients following cardiac revascularization was conducted. Data were collected by telephone using a semi-structured interview questionnaire.

Results: The average age of the patients was 73.9 (± 6.0) years. The majority of patients denied that they had a chronic heart condition, even though some had repeated coronary revascularization. Given the false assumption that coronary revascularization had "fixed" their heart problems, patients failed to perceive the critical need to make lifestyle changes. In addition, the relationship with healthcare providers was perceived as an important factor to help patients recognize the need for lifestyle change.

Introduction

Coronary revascularization procedures (e.g., coronary artery bypass surgery [CABS], percutaneous coronary intervention [PCI]) result in temporary improvements in symptoms and quality of life of cardiac patients.[1-3] To maximize and achieve full, long-term health benefits after the procedures, it is critical for patients to make lifestyle changes and follow secondary prevention recommendations (e.g., participating in cardiac rehabilitation, taking prescribed medications, and making lifestyle modifications regarding dietary changes, smoking, and exercise).[4-14] Studies have shown that long-term lifestyle changes can reduce cardiac risk factors, improve postoperative recovery and prognosis,[6] and reduce symptoms and recurrence rates.[13] Despite the importance of secondary prevention, the adherence to behavioral modification guidelines in cardiac populations remains suboptimal. It was reported that less than 20% of cardiac patients participate in cardiac rehabilitation,[15-18] less than 37% of patients adhere to an exercise regimen, and less than 42% of patients adhere to a recommended diet.[10,19] The reasons contributing to low adherence to secondary prevention guidelines after cardiac procedures include age, gender,[20] illness and treatment beliefs,[21-23] motivation,[24,25] self-efficacy,[25] knowledge about lifestyle changes,[21] psychological distress,[20,25,26] type of procedure (PCI vs. CABS),[24,27] comorbidity,[15,24] current lifestyle,[24,26] family members' lifestyle,[15] support systems,[24,25] and accessible resources.[15]

In the past three decades, there has been much attention on exploring patients' post-surgical experiences and the development of interventions to improve the adherence to recommended secondary prevention following cardiac procedures.[15,24,28-31] However, the effectiveness of these interventions is often ambiguous.[13,32-36] In order to develop effective adherence-enhancing interventions, we need to have a deeper understanding of why patients persistently fail to initiate and sustain recommended behavioral changes following cardiac procedures. Therefore, we conducted a qualitative study to explore cardiac patients' perception and experience with lifestyle changes following cardiac revascularization. The research questions of this study were:

1. What are the perceived enabling factors to make lifestyle changes following a cardiac procedure?
2. What are the perceived blocking factors to make lifestyle changes following a cardiac procedure?

The findings from this study may help to better understand patients' perceptions about heart problems and cardiac revascularization, as well as the impact of these perceptions on their decisions to adopt a healthier lifestyle. Based on the study findings, strategies can be identified and developed to meet patients' needs in making lifestyle changes during the early stage of transition from hospital to home after a cardiac procedure.

Methods

Research Design and Sample

This was an exploratory study using a qualitative design to gain an understanding of participants' perceptions in making lifestyle changes after having a heart procedure. A convenience sample of 30 individuals undergoing CABS (n = 15) and PCI (n = 15) was recruited from a tertiary hospital in a Midwest region. Participants were included in the study if they: 1) were age 65 years or older, 2) underwent CABS or PCI within 3-7 weeks, 3) were not visually impaired, and 4) were able to hear, speak, and read English. Study procedures were approved by the hospital and the University of Nebraska Medical Center Institutional Review Boards.

Procedures

Hospital staff with clinical access to patient records identified prospective participants and notified the investigators. Potential participants were then screened by the principal investigator to determine if they met the inclusion criteria for the study. Those who met inclusion criteria were invited to participate in the study, and written informed consent was obtained. Detailed information about the study was provided to the participant, and a phone interview appointment time was set. A postcard was sent one week prior to the phone interview to remind him/her of the scheduled appointment. The participants' background and clinical information were collected using a demographic and clinical data tool prior to hospital discharge.

Data Collection and Analysis

Data collection took place over a five-month period. A one-time, semi-structured phone interview was conducted after hospitalization. An interview guide was developed for this study in an attempt to explore participants' experiences with lifestyle change following a cardiac procedure. Sample questions included in the interview guide are presented in Table 1. All interviews were audio-recorded and transcribed verbatim. Additional field notes were taken by the interviewers. Data collection took approximately 20-30 minutes. To ensure reliability and validity of the data collection and analysis, the same interview guide was used to ensure consistency. In addition, the principal investigator assumed the primary role in data analysis to ensure internal consistency with data coding. Finally, two researchers (SB and LY) independently reviewed the interview data and grouped the transcripts into themes. After repeated reviews, they reached a consensus and identified common themes under the five areas that emerged from the interview data.

