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SPECIAL THEME ARTICLE: MOBILITY AND THE RHEUMATIC DISEASES

Physical Activity and Experience of Total Knee Replacement in Patients One to Four Years Postsurgery in the Dominican Republic: A Qualitative Study

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Objective. **Musculoskeletal disorders are the second leading cause of years lived with disability globally. Total knee replacement (TKR) offers patients with advanced arthritis relief from pain and the opportunity to return to physical activity. We investigated the impact of TKR on physical activity for patients in a developing nation.**

Methods. **As part of the Operation Walk Boston surgical mission program, we interviewed 18 Dominican patients (78% women) who received TKR about their level of physical activity after surgery. Qualitative interviews were conducted in Spanish, and English transcripts were analyzed using content analysis.**

Results. **Most patients found that TKR increased their participation in physical activities in several life domains, such as occupational or social pursuits. Some patients limited their own physical activities due to uncertainty about medically appropriate levels of joint use and postoperative physical activity. Many patients noted positive effects of TKR on mood and mental health. For most patients in the study, religion offered a framework for understanding their receipt of and experience with TKR.**

Conclusion. **Our findings underscore the potential of TKR to permit patients in the developing world to return to physical activities. This research also demonstrates the influence of patients' education, culture, and religion on patients' return to physical activity. As the global burden of musculoskeletal disease increases, it is important to characterize the impact of activity limitation on patients' lives in diverse settings and the potential for surgical intervention to ease the burden of chronic arthritis.**

INTRODUCTION

Musculoskeletal disorders comprise the second leading cause of global years lived with disability behind mental and behavioral disorders (1). Osteoarthritis of the knee is particularly prevalent worldwide (1,2), and total knee replacement (TKR) offers patients with advanced arthritis relief from pain and the opportunity to return to physical activity.

Although TKR is a cost-effective procedure performed more than 600,000 times annually in the US (3,4), it is not widely available in developing countries (5). In response, some clinicians in the developed world have launched philanthropic surgical mission trips to offer TKR to poor patients in developing nations. One such program is Operation Walk Boston (OpWalk Boston), which has been offering TKR to economically disadvantaged patients in the Dominican Republic since 2008.

Literature from the developed world demonstrates that total joint replacement (TJR) can relieve pain and improve function for general mobility and obligatory activities, such as activities of daily living (6–8). Studies of return to more demanding physical activities are scarce (9–11), but indicate that participation in many leisure and sporting

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Significance & Innovations

- Our study provides the first investigation of physical activity after total knee replacement (TKR) in a developing nation.
- Patients reported that TKR improved their ability to participate in committed, obligatory, and discretionary activities, and a majority of patients reported positive effects of TKR on their mood.
- Like their counterparts in the developed world, TKR patients in the Dominican Republic restricted their physical activity due to uncertainty about the limitations of their artificial joint, and they may benefit from targeted preoperative education about appropriate postoperative physical activity.
- As the global burden of musculoskeletal disease increases, it is important to understand the impact of activity limitation on patients' lives in diverse settings and the potential for surgical intervention to ease the burden of chronic arthritis.

activities is modest after TJR in the developed world (12–14). However, it is not known how TJR impacts physical activity in developing countries, which bear the majority of the global burden of musculoskeletal disease (15). This gap in knowledge is becoming increasingly important as surgical mission programs develop to enhance access to joint replacement in developing countries.

Health care providers counselling patients in developing world settings about physical activity after joint replacement are limited by a lack of data on physical activity demands and types of activities pursued. In addition to inherent sociocultural differences, physical activities following TKR in a developing nation may differ substantially from those pursued by patients in a developed nation. Different life demands may necessitate a greater focus on day-to-day activities, limiting time for discretionary activities (11). Additionally, recovery may be delayed by lack of access to physical therapy and postoperative care once patients have returned to their homes. In the context of the OpWalk Boston surgical mission program, we conducted a qualitative study to explore patients' experiences of return to physical activity following TKR in the Dominican Republic.

PATIENTS AND METHODS

Setting. The Dominican Republic occupies the eastern two-thirds of the island of Hispaniola. Roughly 40% of its 10.2 million residents live below the poverty line (16). Its per capita gross domestic product (GDP) is $9,800, or 19.3% of that in the US (17), and the poorest half of the population receives less than 20% of GDP (17). This inequality contributes to disparities in health care (18). National health insurance established by the General Health Law in 2001 covers routine primary and emergency care, but not elective, expensive procedures such as TJR (18). Therefore, TJR for treatment of chronic arthritis is not accessible to the majority of the population.

