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Understanding barriers and facilitators to healthy eating and physical activity from patients either before and after knee arthroplasty

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Abstract

Purpose—We sought to identify patient-reported barriers and facilitators to healthy eating and physical activity among patients before or after knee arthroplasty.

Materials and methods—Twenty patients with knee osteoarthritis aged 40–79 years who had knee arthroplasty surgery scheduled or completed within 3 months were interviewed. Interview topics included perceived barriers and facilitators to healthy eating and activity before or after surgery. Interviews were coded and analyzed using constant comparative analysis.

Results—Interviews were completed with 11 pre-operative (67.1 ± 7.6 years, 45.5% female, BMI 31.2 ± 6.3) and nine post-operative patients (61.7 ± 11.7 years, 44.4% female, BMI 30.2 ± 4.7 kg/m^2). The most commonly identified personal barriers to healthy eating identified were desire for high-fat/high-calorie foods, managing overconsumption and mood. Factors related to planning, portion control and motivation to improve health were identified as healthy eating facilitators. Identified personal barriers for activity included pain, physical limitations and lack of motivation, whereas facilitators included having motivation to improve knee symptoms/outcomes, personal commitment to activity and monitoring activity levels.

Conclusion—Identifying specific eating and activity barriers and facilitators, such as mood and motivation to improve outcomes, provides critical insight from the patient perspective, which will aid in developing weight management programs during rehabilitation for knee arthroplasty patients.

Keywords

Knee arthroplasty; diet; activity; obesity

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Introduction

Dramatic increases in total knee arthroplasty (TKA) utilization have been seen in the United States across all age groups [1,2]; this trend is expected to continue [3]. Patients undergoing TKA typically report improved health-related quality of life [4], increased physical function [5] and reduced pain [6]. Despite these improvements, physical activity levels remain unchanged [7] or only minimally increase from pre-operative levels, yet do not reach the same level of activity observed among healthy populations [8,9]. TKA patients often expect their activity levels and function to improve following surgery, yet Nilsdotter et al. [10] indicated that the majority of patients' activity levels five years post-operatively did not meet their pre-operative expectations. Additionally, evidence suggests that the odds of TKA patients gaining a clinically significant amount of weight five years post-operative were approximately 60% higher as compared to those who did not have surgery [11]. Even though improvements are observed in pain and function, reasons for weight gain and maintenance of low levels of activity are unknown.

Among the general population, many factors, whether they be personal, social, or environmental in nature, influence diet and activity behaviors [12,13]. While there may be numerous similarities in the determinants of diet and activity between the general population and TKA patients, additional influences may interfere with TKA patients' ability to successfully increase physical activity or adopt a healthy diet. Excess weight not only increases risk of premature mortality, cardiovascular disease, diabetes and cancer [14–16] but will also influence knee replacement outcomes [17,18]. Thus, with the increased utilization of TKA [2], continued low levels of physical activity [7] and lack of weight loss observed among an already primarily overweight and obese population [19], it is imperative to explore the barriers that may be influencing diet and activity behaviors. Gaining a better understanding of specific barriers and facilitators to diet and physical activity, before and after TKA, may help to inform clinicians engaged in the rehabilitation of these patients as well as future behavioral programs designed to increase healthy eating and physical activity. This study was designed to identify and explore barriers and facilitators to physical activity and healthy eating among TKA patients pre- and post-operatively.

Materials and methods

Patients between 40 and 79 years old who either had TKA within the prior 3 months or those who were scheduled within the next 3 months were recruited. Patients were recruited via (1) distributing postcards, sending emails and letters and calling eligible patients, (2) distributing postcards to newly admitted patients at orthopedic rehabilitation centers and (3) online postings on knee-related websites and forums. Interested patients were given more information and completed a brief telephone screening or online web screener. Efforts were made to include both male and female patients, as well as patients at varying time points within the 3 months pre- or post-surgery. All participants provided informed consent; procedures were approved by the Northwestern University Institutional Review Board.

The interview guide was developed based on patient and physician stakeholder input. The guide included questions assessing participants' reflections on their decision to have TKA,

expectations following the surgery and perceived factors that influence diet and activity. The focus of this manuscript is on the identification of personal barriers and facilitators to healthy eating and physical activity both before and after TKA. Table 1 lists the relevant interview questions and prompts. Participants were asked open-ended questions; probes were used to guide discussion toward personally relevant and specific examples. Further emphasis was placed on identifying strategies patients used to overcome barriers related to diet and activity.