Table 1: Examples of Interview Guide

INTRODUCTORY QUESTION:
• Can you tell me about your life after the heart surgery or procedure?
• Do you think you have a "chronic" disease or health problem?
QUESTIONS RELATED TO LIFESTYLE CHANGES:
• Were you given the following instructions or recommendations to make any lifestyle changes to reduce your risk of future heart problems? − Follow a healthy diet (portion control, low salt and fat) − Become physically active and exercise − Maintain a healthy weight − Quit smoking and drinking − Manage stress and reduce workload − Take medicines to control chest pain or discomfort, high blood cholesterol, high blood pressure, and your heart's workload − Attend the cardiac rehabilitation program
• If you were given the recommendations on lifestyle changes, − Who gave the recommendations? − What recommendation(s)? − When were the recommendations given? − How did you follow the recommendations? Are there any changes you have made in response to these recommendations?
• If you made lifestyle changes since you returned home after your heart event, what were your short- or long-term plans for changing your daily lifestyle?
• Has anyone (e.g., spouse, children, other family members, close friends, coworkers, health care providers, etc.) been helpful when you were making lifestyle change?

Table 2: Characteristics of participants

Sample	N = 30	N (%)
Age		73.9±6
Gender	Male Female	15 (50%) 15 (50%)
Procedures	PCI CABS	15 (50%) 15 (50%)
Married		20 (67%)
Risk Factors	Hypertension Hypercholesterolemia Diabetes Mellitus Current Smoker	23 (77%) 23 (77%) 7 (23%) 2 (7%)
Lifestyle Changes	Healthy eating and portion control Attending cardiac rehabilitation Self-directed exercise Stress management Reducing workload Smoking cessation Multiple lifestyle changes	15 (50%) 10 (33%) 5 (17%) 3 (10%) 1 (3%) 1 (3%) 3 (10%)

CABS, *Coronary artery bypass surgery;*
PCI, *Percutaneous coronary intervention*

Results

Sample Characteristics

The interviewed participants (N = 30) were recruited from a Midwest regional hospital during the spring and summer of 2009. Table 2 provides the characteristics of participants. The sample consisted of 15 males and 15 females. Subjects ranged in age from 65 to 88, with a mean age of 73.9 ± 6.0 years. Data were collected during the first month after surgery or PCI (34.3 ± 12.6 days). Participants' cardiac procedures included PCI (n = 15) and CABS (n = 15). The sample shared similar sociodemographic characteristics. The majority of participants were married (67%), had at least one risk factor of heart disease, including hypertension (77%), hypercholesterolemia (77%), diabetes (23%), and 7% were current smokers.

When participants were asked what lifestyle changes they made, healthy eating and portion control were most frequently reported as secondary prevention practices (50%), followed by attending cardiac rehabilitation (33%) and self-directed exercise (17%). Other risk behavior modification practices addressed were stress self-management (10%), the reduction of workload (3%), and smoking cessation (3%). Only three of the thirty participants (10%) reported multiple lifestyle changes (exercise, diet control, and/or managing stress).

As participants discussed their decisions to follow a secondary prevention regimen (e.g., lifestyle change and risk behavioral modification), the shared themes reflected both enabling and blocking factors to their engagement in healthy behavioral changes. These themes were grouped into five sections: 1) personal characteristics, 2) clinical characteristics, 3) transitional care, 4) social and environmental aspects, and 5) treatment outcomes.

RESEARCH QUESTION 1:

What are the perceived enabling factors to make lifestyle changes following a cardiac procedure?

Personal Characteristics

The decision to engage in a secondary prevention practice was affected by the following themes: 1) positive illness and treatment beliefs, 2) sense of control, and 3) positive previous experience.

Personal beliefs about the illness causality played an important role in participants' decision to make lifestyle changes.

- *"If I keep my cholesterol down, I don't think I should have any problems."*
- *"I have the same symptoms that my father had, I am convinced that a lot of this is hereditary, yes, I have chronic heart disease, and I have to make and stick with life changes."*
- *"I had a stent four years ago. I suppose exercise and watch my diet more, so maybe it won't happen again."*
- *"I'd say it in my mind, you can't just lay around, you have to get up and you have to move and work. You are going to have pain because of surgery, but you have to go ahead and work to keep that pain down. You exercise and do things like that, don't lay around because it hurts. You go on with life. I changed my lifestyle, it is a whole new life. I mean you come out from dying, and you have to start all over again, it is a new life."*
- *"Well, my grandmother on my father's side died at a young age from heart disease, my father had heart disease, and now I'm having the same symptoms that my father had . . . So I am pretty much convinced that I have chronic heart disease, a lot of it is probably hereditary, I am realizing that (hereditary is a nonmodifiable factor), so I am going to have to be more strict on changing my lifestyle, or I'm going to continue to have problems."*
- *"My mother had heart disease. Just because your family has it (heart disease), that doesn't mean you are going to have it. Yes, you are more likely to have it (heart disease), but just go on with life, watch the things you can and can't. Don't overlook everything, and think well that I am in good health and I don't want to ruin it again."*
- *"I pay attention and do what the doctor says, do it right, and it's going to help my recovery and it's going to help my well-being and give me a better outlook on everything."*

The decision to engage in lifestyle changes and risk modification was also influenced by personal belief regarding the benefits of a secondary prevention regimen.