For the past 6 years, the OpWalk Boston team has partnered with clinicians at Hospital General de la Plaza de la Salud in Santo Domingo to identify a group of financially vulnerable patients with advanced knee or hip arthritis who are appropriate candidates for TJR. Patients learn of the program through advertisements, word of mouth, or physician referral. To be selected into the program, patients must be diagnosed with advanced arthritis, must have limited financial means and be unable to pay for the procedure, must be stable enough to be a good surgical candidate, and must wish to undergo the procedure. During each medical mission trip, the Boston and Dominican OpWalk teams perform total knee and hip replacement surgeries on approximately 45 patients.

Participants. During the OpWalk Boston program in April 2013, patients from the 2009, 2010, 2011, and 2012 cohorts were invited to return for followup. We used purposive sampling methods (19) to enroll a sample for this qualitative study that would reflect the age and sex composition of OpWalk Boston, provide sufficient information and insights to achieve saturation (20), and be feasible to interview in the context of conducting a busy followup clinic during an annual visit. Patients who experienced osteoarthritis or rheumatoid arthritis involving the knee prior to TKR, were age ≥30 years at the time of surgery, and received either a unilateral or bilateral TKR were eligible. All study activities were approved by the institutional review boards at the Brigham and Women's Hospital and the Hospital General de la Plaza de la Salud.

Procedures. Three trained interview teams of medical students from Harvard Medical School and Universidad Iberoamericana performed interviews in Spanish over 2 days during the 2013 OpWalk Boston Mission. Interview teams followed a moderator's guide (Table 1). We used the World Health Organization's definition of physical activity as any bodily movement produced by skeletal muscles that requires energy expenditure (21). Interviews were conducted in quiet rooms, recorded digitally, and transcribed verbatim into Spanish and English by a translation company. Given the constrained period for interviews, we were not able to analyze transcripts iteratively. The interview team met each evening to reflect on the day's interviews, review impressions, and consider revisions to the interview guide.

Analyses. Investigators used content analysis to analyze English transcripts for themes (22). On 2 occasions, 5 reviewers (DST, SAE, SAB, RG, and JNK) conducted an open reading of 4 randomly selected interview transcripts to gain a general understanding of thematic content (23). Reviewers met to discuss concepts that emerged from the transcripts after each open reading and organize them into codes. Reviewers discussed and resolved discrepancies to come to consensus on major themes emerging from the data.

Table 1. Protocol for patient interviews (n = 18)

Protocol topic	Indepth questions
Section 1 Characterizing physical activity	First I'd like you to think back to the time before your knee(s) started to hurt. Can you remember that time? When was that?
	Can you describe what a typical day was like for you before your knee started to hurt so much? What were some physical activities you needed to do? (Examples of activities you "need to do" might include work, taking care of children or household chores).
	Before you started to have pain in your knee, what were some of your favorite optional activities you liked to do that were not essential for your daily living?
	(Favorite optional activities might include recreational exercise, playing sports, or walking around town to visit with friends). What did you do in your free time?
	Please tell us what a typical day was like for you before the surgery when your knee hurt the most. What are some things that you did differently or had to stop doing because of the pain?
	Please tell us what a typical day is like for you since the knee surgery. What do you do in your free time? Do you do any activities that are strenuous (make you breathe fast or sweat)? What types of activities and how often?
Section 2 Domains of physical activity	Home: How has the knee surgery changed your life at home? Tell me about anything you do differently at home since the knee surgery. Any new activities or responsibilities? Can you tell me about any activities that you are now doing at home but had stopped because of arthritis?
	Family: Can you tell me about how your knee surgery has changed activities you do with your family? Has the new joint allowed you to do anything with your family that you did not do before?
	Community: Can you tell me about how your knee surgery has changed your life in the community? What new places do you visit and what new activities do you do in the community? What activities have you been able to resume in the community as a result of your knee surgery?
	Work (if patient is still working): How has the knee surgery affected your ability to do your job each day?
	Recreation: How has the knee surgery changed your ability to do recreational exercise? Do you do any exercise in order to be more physically fit (such as jogging, bicycling, swimming, walking for exercise, basketball, baseball, dancing)? If yes, which ones? How has the knee surgery changed the way in which you engage in these activities?
Section 3 Health	Did your doctor suggest that you try any new activities or avoid any activities after your surgery? If yes, which ones? Has your doctor recommended that you do regular exercise? Do you do it? If not, why not?
Section 4 Barriers to physical activity	Overall, are you more or less active now than you were before your joint surgery, or is your activity level about the same? Why?
	What prevents or stops you from being more physically active?
	After you left the hospital, what factors do you think affected your ability to recover and return to physical activity?
	What are 2 or 3 physical activities that you were hoping to be able to do after the surgery that you could not do before?
Section 5 Outlook/attitudes about total knee replacement	If you could go back in time before the surgery, would you choose to have it again? Why or why not?
	How do you think your life would be different now if you had not had the surgery?