Pre-operative patients were asked about the personal barriers and facilitators to healthy eating and physical activity they faced while living with knee osteoarthritis (OA) before TKA. Questions for post-operative patients were tailored toward identifying barriers and facilitators to healthy eating and physical activity encountered during recovery, including time spent in the hospital, rehabilitation center and at home. The interview was pilot tested with a TKA patient stakeholder and revised according to feedback. All interviews were completed by one of two trained members of the team (CAP, GL), either in-person or over the telephone to accommodate patients who did not live locally, had mobility limitations or were in the early stages of recovery from surgery. Individual interviews were used instead of focus groups as not all patients would feel comfortable discussing diet, activity and weight-related behaviors in front of others. Interviews were completed until thematic saturation, the point in which no new themes or concepts emerge, was reached [20,21].

Qualitative analysis

Interviews were audiorecorded and transcribed verbatim either by staff members or a transcription company. Personal identifiers were removed and transcripts were uploaded into Dedoose (version 6.2.7) to facilitate analysis [22]. Three research team members (CAP, GL, KAC) independently reviewed two transcripts, analyzing them using constant comparative analysis [23,24]. The group met to review identified codes and discuss emergent themes, identifying a common structure of participant discussion of barriers and facilitators across multiple levels of influence: personal, social and environmental. Using these three levels of influence as an initial framework, the coders built a preliminary taxonomy of codes describing participant responses to our pre-identified areas of interest: physical activity barriers, physical activity facilitators, healthy eating barriers and healthy eating facilitators. The coders returned to the original transcripts to assess the adequacy of the identified codes, and met again to create a mutually agreed upon codebook for further analysis. Two team members (CAP and GL) applied these codes on the remaining transcripts. Any discrepancies were thoroughly reviewed and discussed until consensus was reached; there were no cases in which the coders were unable to reach consensus

Results

A total of 24 patients were screened to participate in the interviews. Two patients were unable to be contacted again to complete the interview and two additional patients had not yet scheduled a TKA. Twenty patients were eligible and completed the study (55% pre-TKA and 45% post-TKA). Pre-TKA patients were approximately 24.1 ± 21.1 days from the surgery (range 5–58 days). Post-TKA patients completed the interview on average 36.6

± 25.4 days after the surgery (range 10–80 days). Table 2 shows the patient characteristics at the time of the interview. The majority of patients were white, non-Hispanic adults with a mean age of 64.7 ± 9.8. Most patients (55%) were classified as obese.

The most common codes for barriers and facilitators to healthy eating and physical activity that emerged were related to personal factors. Personal barriers were defined as obstacles either specific to a person, or occurring within an individual, that interfere with one's knowledge, attitude, beliefs and ability to engage in healthy eating or physical activity. Personal facilitators were defined as personal factors that occur within an individual and positively influence one's knowledge, attitudes, beliefs and ability to engage in healthy eating or physical activity. Table 3 provides an overview of the identified codes and representative quotations from each code.

Healthy eating barriers

One of the most common barriers to healthy eating expressed across patients, both before and after TKA, was a desire for high-fat/high-calorie foods; many patients experience temptations and cravings. As one patient said, "Temptation is always there. Sometimes you fall down; fall off the wagon as they say" (ID 17, pre-op male, age 79). Patients also mentioned the difficulties they faced in choosing healthy options when high-fat/high-calorie foods were available.

Another common barrier to healthy eating was managing one's own overconsumption of food. Managing caloric intake while eating out at restaurants was a challenge, as was evening snacking. "The hardest thing for me is calories because I tend to snack at night … Whenever I do that my portions are probably three times as large as they should be" (ID 20, pre-op male, age 73).

Many patients, either before or after surgery, indicated that mood affected their ability to eat healthy. Dimensions of negative affect mentioned that influenced eating behaviors included stress, depressed mood, boredom and guilt. One patient who discussed experiencing a higher pain level after surgery than expected, noted that the effect on her mood may have inhibited her ability to eat healthy: "I just think that having the knee replacement and not feeling as great as I thought I would, feeling sorry for myself, I was just succumbing to a lot of poor choices" (ID 15, post-op female, age 55). Another patient identified balancing work and family-related stress as a trigger for making unhealthy choices for meals and snacks at work and at meal times, leading her to "going down to the vending machine" or sometimes "going through the drive through at McDonald's" (ID 11, post-op female, age 50).