- *"Cardiac rehab has been very helpful, beneficial, and safe."*
- *"You know I just have that comfort of (going to cardiac rehabilitation) when I go there to exercise. They have the monitor on me and things like that…"*
- *"I'm going to rehab three times a week, and I can see where my strength is gaining all the time. I can really tell a difference from when I first started (cardiac rehabilitation)."*
- *"I walk every day, and I am going to rehab now, and I think that is making me stronger."*
- *"I think having cardiac rehab is just an absolute plus because the two ladies – the physiologist and the nutritionist – are monitoring us all the time and checking, you know, our blood pressure three times during the hour, I just think that's bringing me around really fast. It's getting me back on top of my schedule again, and I just – and peace of mind – I just feel they're monitoring me, they put the electrodes on me when we're working out so if there's anything going wrong, they're going to know right away because they're monitoring that computer all the time so …so I'm pleased. I think that's probably one of the best things that they have done for us or for me, so – yeah, that's a good follow-up. I'll be on that for 18 weeks or so."*
- *"…Yeah, I think rehab has done a lot to educate me. They've been tremendous."*

Some participants expressed a strong desire to have control over their health.

- *"The home health nurse is very good about letting me do my own thing. If people (providers) want to do it (change my lifestyle) by force, I'd say no. It is not always doing things by the rules. I don't mean disobeying the doctors' rules. I have to kind of adjust them for what works for me and how I am feeling."*

Participants who had previous experience with cardiac revascularization expressed willingness to change lifestyle and modify cardiac risk factors more readily.

- *"My husband had heart surgery six years ago so we pretty much watch (our diet)."*
- *"I had four stents put in years ago, but it plugged up again, so I'm going to be aware of it and carrying my nitro in case things plug up again, you know, and have more (doctor) check-ups than what I had been doing."*
- *"I had bypass surgery six years ago so I have been on a special diet, staying away from salt, less caffeine, low or non-fat diet…."*
- *"I had five stents and one bypass; we have been trying to eat low-fat foods, drinking skim milk since 1990."*

Social and Environmental Aspects

Many participants reported that their support system helped them initiate and maintain lifestyle changes.

- *"Well, well I have a wonderful wife that used to be a wonderful nurse … And I can see if I did not have a spouse, I would not want to have to come home alone and I would hope that somebody would tell me to go to the assisted living complex for a while, you know, because I can see where you would get yourself in trouble by not eating properly and bathing properly and things like that so… My wife monitors me here at home. We have our own blood pressure machine too, and then she makes sure I take all my pills when I'm supposed to and things like that. . . The diet is working really well, my wife is careful that we're eating lots of veggies and fruit, ahh, we're trying to follow the program. I think it's helping a lot."*

Outcomes

Positive outcomes reinforced behavioral change adherence, as these participants noted:

- *"Now I pay attention to how much sodium is in things I buy, and you wouldn't realize how much sodium is in everything. I have been cutting down on my eating, and you know watching for the fat and everything, sodium, and I have lost 12 pounds."*
- *"I'm starting rehab now, and I think that made a difference. I started to get a little more exercise and, when I started that, I started to change."*
- *"I'm in rehab right now, and boy, my blood-pressure is the best that it's been in 15 years and things are going great!! I mean I just feel really good. Of course, we're working on nutrition too, we're working on our diet so I think things are going along really pretty good. I went back to see my doctor the first two weeks afterwards, he gave me a good evaluation and checked it all out."*

In addition, those who made a connection between his/her expected outcomes and behavioral change were more likely to follow a secondary prevention practice.

- *"I am 81 years old; if I take care of myself, I might be around three or four more years."*
- *"If we got on top of it pretty quickly and control it, I behave myself and do what I should; I can get another 10 or 20 years out of my life anyway."*
- *"I really watch what I eat because I want to get back to doing what I was doing before."*

RESEARCH QUESTION 2:

What are the perceived blocking factors to make lifestyle changes following a cardiac procedure?

Personal Characteristics

The following themes indicated that participants could have difficulty in adopting a secondary prevention practice: 1) believing their heart problems have been "fixed", not perceiving as a chronic disease; 2) perceiving chronicity as "loss of control"; 3) attributing heart disease to genetic factors (nonmodifiable factor); 4) negative attitude toward behavioral change; 5) financial burden associated to a secondary prevention practice; 6) failing to establish goals to change behaviors, and 7) lack of knowledge and information regarding heart disease and secondary prevention.