An investigator (DS) compiled, synthesized, and organized reviewers' notes from the 8 transcripts to produce a coding scheme consisting of 6 main codes and 29 subcodes representing 6 themes. Saturation of themes was reached after open reading of 8 transcripts. The same author read 4 additional transcripts and no new themes emerged. Investigators (DS, SE, and JK) reviewed the final coding scheme together. One investigator (DS) then coded all 18 interviews using the final coding scheme, organizing interview content according to identified themes and extracting representative quotations. Another investigator (SE) coded 4 randomly selected transcripts with the final coding scheme. We assessed the reliability of content analysis performed independently by 2 coders (DS and SE). The interrater reliability of coding for major themes between 2 coders (DS and SE) was excellent with Cohen's $\kappa = 0.85$ (95% confidence interval 0.79–0.92) (24). Two investigators (DS and SE) met to resolve discrepancies. We used the Dedoose mixed-methods online research platform (version 4.5.98) to code for themes, export themes for analysis, and store coded transcripts.

RESULTS

We approached 19 patients who received TKR during an OpWalk Boston surgical mission trip between 2009 and 2012; all patients consented to be interviewed. We excluded 1 subject who was distressed about the recent death of her husband and unable to participate meaningfully. Of the 18 participants, 14 were women (77.8%) and 14 (77.8%) received unilateral TKR, while 4 (22.2%) received bilateral TKR. The median age was 66.5 years (range 34–80 years). The sex and age distributions of participants were similar to those of OpWalk Boston patients

who had TKR in the same years (5). There were no statistically significant differences in age, sex, body mass index, Western Ontario and McMaster Universities Osteoarthritis Index pain and function scales, and the Short Form 36 health survey physical function and mental health scales between patients who returned for a followup visit in 2013 (41% of those who had surgery between 2009 and 2012) and those who did not. Interviews lasted 30 minutes, on average.

Impact of TKR on participation in physical activity. We grouped participant-reported activities into 3 categories according to the framework of Verbrugge and Jette (25): obligatory, committed, and discretionary (26). Obligatory activities are required for survival and self-sufficiency and primarily include activities of daily living. Committed activities are those associated with one's principal productive social roles and may include household responsibilities, child and family care, and paid work. Discretionary activities include exercise, religious or spiritual activities, volunteer activities, hobbies, or any recreational activities (26).

Obligatory activities. Every patient in our study (18 of 18) noted improvements in walking after TKR that affected obligatory activities. Many patients described a change in the amount and quality of obligatory activities they performed that required walking. One woman contrasted challenges with walking for transportation prior to TKR with subsequent improvements: "People always said, 'I have to go buy something,' [and I would say] 'I can't.'" She noted that she was unable to "go anywhere like anyone else and just put your clothes on and go. I had to think twice about it" (female, age 49).

Obligatory movement within the home environment was limited by chronic arthritis and improved by TKR. "I couldn't walk before, now I can walk, sometimes I had to be holding on to the wall, because when I would start to fall I had to grab the wall, not anymore, I even walk to the house, well now." (male, age 67 years). Several patients experienced difficulty with activities of daily living or self-care: "Before, I couldn't even cook. I couldn't wash dishes, and now I do" (female, age 72 years). When asked if her physical activity had increased post-TKR, one woman stated, "Yes of course, because when I had the pain I couldn't do absolutely anything. But now [after TKR] I can do light things . . . for example, organize my clothes and even iron them" (female, age 80 years). One woman struggled with activities of daily living prior to TKR: "It was work to get out of bed . . . I asked for help, because I couldn't get up" (female, age 70 years). She regained the ability to use the bathroom independently and dress herself after TKR.