Healthy eating facilitators

Factors related to planning for healthy eating were a common facilitator and were primarily mentioned by pre-operative patients. Specifically, planning and preparing meals and snacks in advance of the surgery were discussed. Strategies included planning to have leftovers, stocking the house with healthy food choices, and having easy access to healthy foods: "Right before the surgery, we did a bunch of grocery shopping at the commissary, and I tried to get some healthy foods" (ID 13, post-op female, age 48). Preplanning was also identified as a strategy to avoid temptations. "I have my tea ready for me. I take it with me in the

morning so … that I don't get a Coke. I try to plan that so that I don't get tempted" (ID 16, pre-op female, age 62).

Many TKA patients also mentioned portion control as a facilitator. Strategies to assist with managing portions included sharing desserts with others, limiting intake of particular foods or drinks (i.e., alcohol) and using meal replacement products. Several patients also mentioned that while they have not eliminated problematic foods, they reduced the frequency of eating those foods. "Well, we watch what we eat. You know, like pastries, or something, maybe we'll have one once every two weeks, or we'll have some ice-cream, you know, every once in a while, but not every day. We watch ourselves with that" (ID 6, post-op male, age 67).

Other patients reported general health-related reasons as a motivation to engage in healthy eating. Identified health concerns included reducing the risk of chronic diseases (i.e., heart disease, diabetes) and wanting to live longer. Others indicated that they found it easier to eat healthy because they believed it would improve knee symptoms and surgery outcomes. For example, one patient noted, "and I don't wanna go another notch on the belt, so you know [by engaging in] healthy eating … you know maybe I have less knee pain, have less chance of heart attack or heart disease you know, which I am conscious of" (ID 2, pre-op male, age 67).

Physical activity barriers

Barriers to physical activity mentioned by the majority of patients were related to their knee OA, whether it referred to as pain or a physical limitation. Both before and after TKA, patients reported that knee pain, loss of range of motion, stiffness, swelling, inability to stand for a long period of time, loss of strength, fatigue and fear of falling interfered with their ability to be more physically active. Pre-operative patients discussed limitations in physical activity related to knee pain, such as an inability to bend down to do yard work and issues with balance. One patient discussed how activity led to pain, ultimately making her avoid any activity: "the reality is if I walk for 30 to 45 min, then I have a burning sensation in my knee. I'm also always conscious that my kneecap could be slipping out. I worry about that. Those are definitely limitations that don't allow me to work out" (ID 11, pre-op female, age 50). Several patients reported difficulty in engaging in physical activity due to having lower levels of fitness, not enough stamina, and getting fatigued quickly. "I still have to get some more muscles in my leg because I knew when I was not walking for two years before the surgery I was losing a lot of ability to walk and every-thing else. So now it's hard to walk because I didn't walk in two years" (ID 3, post-op male, age 78).

Besides pain and physical limitations, lack of motivation and mood interfered with activity. One patient described her mood after surgery as an obstacle to getting to the gym: "many days where I was just like disgusted with everything and just sat on the sofa all day … " (ID 15, post-op female, age 55). Another patient mentioned that the biggest challenges with being active were related to, "attitude and knee. Bad knee and attitude where, my depression limits me … If I don't have a meeting to go to then I have a hard time getting out of bed … " (ID 20, pre-op male, age 73).

Physical activity facilitators

The most common facilitators to physical activity patients reported were related to their motivation to improve symptoms (such as pain) or surgery outcomes. A post-op male discussed engaging in activity outside of physical therapy to improve his performance in therapy sessions: “I do exercises, you know, just to … get better. So it makes it easier when I go to therapy” (ID 6, postop male, age 67). Several patients also discussed how it was easier to be active when the knee was not hurting and how they felt better when they got up and moved more frequently.

Patients also commonly expressed a personal commitment to physical activity, motivated by seeing an active lifestyle as part of who they are or want to be. Many patients seemed to be intrinsically motivated to engage in activity and relied on habits and other strategies including planning to ensure they were being active throughout the day. One pre-op male explained that he consciously tries to stand up and walk often, which he attributes to lifelong habits: “I think it came from when I was younger. When I had my business I was always walking, just about all day long, strolling through the plant” (ID 17, pre-op male, age 79). Another patient explained that scheduling an activity into her morning routine was successful because it is “easier if I do [physical activity] immediately. I have to get up. I have to be on my way to that if anything says, ‘Okay I’m not going to do it until later,’ that doesn’t really work for me very much” (ID 9, pre-op female, age 69).