Participants perceived the heart surgery as a "permanent cure," and they were "fixed" by the procedure. As a result, most participants (67%) denied having chronic heart disease.

Participants' responses typified this perception. A participant who had valve disease and atrial fibrillation claimed:

- *"No, they (healthcare providers) say this is pretty well taken care of, I don't have chronic heart disease."*

Another participant who had CABS six years ago denied he had chronic heart disease. Other participants stated:

- *"I thought they fixed it, so it is just a health problem."*
- *"Well, I think to some extent it may, I mean, yeah, it has slowed me down and ... but I don't think it will take that big of a toll, no, I don't have chronic disease."*
- *"I don't think I have chronic heart disease, I feel like it is fixed, no."*
- *"I think I am cured for now, for quite a while."*

Only four of the 30 participants (13%) believed they had chronic heart disease, and six of the 30 participants (20%) had ambiguous feelings about the chronic nature of their heart conditions. One participant described:

- *"I feel like it is fixed, and that's something I was kind of wondering about, what would determine my problems and do I really have heart disease? I don't think I do. I think I just have something that wore out. I mean that is the way I look at it."*

Some participants started to make adjustments and accepted the fact of having a chronic heart problem.

- *"They (healthcare providers) warned me, don't get fooled into thinking you're better off than you were, and I realized that's why I feel now, it's coming back...."*

The participants who attributed their heart condition to a sole genetic factor did not believe the benefits of a secondary prevention. A couple of participants stated:

- *"I wish it is something that I can do something about it, but each time the doctors have told me it is pretty much an inherited factor that I am going to have to live with it. You can only control about so much of this in your lifestyle and that is about all you can do."*
- *"I don't know, it is all in God's hands, whatever he decides, no matter what I do, it's up to him."*

Some participants expressed a negative attitude towards risk behavioral modification. Others did not think making a behavioral change would make a difference.

- *"I have gone to 1% milk instead of 2% but I refuse to go to skim milk. If I have to drink skim milk, I am going to drink water."*
- *"I am lazy, don't want to do too much on exercise."*
- *"They got me on this diet deal, I am not too crazy about the diet but I am following it."*
- *"Well, at my age, I don't really think that there is too much room to change. I will be 80 my next birthday."*
- *"I haven't really found anything that has improved my recovery that much."*

For some participants, cost was a barrier to engaging in recommended cardiac rehabiliation. One reported:

- *"I don't know for sure if I am going to cardiac rehabiliation. If I get along here with my own exercise, I will stick with that. It is cheaper."*

Many participants struggled with personal goals for behavioral change. Twenty-four of the 30 participants (80%) did not have either short- or long-term goals for lifestyle changes.

- *"Cutting out salt and eating better, I was not too good at that. I don't have goals yet to change my lifestyle. Plus, it is hard to get them implemented. We get them started, we don't follow through usually."*

Participants' responses revealed many of them lacked knowledge and had a misunderstanding in terms of heart disease risk factors and their association with secondary preventions.

- *"If I keep my cholesterol down, I don't think I should have any problems."*
- *"I am like 5'6" but I weigh 180-some pounds but I don't consider myself fat, maybe just a freckle being overweight."*
- *"I am diabetic, but I am not at risk for heart disease because I have more trouble with low blood sugar than high."*
- *"I am overweight and I don't know what I should weigh."*

- *"I don't know how much, how hard to push myself (on increasing physical activity)."*

Clinical Characteristics

Clinical factors, such as comorbidity, symptom burden, impaired functioning were perceived as blocking factors that prevented participation in cardiac rehabilitation. One participant reported:

- *"I've been doing some exercise in between rehab at home, but sometimes I wonder if, on account of my bad knee that maybe I should have rested that day but I don't know."*

Several participants were unable to walk due to musculoskeletal problems and surgeries (e.g., open reduction internal fixation [ORIF] of foot, chronic back pain). One participant had chronic leukemia, so he was concerned about getting the flu from other people who attended cardiac rehabilitation. Another participant was reluctant to go to cardiac rehab due to a gastrointestinal problem. In addition, the disease-specific, self-management instructions created confusion to participants when they tried to manage their multiple problems.

- *"I got some pamphlets from the hospital (when I was discharged). I was on a special diet for my colitis, and I was trying to figure out how I could work both diets together (heart and colitis diets), they don't always agree."*

Transitional Care

Many participants expressed feelings of frustration and disappointment with the care provided during transition from hospital to home. Their negative experience influenced their decision to make lifestyle changes and included: 1) inadequate coordination during care transition after hospitalization, 2) perceived poor discharge teaching, 3) inconsistent information given by different healthcare professionals, and 4) lack of recommendation of a secondary prevention program from providers (especially the physicians).

Some participants were unable to attend cardiac rehabilitation programs due to poor coordination between care settings and providers.