Of 7 patients who reported persistent functional limitation due to pain postoperatively, only 3 reported experiencing this pain in the index knee. The other 4 noted pain in the nonoperative knee, lower back, hip, and ankle, which limited their ability to perform activities of daily living. The 3 women with index knee pain noted that although their general ability to perform activities of daily living was improved, their ability to walk long distances was not restored after TKR. Two of these women also experienced persistent difficulty with grocery shopping. One of them often had to sit down due to pain and swelling in her knee, and the other was unable to carry heavy objects.

Committed activities. Every patient reported that at least 1 committed physical activity associated with his or her principal productive social role was affected by TKR. For the majority of women (12 of 14), homemaking was their principal social role and primary source of physical activity. All 12 reported that TKR improved their ability to perform this role. "There are things that I couldn't do. Grabbing a mop . . . you see? I couldn't grab it, pouring some water and cleaning the house, because I was scared of falling, because I was limping and it hurt. Those are things that I do now" (female, age 72 years). Another woman described the impact of TKR on her role as homemaker, mother, and caregiver: "I live in the countryside, and sweeping the patio got very difficult for me, there were times when I couldn't do it." But since her TKR she says, "I get up and I sweep my patio . . . And I can take care of my mom, who can't walk. She's diabetic . . . I wash, I cook, I iron, I do everything in the house, thank God" (female, age 45 years).

The 2 women in this sample who were employed outside of the home were physically active in their professions. TKR allowed these patients to attend work more regularly and to be more productive. "The work that I do is taking photographs at events. I almost always have to be standing because with the bundle on top, plus the camera, which is rather heavy . . . [after surgery] I can move around well, I can do my job and I don't get very tired . . . At night, I can go to events and last two, three, four hours" (female, age 54 years).

Two of the 4 men in the study were employed prior to TKR and were required to be physically active in their occupations. One was a painter and had resumed working around his house and community since TKR: "I said to myself, 'let me see if I can work or not . . . .' I went up the 5-foot ladder and I kept climbing up and I painted the whole upper part" (male, age 67 years). He was also looking to resume paid work after TKR. "I was suspended from where I worked before because I was sick. I want to say that I am better now, that I can work" (male, age 67 years). The other employed male patient felt he was more active after TKR and better able to perform his work as a mechanic.

The 2 retired males in the study acknowledged their improved functional capacity but indicated that they had entered a period in their lives in which they could be more sedentary. Nevertheless, TKR improved one elderly man's ability to fulfill his social role of feeding chickens and walking several kilometers to look after his family's plot of land. The other had returned to a social role of participation in municipal politics because TKR improved his ability to tolerate long meetings.

Discretionary activities. Seventeen of the 18 patients described a change in the ability to participate in at least 1 type of discretionary physical activity after TKR.

Family. Four men and women noted increased participation in discretionary activities involving family after TKR. For example, "I go to the beach with my children, I go to the movie theater, out to eat, I go to the park with my grandchildren . . . now I can watch the grandchildren, carry them, I can play with them. I didn't do that" (female, age 54 years). "Now I'm going out with [my family], we go to the beach, I can walk . . . I can visit my friends now . . . I can go wherever now" (male, age 67 years).

Community participation. Six women reported improved ability to engage in religious pursuits and community service. "I visit the sick. I'm in the church community. I did it [before TKR] but with difficulty, now I do it more freely" (female, age 63 years). TKR altered patients' lives as church-goers as well. "Yes, since after the surgery, I've gone out more often . . . I go to church, I go to the church community, I go out with my friends" (female, age 49 years). Several women found they could attend church more regularly after TKR, and others noted that their ability to genuflect was restored.

Social recreation. Many patients reported that TKR affected their participation in social recreation as well. For example, 3 women returned to dancing after TKR, while other patients visited friends or attended social events more readily. One woman reported, "[Before TKR] I went out without wanting to, without feeling like it. I would socialize but not the same" (female, age 54 years).

Exercise. Half of the TKR patients in this study reported a return to exercising for health benefits after TKR (9 of 18) and walking was the predominant form of exercise (7 of 9). One woman also rode a stationary bike and another lifted hand weights. Most returned to the moderate levels of exercise they had maintained prior to onset of advanced arthritis. "Before the pain started, I walked, I exercised. After the pain started, I couldn't walk; now I walk, every day" (female, age 63 years). A tenth patient began to exercise for the first time after TKR by walking and swimming. "I walk with my sister-in-law, I couldn't walk before. She would tell me, 'let's go walk' and I would say, 'no, it hurts a lot.' But now I can go walking" (female, age 45 years). The 7 remaining patients did not report regular physical activity for exercise prior to being limited by arthritis and did not begin to exercise after TKR.