Other common facilitators to physical activity mentioned by pre-operative patients were monitoring and awareness of activity levels. Some patients reported how just being conscious of their activity levels helped, whereas others reported using some type of wearable device such as a Fitbit or smartwatch which monitored activity and allowed for goal setting: “I shoot for 10,000 which is what everybody does and I never get there but I get 8 often, 7 and 8 every day” (ID 1, pre-op male, age 74).

Discussion

TKA patients who were scheduled or had surgery within 3 months were interviewed to identify personal factors that influenced eating and physical activity behaviors. The barriers to healthy eating that emerged most frequently among patients were desires for high calorie/fat foods, difficulties managing overconsumption and mood. Facilitators to healthy eating included planning for cooking and shopping, using strategies for portion control and motivation for improvements with general health. In regards to activity, specific knee-related restrictions including pain and physical limitations as well as lack of motivation and mood were frequently identified as barriers. Having motivation to improve knee outcomes, developing a personal commitment to activity, and monitoring activity levels made engaging in activity easier. Weight management both before and after knee replacement remains problematic [25]; this study provides initial insight on the factors that may be hindering or helping weight management in these patients.

Our results suggest that pain remains a major barrier to physical activity, especially among pre-operative patients, a result consistent with previous literature [26,27]. Fortunately, TKA typically results in a significant reduction in pain [28], although approximately 20% of

patients still experience long-term pain following surgery [29]. Among our post-operative patient sample inter-viewed, pain was likely as patients were on average only 36 days into their recovery. Although pain was qualitatively identified as a barrier to activity, pain levels are not always inversely associated with physical activity levels [30]. For instance, after surgery, patients who experience significant reductions in pain do not necessarily increase their activity levels [7,31]. Engaging in exercise and activity post-operatively appears safe and may improve functional outcomes long term [32,33], yet only a small proportion of joint replacement patients meet recommended physical activity guidelines [34,35]. Pain may be playing a major role in the deter-rent of activity among pre-operative patients, but once it declines post-operatively, it is likely that a lack of motivation or other factors may become the new primary barriers to physical activity [27].

In addition to pain, numerous physical limitations relating to either the knee or other health conditions were identified as barriers to activity. Given patients were interviewed within 3 months of the surgery, it was expected that physical limitations would emerge as a main activity barrier. Additionally, over 85% of TKA patients have comorbidities [36]; thus, it is likely that these other health issues may be contributing to the nonknee-related physical limitations. Many patients' expectations regarding the timing of recovery and functional capabilities are high prior to the surgery and often go unmet. Thus, informing pre-operative patients about the various limitations that they may experience post-TKA may help better align expectations and lead to an improvement in functional outcomes [37].

Stenquist et al. [38] interviewed knee replacement patients in the Dominican Republic and identified physical activity barriers following surgery; however, their results differed significantly from the current findings. Their patients indicated that the primary barriers to activity were that they were unsure of what type and how much activity they were able to do after the surgery. None of the post-operative patients in this study mentioned uncertainty about the amount or type of activity, but rather knee-specific restrictions and a lack of motivation to be more active were discussed. As patients in our study were still within the initial phases of recovery, they may have been unable to fully engage in structured physical activity and thus may not have been focusing on specific amounts of types of activity. Patients in the study conducted by Stenquist et al had their TKA at least 1 year ago, thus function may have significantly improved as compared to that experienced immediately post-operatively [38].

Much more is known about physical activity in TKA patients than is known about this population's eating behaviors. Gandler et al. [39] were successful in improving diet quality in TKA patients who also received a weight loss program led by dieticians both pre- and post-operatively as compared to control; however, little is known about what factors helped or hindered dietary changes in this population. Our findings provide a preliminary overview of factors influencing patients' ability to maintain a healthy diet. Many of the barriers and facilitators to healthy eating identified in this study are similar to those faced by the general population. For example, lack of time to prepare or plan a healthy diet [40–42], difficulties managing portion sizes [43], and mood (i.e., stress, boredom and depression) [44,45] are common barriers to healthy eating or obesity treatment both in the general population and knee replacement patients. Behavior change techniques common within other successful

behavioral diet or weight loss interventions such as the Diabetes Prevention Program [46] or Look AHEAD [47] may also be promising for this population given the similarities in dietary barriers.