- *"I was supposed to start rehab at the community hospital, but they don't want to do that until after I see the doctor (the cardiologist)."*

One participant had difficulty in making follow-up appointments.

- *"I was quite disappointed in the scheduling of doctors. They (the scheduler at the physician's office) had scheduled me to see the cardiologist, but they didn't have me scheduled with the right doctor at all. I was, I was very upset with that. So then I couldn't get in to see him until the next Thursday. I had pain at my whole chest and was really afraid of angina again. That was totally uncalled for, and they should have gotten me by at least the next day. I haven't seen any (doctors), and the appointment I had with the cardiologist was with the wrong doctor. Had I not called, I would have really been upset."*

The discharge teaching content was perceived as inadequate and the timing of the teaching was inappropriate. Twenty-one out of 30 participants (70%) could not remember who provided the discharge instruction regarding secondary prevention.

- *"I don't remember, well it was the people from the hospital where I had my heart surgery."*
- *"Well I don't remember, I'm sure somebody – they told me so much stuff that …"*
- *"I don't remember who gave the instruction. They gave me a book and told me to read that and do what is said."*
- *"They kicked you out there in a hurry, and they did not have enough time to tell you anything."*

Some participants reported they received contradictory advice regarding secondary prevention practices from different providers.

- *"… I know you are not supposed to eat so many eggs, but there is kind of a different story about eggs from different people (providers)."*

Some participants reported physicians failed to recommend cardiac rehabilitation.

- *"I had five stents and one bypass, my doctor said that if I can use my treadmill for 25-30 minutes a day, that would be sufficient, no need to go to cardiac rehab."*
- *"I did not go to heart rehab. My doctor did not think it was necessary for me to do that because I was active enough. I walked to my mailbox every day…"*
- *"I did not go to cardiac rehab, my doctor said once the weather straightens out and I can get outside, everything will come back to you in good shape."*
- *"They (healthcare professionals) have not yet talked to me about lifestyle changes."*
- *"Nobody has said anything about cardiac rehab to me yet, I don't know, usually they do cardiac rehab, don't they?"*

Social and Environmental Aspects

Participants living in rural communities found it difficult to make lifestyle changes because of inability in obtaining the resources needed.

- *"We live in a small town, less than 1000 people, and the grocery store here didn't have anything healthy. . ."*
- *"I can't see driving long distance for cardiac rehab unless the doctor insists upon it. I don't feel like I am safe on the road, then my husband would have to take me and wait for me."*
- *"It is about 26 miles of driving to cardiac rehabilitation. That's why I only did two weeks…"*

Outcomes

The negative experience from a secondary prevention practice became a barrier for some participants to follow the behavioral change regimen.

- *"I think the hardest thing is the salt. I am finding it is tough to stay under 2000 mg of salt a day. I like salt, food does not taste right without salt. Pretty tough when you work on gardening, salt gives you the energy."*
- *"I did not take any medicine because I know from experience, medicine does not agree with me when I get sick. I did not ask a doctor for permission. To tell you the truth, I am not taking any of my medicines except TUMS right now because I have gotten better in the last few days after quitting the medicine."*
- *"I put in a lot of long hours during harvest but I get so hungry that vegetables don't quite give me enough energy to run our days."*

Discussion

This study revealed insight into participants' experiences regarding their recovery and care received during the transition to home following hospitalization for a cardiac procedure. The findings further improved our understanding of the impact of participants' perceptions and recovery progress on their adherence to secondary preventive regimens. Overall, participants adopted some behavioral lifestyle changes after their cardiac procedure. Similar to the findings from other studies,[25,37] we found the most frequently reported modified behaviors were diet and physical activity. Generally, participants often only engaged in a single lifestyle behavioral change (e.g., diet, exercise, stress management), as reported by 3-50% of the participants. Only 10% of participants reported multiple lifestyle changes. Sustained lifestyle modifications are of paramount importance for patients after cardiac revascularization to delay the progression of heart disease. However, the rate of adherence to recommended secondary prevention in our study group was low, similar to those reported in previous research.

Comparable to previous studies, our study found participants had misperceptions of being "cured" or "fixed" following cardiac revascularization. Therefore, they were less likely to engage in risk behavioral modifications compared to non-surgical cardiac patients and experienced significant levels of psychological distress over time if these misconceptions were not corrected during early recovery.[15,24,29,37-41]

Perioperative and discharge teaching is implemented to modify patients' misconceptions and emphasize the importance of adopting long-term lifestyle changes to prevent further cardiac disease.[15,42] However, similar to other studies,[25,43-45] the participants enrolled in our study perceived discharge teaching was insufficient in meeting their informational needs. Timing of the delivery of teaching was thought inappropriate. Most participants could not recall what was taught at discharge. In addition, participants reported that inconsistent, contradictory, and incorrect information was provided by different providers.