Barriers to physical activity. Patients were asked if there were physical activities they desired to do but did not do after TKR, and why. One theme that emerged was uncertainty about appropriate amount or type of physical activity after TKR. When asked whether they had received physical activity guidelines after TKR, several patients recalled recommendations to walk, but most (14 of 18) did not recall receiving any exercise guidelines. Patients most commonly reported physician instructions to avoid falls and to take care of the knee or oneself. "No. They didn't tell me what I could or couldn't do" (female, age 49 years). "Well no, they don't generally tell you, they don't limit you, they tell you that you have to do everything carefully so as not to slip, not to fall" (female, age 45 years).

Other reasons for physical activity limitation included patients' fear of damaging their knee and a lack of confidence in their implanted knee. "No, if I want to do something now, I don't do things that require strength because I take care of the surgery" (male, age 77 years). Several men and women lacked confidence in their ability to return to recreational dancing. "I'm afraid that it's going to buckle and that I'm going to fall to the ground" (female, age 74 years). Another woman was afraid to resume horseback riding, one of her favorite activities, and to wear high-heeled shoes.

TKR and mental health. Many patients in our sample (11 of 18) discussed the effect of TKR on their mental health or mood. Some patients described relief from fear and anxiety after TKR. "It changed my life. You know, at certain times I was even scared of standing up, because I thought, 'if I fall, something's going to happen to me.' So I walked in fear" (female, age 49 years). "I was afraid to go out before, because at any moment it could hurt and I would be stuck standing up, paralyzed because the pain was frequent" (female, age 45 years). Yet another woman found that TKR alleviated both pain and anxiety. "At night I could barely sleep because the pain wouldn't allow me to sleep and I was always anxious" (female, age 54 years).

Patients also reported that TKR affected their mood. "Oh, before that surgery . . . I didn't have a day of happiness" (female, age 72 years). The woman who had trouble sleeping also said, "It's that sometimes when there is something that prevents you from doing things, you isolate yourself, you throw yourself to the side and you don't even have the desire to live because it hammers you all the time" (female, age 54 years). One retired man noted, "Since I had the operation . . . the only thing I've felt is goodness. Instead of being negative, I feel positive, good everywhere." He believed that without the surgery he would have been "a failure" (male, age 66 years). Patients' families noticed positive changes as a result of TKR as well. "My daughter tells me: it even changed your face. She says, 'Mom, you never laughed before . . . but now you do'" (female, age 45 years). All patients (18 of 18) reported that in hindsight they would still choose to have TKR surgery.

Role of spirituality. Patients often ascribed their experience of having TKR and enjoying the attendant gains in physical capacity to divine intervention. Most patients in the sample attributed their surgery directly to God's will (14 of 18). "But God, in his mercy, led me to a person who told me that [the OpWalk Boston program] was here" (female, age 72 years). "And it happened to me and it has been God's wish" (female, age 34 years). Some felt that God had intervened for them due to their inability to pay for joint replacement. "God is the only one who knows, and I was very happy when I was chosen and they called me . . . because I couldn't afford the operation. God rewarded me for putting up with so much pain" (female, age 49 years).