Specific to TKA patients, a common barrier to both healthy eating and activity was mood. In particular, patients expressed experiencing negative affect due to the pain experienced either before or after surgery. There is a high prevalence of anxiety and depression among TKA patients, and although symptoms commonly decline following surgery, they are not completely eliminated [48]. Further, depressive symptoms have been demonstrated to impair functional improvement in TKA patients [49], which highlights the need to assess and address mood following surgery to maximize recovery. Patients' strong motivation to improve knee outcomes following surgery may help to patients overcome the mood barriers hindering diet and activity behaviors. Specifically, patients were motivated to eat healthy because they believed it would help to improve their knee symptoms and outcomes from the surgery. Surgeons, rehabilitation clinicians and future behavioral diet interventions may want to address these identified barriers to healthy eating activity experienced by TKA patients, while also trying to capitalize on patients' motivation to recover from surgery. Targeting both factors simultaneously may increase the likelihood of initiating and sustaining behavior change.

The study had several limitations. First, the sample is primarily white, highly educated adults and may not be generalizable to other populations. Second, the majority of the patients interviewed expressed an interest in losing weight. Patients who are not as interested in losing weight or participating in a study discussing physical activity and eating behaviors may experience different barriers and facilitators to healthy behaviors. This study also had several strengths including having nearly a 50% distribution among males and females as well as between patients who already had the surgery and those who were scheduled for TKA.

Overall, this study identified specific personal barriers and facilitators that influence healthy eating and activity behaviors in TKA patients, both before and after surgery. The majority of TKA patients are overweight or obese [19], and as physical activity levels and weight do not appear to change in a high proportion of patients [7,50], rehabilitation clinicians may need to more strongly encourage behavior change. Behavioral programs targeting diet, activity and weight loss may need to be developed to prevent or delay the development of further comorbidities. The results from the current study provide initial insight from the patient perspective and identified certain barriers and facilitators specific to TKA patients, which will assist with the development of patient-centered behavioral program. Additionally, the results can help to guide clinician discussions encouraging weight loss pre- or post-operatively in overweight and obese TKA patients.

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IMPLICATIONS FOR REHABILITATION

- This study provides insight into the identified barriers and facilitators to healthy eating and physical activity in knee arthroplasty patients, both before and after surgery.
- Intrapersonal barriers that may hinder engagement in physical activity and rehabilitation include pain, physical limitations and lack of motivation; factors that may help to improve activity and the rehabilitation process include being motivated to improve knee outcomes, having a personal commitment to activity and tracking activity levels.
- Barriers that may interfere with healthy eating behaviors and knee arthroplasty rehabilitation include the desire for high-fat/high-calorie foods, overeating and mood; whereas planning and portion control may help to facilitate healthy eating.
- Understanding barriers and facilitators to healthy eating and physical activity can help guide rehabili- tation professionals with their discussions on weight management with patients who had or are contemplating knee arthroplasty.

Table 1

Interview questions assessing knee arthroplasty patient barriers & facilitators to healthy eating and physical activity.

Interview questions
Healthy eating
When you hear the phrase “healthy eating,” what does it mean to you?
What, if anything, affects your ability to (description of “healthy eating”)?
What, if anything, makes it easier for you to (description of “healthy eating”)?
[a] Has this changed during the course of your recovery?
What, if anything, makes it more difficult for you to (description of “healthy eating”)?
[a] Has this changed during the course of your recovery?
Physical activity
When you hear the phrase “being physically active,” what does it mean to you?
What, if anything, affects your ability to (description of “being physically active”)?
What, if anything, makes it easier for you to (description of “being physically active”)?
[a] How has this changed or stayed the same at different stages in your recovery?
What, if anything, makes it more difficult for you to (description of “being physically active”)?
[a] How has this changed or stayed the same at different stages in your recovery?

[a]Postoperative participants only.

Table 2

Knee arthroplasty patient characteristics at time of interview.

Characteristics (% or mean ± SD)	Pre-TKR patients (*n* = 11)	Post-TKR patients (*n* = 9)	Total (*n* = 20)
Age (yrs)	67.1 ± 9.8	61.7 ± 11.7	64.7 ± 9.8
Female	45.5%	44.4%	45%
Race			
Black or African–American	9.1%	11.1%	10%
White	90.9%	88.9%	90%
Not Hispanic or Latino	100%	100%	100%
Education			
High school	0%	11.1%	5%
Vocational training	0%	11.1%	5%
Some college (<4 years)	9.1%	22.2%	15%
College degree	18.2%	22.2%	20%
Graduate or professional	72.7%	33.3%	55%
Currently employed	63.6%	44.4%	55%
Body mass index (kg/m^2)	31.3 ± 6.3	30.2 ± 4.7	30.8 ± 5.5
Body mass index classification			
Normal weight (BMI 18–24.9 kg/m^2)	9.1%	22.2%	15.0%
Overweight (BMI 25–29.9 kg/m^2)	27.3%	33.3%	30.0%
Obese (BMI 30 kg/m^2)	63.6%	44.4%	55.0%

BMI: body mass index; TKR: total knee replacement.