Adequate discharge teaching and planning is critical in providing accurate information to assist patients' transitioning from hospital to home.[43,46] With shortened hospital stays, healthcare professionals often have little or no time to correct these aforementioned misperceptions, which may result in non-adherence to secondary prevention.[39] In addition, the quality of discharge education may be suboptimal. Literature suggests that healthcare professionals have limited knowledge and skills to teach patients how to manage their chronic problems and make lifestyle changes.[47,48] Furthermore, standardized discharge information fails to tailor to each individual's unique needs.[45]

Due to poor discharge teaching and insufficient post-discharge follow-up programs,[28] patients and their families often feel uncertain about their disease prognosis and treatment outcomes. In addition, patients struggle for sense of control, feel unprepared to perform self-management,[38] and have difficulty in making lifestyle changes during the early stage of transition from hospital to home after a cardiac procedure.[25,28]

Studies have shown that positive recovery experiences during the early stage of transition after a cardiac event promote adherence to recommended lifestyle changes.[38] Therefore, home-based, tailored transitional care programs are increasingly needed to provide post-acute care services to prematurely discharged patients who still have complex, intensive care needs that family members cannot accommodate. In addition, these transitional programs play a vital role in helping patients engage in and sustain their behavioral change. Nurses, in conjunction with multidisciplinary teams, have the opportunity to make a significant impact on helping patients adopt life-long secondary prevention practices following cardiac surgery.

Clinical Implication

Healthcare professionals need to identify patients' misperceptions about cardiac revascularization and send a clear message that coronary revascularization does not cure heart disease but only relieves symptoms. Lifelong secondary prevention is required to improve the outcomes of the procedure, prolong life, further reduce symptoms, and enhance the functioning level. To avoid conflicting information provided by different healthcare professionals, guidelines are needed to develop consistent and accurate transitional care for these patients.

Research Implication

Current adherence-enhancing interventions often target only singular psychosocial and cognitive factors (e.g., self-efficacy, motivation, knowledge) influencing the decision-making process related to behavioral change.[32,34,35,39,49-53] These interventions may overlook the contextual factors, such as care transition processes, patient-provider interactions, household health belief and practice, and community resources.[15] There is a need to develop a comprehensive transitional care model to address both patient factors (e.g., knowledge, self-efficacy, and moti-

vation) and contextual factors that impact patients' behavioral change to guide development of effective interventions.

Education Implication

Considering the progressively increasing aged population with multiple chronic conditions, school curricula need to be re-designed to produce future healthcare professionals who are knowledgeable and capable in caring for patients with multiple chronic diseases, as well as meeting their complex care needs. In addition, adequate information and practice opportunities need to be provided to augment healthcare professionals' teaching skills in conducting effective patient education.

Limitations

This study used a small, homogenous group, which limits the generalizability. Although this study was small, it provided a deeper understanding of participants' experiences as the post-discharge interview allowed the authors to identify factors that influenced lifestyle behavioral change in the home setting.

Conclusion

Sustained lifestyle change reduces coronary artery disease risks and improves coronary revascularization outcomes. This study reinforced the variety of complex barriers in adopting health behaviors experienced by cardiac patients, including misperception about heart disease and treatment outcomes, perceptions of inadequate discharge teaching, limited community resources, and lack of transitional care after hospitalization.