Table 2. Themes and representative quotations from interviews (n = 18)*

Qualitative interview themes
Obligatory activities: 18 of 18 patients reported improvement in the ability to perform at least 1 obligatory activity, such as walking for transportation in and around the house, climbing stairs, using the bathroom, or washing and ironing personal items:
"I couldn't walk before, now I can walk, sometimes I had to be holding on to the wall, because when I would start to fall I had to grab the wall, not anymore, I even walk to the house, well now" (male, age 67 years).
"When I had the pain I couldn't do absolutely anything. But now I can do light things . . . for example, organize my clothes and even iron them" (female, age 80 years).
"[Before surgery] It was work to get out of bed . . . I asked for help, because I couldn't get up" (female, age 70 years).
3 of 18 patients found that TKR restored some obligatory activities but index (operative) knee pain continued to limit their ability to walk long distances or carry groceries:
"Well I walked a lot, not walking when the doctors prescribe per se, I had to visit many people. But now what I cannot do is walk far" (female, age 79 years).
"Yes, I have been able to go out, sometimes . . . if I go to the supermarket I can't carry, I can't carry anything heavy" (female, age 63 years).
Committed activities: 18 of 18 patients reported improvement in the ability to perform at least 1 committed activity in their roles as caretakers and homemakers, or in work external to the home:
"There are things that I couldn't do. Grabbing a mop . . . you see? I couldn't grab it, pouring some water and cleaning the house, because I was scared of falling, because I was limping and it hurt. Those are things that I do now" (female, age 72 years).
I can take care of my mom, who can't walk. She's diabetic. I have to give her medicine and help her with everything. I wash, I cook, I iron, I do everything in the house, thank God" (female, age 45 years).
"The work that I do is taking photographs at events. I almost always have to be standing because with the bundle on top, plus the camera, which is rather heavy . . . [after surgery] I can move around well, I can do my job and I don't get very tired . . . At night, I can go to events and last two, three, four hours" (female, age 54 years).
Discretionary activities: 17 of 18 patients reported improvement in the ability to perform at least one discretionary activity. These activities fell into different life domains including, family, community participation, social recreation, and exercise:
"I go to the beach with my children, I go to the movie theater, out to eat, I go to the park with my grandchildren . . . now I can watch the grandchildren, carry them, I can play with them. I didn't do that" (female, age 54 years).
"Yes, since after the surgery, I've gone out more often…I go to church, I go to the church community, I go out with my friends" (female age 49 years).
"I walk with my sister-in-law, I couldn't walk before. She would tell me: Let's go walk and I would say: no, it hurts a lot. But now I can go walking" (female age 45 years).
Barriers to physical activity: 14 of 18 patients did not recall receiving any exercise guidelines and many limited their physical activities after TKR due to uncertainty about joint limitations and appropriate activities:
"Well no, they don't generally tell you, they don't limit you, they tell you that you have to do everything carefully so as not to slip, not to fall" (female, age 45 years).
"[I don't dance because] I'm afraid that it's going to buckle and that I'm going to fall to the ground" (female, age 74 years).
Mental health: 11 of 18 patients reported improvement in mood or mental well-being after TKR:
". . . it changed my life . . . I was even scared of standing up, because I thought, 'If I fall, something's going to happen to me.' So I walked in fear" (female, age 49 years).
"At night I could barely sleep because the pain wouldn't allow me to sleep and I was always anxious." (female, age 54 years).
Role of spirituality: 14 of 18 patients attributed their receipt of surgery directly to God's will.
"But God, in his mercy, led me to a person who told me that [the OpWalk Boston program] was here" (female, age 72 years).
"At that point, I had to pay for it. Where was I going to get that money? Thank God, God put me on the path of that Good Samaritan" (male, age 66 years).

* TKR = total knee replacement.

DISCUSSION

We interviewed 18 OpWalk Boston patients between 1 and 4 years postsurgery to investigate the impact of TKR on daily physical activity in a developing country. TKR affected each patient's ability to perform at least 1 obligatory, committed, or discretionary physical activity, and many patients increased their self-reported participation in several physical activities in different life domains. Few patients experienced persistent limitation by pain, but in some cases patients limited their physical activity due to uncertainty about appropriate joint use. A majority of patients noted positive effects of TKR on mood and mental well-being. Religion formed the basis of most patients' explanatory model for TKR. This study provides the first insight into the impact of TKR on physical activity in a developing nation.

All patients in this study reported returning to committed, obligatory, and discretionary activities after TKR and many described the positive impact of TKR on their experience with activities of daily living. These findings parallel self-reported gains in activities of daily living made by TJA patients in developed countries (11,27), which is noteworthy considering differences in preoperative function and followup care across the study settings, including lack of intensive inpatient and outpatient rehabilitation in the Dominican Republic (28). OpWalk Boston patients reported improvements within the context of their personal physical activity demands, which included a wide range of activities (Table 2). These results provide clinicians with information about the types of activities patients returned to following TKR in the Dominican Republic, and may be useful in counseling about physical activity after TKR in a developing nation.