Table 3

Healthy eating and physical activity themes and related quotations.

Themes	Patient quotations
Healthy eating barriers	
Desire for high-calorie/high-fat food	"I like sweets more than anything else" (ID 9, preop female, age 69).
	"That was the chocolate chip cookie man offering me [a cookie]. I can't resist that. I am just having it where I would never have it, you know?" (ID 4, postop female, age 73).
Managing overconsumption	"I snack on almonds and I know that I'm supposed to eat maybe only 10 or 20, but I end up eating 30 or 40, twice the amount" (ID 11, preop female, age 50).
	"I don't want to go out to a nice restaurant and always order the healthiest thing because, at home, Imake that – that's what I can control at home … So I kind of like to splurge when I go out" (ID 15, posop female, age 55).
Mood	"You know over the course of the last several years, just really becoming very sedentary is a very big downer to me" (ID 5, postop male, age 47).
	"I have trouble limiting portion size when I'm stressed and tensed" (ID16, preop female, age 62).
Healthy eating facilitators	
Planning	"I designed some recipe that I basically make it about every three or four weeks and I freeze it. I come home, pop it in the microwave, ten minutes later, I have an 8-ounce meal" (ID 8, preop male, age 64).
	"Well, I wasn't as mobile, and I really couldn't go out on my own the first two weeks [after surgery], but … I planned ahead and went shopping. I had some things that were frozen. So I had access within my own kitchen" (ID 15, postop female, age 55).
Portion control	"Depending on who I'm having dinner with I'll probably share dessert" (ID 9, preop female, age 69).
	"I wanted to make sure I maintain the healthy eating. I mean not denying myself if I want to eat chocolate or something like that, but everything in moderation" (ID 13, postop female, age 48).
General health	"I [eat healthy] sometimes and when I do it, I feel better" (ID 10, preop male, age 63).
	"I want to stay away from the things that are going to prolong the healing process. So by eating, eating better quality foods … portion control, trying to eat plenty of protein, lots of veggies and fruit … Just kind of using it all as an opportunity to change my life around" (ID 5, postop male, age 47).
Physical activity barriers	
Knee-specific restrictions	"I have an exercise bike, but I can't use the bike anymore. It hurts my knees so much to use the bike. So, I don't use that anymore, but I will once I have a relief" (ID 16, preop female, age 62).
	"Well the healing process right now … just because the knee is still swelled up, and it's still a little stiff, so it makes it hard to get out and walk" (ID 14, postop male, age 50).
Lack of motivation or mood interference	"No its just self-discipline, a lack of it. I don't wanna take an hour or half an hour out of my day to do physical work" (ID 2, preop male, age 67)
	"Yeah but you know we have with our health insurance we have ability to join the health club for no charge. I'm always threatening to go there, but I didn't go there you know" (ID 3, postop male, age 78).
Physical activity facilitators	
Motivation to improve knee outcomes	"I just really want to make sure that I'm doing what I can to keep my muscles in my legs strong so that it will be an easier recovery" (ID 16, preop female, age 62).
	"That was the first time since the knee operation that I did any kind of extensive walking … .I want to build up stamina" (ID 7, postop male, age 68).
Personal commitment to activity	"It is important to me to have the ability to do this stuff, to shoot baskets or ride a bicycle because I naturally do spend so much time, or playing over chess games or whatever" (ID 10, preop male, age 63).
	"Eventually I want to extend [my workout] to two hours … In other words, to get myself on a schedule that allows for, number one allows for exercise, and number two does not allow for me to lay in bed" (ID 20, preop male, age 73).
Monitoring and awareness of activity levels	"That would keep me moving all day and I would try to get up. I was trying to walk at least take 3500 to 5000 steps" (ID 9, preop female, age 69).
	"I love my Fitbit. I've become almost dependent on it. I wear it all the time even now that I've been able to work out less … I won't be able to wear it on Tuesday during my surgery. I'm thinking that even

Themes	Patient quotations
	though I probably will not have more than a thousand steps per week the first week, I still wear it just to see that I can make some progress, a little bit of progress, week to week" (ID 11, preop female, age 50).