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References

1. Loponen P, Luther M, Korpilahti K, et al. HRQoL after coronary artery bypass grafting and percutaneous coronary intervention for stable angina. *Scand Cardiovasc J*. 2009;43(2):94-99.
2. Seki S, Motomura N, Kinugawa K, et al. Abstract 2084: Measurement of health outcomes after percutaneous coronary intervention (PCI) and coronary artery bypass graft (CABG): Better physical features with PCI vs. quality of life with CABG. *Circulation*. 2008;118(18_MeetingAbstracts):S_666-b.
3. Bair TL, Muhlestein JB, May HT, et al. Surgical revascularization is associated with improved long-term outcomes compared with percutaneous stenting in most subgroups of patients with multivessel coronary artery disease: Results from the intermountain heart registry. *Circulation*. 2007;116(11 Suppl):I226-31.
4. Goel K, Lennon RJ, Tilbury RT, Squires RW, Thomas RJ. Impact of cardiac rehabilitation on mortality and cardiovascular events after percutaneous coronary intervention in the community. *Circulation*. 2011;123(21):2344-2352.
5. Istvanovic N, Smalcelj A, Filakovic P, Cerovec D, Plecko D. Influence of in-hospital cardiac rehabilitation on psychological status after myocardial infarction in patients with D-type personality. *Coll Antropol*. 2011;35(3):797-807.
6. Lin HH, Tsai YF, Lin PJ, Tsay PK. Effects of a therapeutic lifestyle-change programme on cardiac risk factors after coronary artery bypass graft. *J Clin Nurs*. 2010;19(1-2):60-68.
7. Pavy B, Tisseau A, Caillon M. The coronary patient six months after cardiac rehabilitation: Rehabilitation evaluation research (RER study). *Ann Cardiol Angeiol (Paris)*. 2011;60(5):252-258.
8. Pluss CE, Billing E, Held C, et al. Long-term effects of an expanded cardiac rehabilitation programme after myocardial infarction or coronary artery bypass surgery: A five-year follow-up of a randomized controlled study. *Clin Rehabil*. 2011;25(1):79-87.
9. Redfern J. Expanded cardiac rehabilitation reduces cardiac events over five years. *J Physiother*. 2011;57(1):57.
10. Chow CK, Jolly S, Rao-Melacini P, Fox KAA, Anand SS, Yusuf S. Association of diet, exercise, and smoking modification with risk of early cardiovascular events after acute coronary syndromes. *Circulation*. 2010;121(6):750-758.
11. Alter DA, Oh PI, Chong A. Relationship between cardiac rehabilitation and survival after acute cardiac hospitalization within a universal health care system. *Eur J Cardiovasc Prev Rehabil*. 2009;16(1):102-113.
12. Hansen D, Dendale P, Leenders M, et al. Reduction of cardiovascular event rate: Different effects of cardiac rehabilitation in CABG and PCI patients. *Acta Cardiol*. 2009;64(5):639-644.
13. Son YJ. The development and effects of an integrated symptom management program for prevention of recurrent cardiac events after percutaneous coronary intervention. *Taehan Kanho Hakhoe Chi*. 2008;38(2):217-228.
14. Vachenauer R, Grunenfelder J, Plass A, et al. Changing lifestyle habits as secondary prophylaxis after coronary artery bypass grafting. *Heart Surg Forum*. 2008;11(4):E243-7.
15. Fix GM, Bokhour BG. Understanding the context of patient experiences in order to explore adherence to secondary prevention guidelines after heart surgery. *Chronic Illn*. 2012;8(4):265-77.
16. Neubeck L, Freedman SB, Clark AM, Briffa T, Bauman A, Redfern J. Participating in cardiac rehabilitation: A systematic review and meta-synthesis of qualitative data. *Eur J Prev Cardiol*. 2012;19(3):494-503.
17. Suaya JA, Stason WB, Ades PA, Normand SL, Shepard DS. Cardiac rehabilitation and survival in older coronary patients. *J Am Coll Cardiol*. 2009;54(1):25-33.
18. Paquet M, Bolduc N, Xhignesse M, Vanasse A. Re-engineering cardiac rehabilitation programmes: Considering the patient's point of view. *J Adv Nurs*. 2005;51(6):567-576.
19. Dolansky MA, Stepanczuk B, Charvat JM, Moore SM. Women's and men's exercise adherence after a cardiac event. *Res Gerontol Nurs*. 2010;3(1):30-38.
20. Yohannes AM, Yalfani A, Doherty P, Bundy C. Predictors of drop-out from an outpatient cardiac rehabilitation programme. *Clin Rehabil*. 2007;21(3):222-229.
21. White S, Bissell P, Anderson C. Patients' perspectives on cardiac rehabilitation, lifestyle change and taking medicines: Implications for service development. *J Health Serv Res Policy*. 2010;15(suppl 2):47-53.
22. Stafford L, Jackson HJ, Berk M. Illness beliefs about heart disease and adherence to secondary prevention regimens. *Psychosom Med*. 2008;70(8):942-948.