TKR has been shown to offer benefits to mental as well as physical health (29–32). In this study, 12 of 18 patients reported positive effects of TKR on their mood or mental well-being, and patients often attributed this change to improved participation in community activities and reduced anxiety related to pain or physical limitation. These findings resonate with those of Katz and Morris (26), who noted that functional limitation due to rheumatoid arthritis shifted patients' time use toward obligatory and away from committed/discretionary activities. They proposed that the need to sacrifice time spent in valued activities in order to complete those necessary for survival could lead to negative psychological outcomes. Nearly every patient in this study was able to return to at least 1 valued, discretionary activity following TKR.

Despite the general increase in self-reported physical activity in this cohort, we note that 3 women were limited in their ability to walk long distances for transportation and 2 of these women struggled with carrying groceries. As a result of persistent pain in their knees, these patients did not find their ability to perform more demanding committed activities restored after TKR.

Our findings add to prior literature on the role of cultural context in patient conception of disease etiology and treatment. Niu et al found that patients undergoing TJR in the Dominican Republic ascribed their chronic arthritis to God's will (33), and our results indicate that many patients also attribute their opportunity to undergo TKR to God (Table 3). Knowledge of culturally influenced understandings of disease and treatment is especially important for clinicians working in global health settings, as well as with minority patients in the developed world. Physicians should tailor physical activity recommendations so that they are realistic, effective, and consistent with social roles.

Our results also offer insight into OpWalk Boston TKR patients' preoperative education needs and represent an opportunity for intervention. Many patients were uncertain about appropriate physical activity after surgery, but increasing physical activity following TKR is an important goal with many potential health benefits (21,34–37). OpWalk Boston patients' self-imposed limitations were consistent with findings in the developed world that patients may restrict their physical activity for fear of falling or uncertainty about the limitations of their artificial joint (38–41). Therefore, OpWalk Boston patients might benefit from a version of "joint school" prior to surgery in which they receive information about appropriate physical activity at different postoperative time points, and learn about the benefits of physical activity after TKR.

Table 3. Patient demographics (n = 18)*

Characteristics	No. (%)
Demographic	
Age, mean ± SD (range) years	63.8 ± 13.2 (33–80)
Sex	
Female	14 (77.8)
Male	4 (22.2)
Socioeconomic	
Marital status	
Single	7 (38.9)
Married	7 (38.9)
Divorced/separated/widowed	4 (22.2)
Living situation	
Alone	3 (16.7)
With family/friends	15 (83.3)
Work status	
Employed outside home	3 (16.7)
Not working outside home	15 (83.3)
Surgery information	
Procedure	
Unilateral TKR	14 (77.8)
Bilateral TKR	4 (22.2)
Year of surgery	
2009	2 (11.1)
2010	4 (22.2)
2011	4 (22.2)
2012	8 (44.4)
Followup information for all OpWalk TKR patients by year of surgery, total no./no. returned for 2013 followup (%)	
2009	26/5 (19.2)
2010	35/8 (22.9)
2011	33/16 (48.5)
2012	33/17 (51.5)

* TKR = total knee replacement; OpWalk = Operation Walk Boston.

Several limitations of our study should be noted. We utilized purposive sampling to obtain a representative sample of OpWalk Boston patients who underwent TKR during the previous 4 years, which limits the generalizability of our results. The results are illustrative but not definitive (19) and provide preliminary insight into physical activity after TKR in a developing nation. Our sample also represents a subset of patients who returned for followup and may therefore be more active than those who did not return. Finally, participants of OpWalk Boston represent a select sample of individuals who sought care and were selected into the program. Not all arthritis patients in the Dominican Republic will necessarily employ the same religious coping mechanisms or explanatory model of divine intercession.

In conclusion, we report the first characterization of physical activity following total joint replacement in a developing nation. Patients reported gains in committed and obligatory activities, which parallel widely reported

gains in activities of daily living by patients in the developed world following TKR (11,27). Patients also reported that they were able to return to participation in many discretionary activities they valued, which may offer benefits for mental as well as physical health (26,30,34,35). Our results also highlight the importance of understanding the roles of culture and religion in TKR patients' experience of care and return to physical activity. As the global burden of musculoskeletal disease increases, it is important to understand the impact of activity limitation on patients' lives in diverse settings and the potential for surgical intervention to ease the burden of chronic arthritis.

AUTHOR CONTRIBUTIONS

All authors were involved in drafting the article or revising it critically for important intellectual content, and all authors approved the final version to be submitted for publication. Mr. Stenquist had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Study conception and design. Stenquist, Elman, Davis, Bogart, Katz.

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