23. Khanderia U, Townsend KA, Erickson SR, Vlasnik J, Prager RL, Eagle KA. Medication adherence following coronary artery bypass graft surgery: Assessment of beliefs and attitudes. *Ann Pharmacother*. 2008;42(2):192-199.
24. Peterson JC, Allegrante JP, Pirraglia PA, et al. Living with heart disease after angioplasty: A qualitative study of patients who have been successful or unsuccessful in multiple behavior change. *Heart Lung*. 2010;39(2):105-115.
25. Gentz CA. Perceived learning needs of the patient undergoing coronary angioplasty: An integrative review of the literature. *Heart Lung*. 2000;29(3):161-172.
26. Mildestvedt T, Meland E. Examining the "Matthew Effect" on the motivation and ability to make lifestyle changes in 217 heart rehabilitation patients. *Scand J Public Health*. 2007;35(2):140-147.
27. Gulanick M, Bliley A, Perino B, Keough V. Recovery patterns and lifestyle changes after coronary angioplasty: The patient's perspective. *Heart Lung*. 1998;27(4):253-262.
28. Lapum J, Angus JE, Peter E, Watt-Watson J. Patients' discharge experiences: Returning home after open-heart surgery. *Heart Lung*. 2011;40(3):226-235.
29. Sampson F, O'Cathain A, Goodacre S. Feeling fixed and its contribution to patient satisfaction with primary angioplasty: A qualitative study. *Eur J Cardiovasc Nurs*. 2009;8(2):85-90.
30. Egan AG, Reid JJ. Cardiac arrest and heart attack: An evaluation of lay knowledge. *N Z Med J*. 1986;99(799):237-240.
31. Hanson VL. Compliance with risk factor reduction among post-coronary-bypass surgery and post-coronary angioplasty patients... research briefs. *Appl Nurs Res*. 1988;1(2):94-94.
32. Zarani F, Besharat MA, Sarami G, Sadeghian S. An information-motivation-behavioral skills (IMB) model-based intervention for CABG patients. *Int J Behav Med*. 2012;19(4):543-9.
33. Neubeck L, Redfern J, Fernandez R, Briffa T, Bauman A, Freedman SB. Telehealth interventions for the secondary prevention of coronary heart disease: A systematic review. *Eur J Cardiovasc Prev Rehabil*. 2009;16(3):281-289.
34. Krannich JH, Weyers P, Lueger S, Schimmer C, Faller H, Elert O. The effectiveness of a motivation programme for lifestyle change in the course of aortocoronary bypass graft surgery. *Clin Rehabil*. 2008;22(1):3-13.
35. Moore SM, Charvat JM, Gordon NH, et al. Effects of a CHANGE intervention to increase exercise maintenance following cardiac events. *Ann Behav Med*. 2006;31(1):53-62.
36. Linde BJ, Janz NM. Effect of a teaching program on knowledge and compliance of cardiac patients. *Nurs Res*. 1979;28(5):282-286.
37. Eastwood GM. Lifestyle pattern change in males following percutaneous transluminal coronary angioplasty/intracoronary stenting. *Int J Nurs Pract*. 2001;7(2):131-137.
38. Barnason S, Zimmerman L, Nieveen J, Schulz P, Young L. Patient recovery and transitions after hospitalization for acute cardiac events: An integrative review. *J Cardiovasc Nurs*. 2012;27(2):175-191.
39. Astin F, Jones K. Changes in patients' illness representations before and after elective percutaneous transluminal coronary angioplasty. *Heart Lung*. 2006;35(5):293-300.
40. Hajek P, Taylor TZ, Mills P. Brief intervention during hospital admission to help patients to give up smoking after myocardial infarction and bypass surgery: Randomised controlled trial. *BMJ*. 2002;324(7329):87-89.
41. Oldenburg B, Martin A, Greenwood J, Bernstein L, Allan R. A controlled trial of a behavioral and educational intervention following coronary artery bypass surgery. *J Cardiopulm Rehabil*. 1995;15(1):39-46.
42. Lau-Walker M. Importance of illness beliefs and self-efficacy for patients with coronary heart disease. *J Adv Nurs*. 2007;60(2):187-198.
43. Fredericks S. Timing for delivering individualized patient education intervention to coronary artery bypass graft patients: An RCT. *Eur J Cardiovasc Nurs*. 2009;8(2):144-150.
44. Fredericks S, Sidani S, Shugurensky D. The effect of anxiety on learning outcomes post-CABG. *Can J Nurs Res*. 2008;40(1):127-140.
45. Hanssen TA, Nordrehaug JE, Hanestad BR. A qualitative study of the information needs of acute myocardial infarction patients, and their preferences for follow-up contact after discharge. *Eur J Cardiovasc Nurs*. 2005;4(1):37-44.
46. Maloney LR, Weiss ME. Patients' perceptions of hospital discharge informational content. *Clin Nurs Res*. 2008;17(3):200-219.
47. Washburn SC. Nurses knowledge of heart failure education topics as reported in a small midwestern community hospital. *J Cardiovasc Nurs*. 2005;20(3):215.
48. Washburn SC, Hornberger CA. Nurse educator guidelines for the management of heart failure. *J Contin Educ Nurs*. 2008;39(6):263-267.
49. Phillips LA, Leventhal H, Leventhal EA. Physicians' communication of the common-sense self-regulation model results in greater reported adherence than physicians' use of interpersonal skills. *Br J Health Psychol*. 2012;17(2):244-257.
50. Krannich JH, Weyers P, Lueger S, et al. The short- and long-term motivational effects of a patient education programme for patients with coronary artery bypass grafting. *Rehabilitation (Stuttg)*. 2008;47(4):219-225.
51. Jiang X, Sit JW, Wong TK. A nurse-led cardiac rehabilitation programme improves health behaviours and cardiac physiological risk parameters: Evidence from Chengdu, China. *J Clin Nurs*. 2007;16(10):1886-1897.
52. Mildestvedt T, Meland E, Eide GE. No difference in lifestyle changes by adding individual counselling to group-based rehabilitation RCT among coronary heart disease patients. *Scand J Public Health.* 2007;35(6):591-598.
53. Hiltunen EF, Winder PA, Rait MA, Buselli EF, Carroll DL, Rankin SH. Implementation of efficacy enhancement nursing interventions with cardiac elders. *Rehabil Nurs*. 2005;30(6):221-229.