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Acceptability of a Guided Imagery Intervention for Persons Undergoing a Total Knee Replacement

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Abstract

Background—Guided imagery (GI) has been recommended as a mind-body therapy for pain relief following orthopaedic surgery, but little is known about the acceptability of the intervention.

Purpose—Describe the perceptions of patients undergoing total knee replacement surgery (TKR) regarding the acceptability of a customized GI intervention to promote TKR outcomes.

Methods—Narrative and survey data collected during a randomized controlled trial of the GI intervention were analyzed to assess the acceptability of the intervention.

Results—Most participants were satisfied with and actively engaged in the intervention, and they perceived it to be helpful. For the smaller group who did not find the intervention to be acceptable, reasons for dissatisfaction and barriers to engagement were identified.

Conclusions—GI is an acceptable intervention for many persons undergoing TKR surgery. The results of this study can provide information to further develop a targeted and customized GI intervention for this population.

Introduction

Complementary health approaches are widely used by persons with orthopaedic conditions (D. Rispler, Sara, Davenport, Mills, & Iskra, 2011; D. T. Rispler & Sara, 2011; Yang, Dubé,

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Conflicts of interest

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Eaton, McAlindon, & Lapane, 2013). Guided imagery (GI), the generation of positive sensory and affective images to promote therapeutic outcomes (Nelson et al., 2013), is a complementary approach for persons with osteoarthritis (Fouladbakhsh, 2012). GI has been recommended as a mind-body therapy for pain relief following orthopaedic surgery by the American Association of Orthopedic Surgeons (Alternative methods to help manage pain after orthopaedic surgery.2011).

Despite its popularity, GI lacks a strong evidence base for its effectiveness (Lewandowski & Jacobson, 2013). Intervention research provides the evidence base for nursing practice (Conn, 2005). Research evaluating the effectiveness of interventions should include analysis of its acceptability by users (Corry, Clarke, While, & Lalor, 2013). Treatment acceptability is defined as a favorable attitude toward an intervention by the population for whom the intervention was developed (Sidani, Epstein, Bootzin, Moritz, & Miranda, 2009). Interventions are considered acceptable if targeted individuals experience overall satisfaction with the intervention and its various components and characteristics and if they perceive the intervention to be helpful to them. The acceptability of an intervention also depends on how well individuals engage in it and what factors facilitate or interfere with their engagement. Despite the fact that treatment acceptability is critical to the successful implementation of complementary health approaches, it is often not systematically addressed during intervention development (Price, Wells, Donovan, & Brooks, 2012). The purpose of this study was to describe the perceptions of patients undergoing total knee replacement surgery (TKR) regarding the acceptability of a customized GI intervention to promote TKR outcomes.

Methods

This study was part of a larger mixed methods study involving a randomized controlled trial (RCT) of 82 participants randomly assigned to a guided imagery ($n = 42$) or placebo (audio-book) ($n = 40$) treatment. Only data from the guided imagery (GI) group were analyzed for this report. The characteristics of the GI group, which were not statistically significantly different from those of the audiobook group, are presented in Table 1.

Participants were recruited from the office of an orthopaedic surgeon who performs a large volume of total joint replacements with a highly standardized approach. Patients who were to be scheduled for a TKR were approached by a member of the study team, and those who were interested were screened for inclusion criteria (first-time knee replacement; no autoimmune disease or steroid use; no current use of guided imagery; BMI < 40; no sensory or cognitive impairment). The study was explained to eligible participants and those who agreed to participate signed a consent form, completed baseline questionnaires for the RCT, and were randomly assigned to the treatment (GI) or control (AB) intervention with concealed allocation of treatment.

Participants were provided with all equipment necessary to listen to CD recordings of the assigned treatment via CD players with headphones. They were asked to listen every day for two weeks before and three weeks after surgery, and to miss no more than two days a week if possible. A member of the study team called each participant at home twice during the

preoperative period and twice during the postoperative period to identify any issues and provide support.

Diary Data

Participants were provided with diaries to record their reflections after each day of CD listening by responding to the following items:

1. What was your CD listening experience like today?
2. If you did NOT listen, what was the reason?
3. What benefit did you get today, or are you getting in general, from listening to the CD?
4. What was burdensome, or not beneficial?
5. Please comment on what your overall experience of being in this study is like so far. For example, the extent to which you are able to schedule the daily CD sessions; completing questionnaires when you receive them, etc.

Diaries were collected at the end of the intervention period and transcribed.

Interview Data

To address the study aim of assessing the acceptability and feasibility of the intervention, we identified participants who either elected to drop out of the study during the intervention phase ("dropouts"; $n = 5$; all in GI group) or who did not meet our requested target of listening to the intervention at least five days a week ("low compliers"; $n = 8$; 6 in GI group). Three of the dropout group and five of the low-complier group (4 in GI) consented to be interviewed regarding their experience with the intervention. Participants were met in their homes or at the investigator's (RM) office and signed a consent form. All but one participant agreed to have the interview audio recorded; the content of the interview that was not audio recorded was recorded by hand by the investigator. Audio recordings were transcribed verbatim.

Guided Imagery Intervention

The GI intervention, developed by the research team in collaboration with a guided imagery specialist, consisted of three professionally produced audio recordings (pre-, intra- and postoperative) with a soothing instrumental music background (Kohn, unpublished) that lasted from 19–21 minutes. Each recording began with a general relaxation exercise with a visualization of a special place, followed by images and affirmations specific to each phase of the TKR experience. The TKR-specific content was based on results from a study of 27 participants to determine concerns and hopes about TKR (A. F. Jacobson et al., 2008). The imagery script was developed to address three of four distinct aspects of TKR surgery revealed in the study: Waiting and Worrying (preoperatively); Letting Go and Letting In (accepting limitations and assistance), and Hurting and Hoping (dealing with the pain and believing in a positive outcome) (Table 2). (The fourth component of the experience was

concerned with the period before deciding to have the surgery and so was not relevant to this study's population).

The CD Use Questionnaire (CDUQ) is an 11-item 4-point Likert-type questionnaire developed for this study to generate data concerning participants' views about aspects of listening to the audio recordings (Table 3). Items for the questionnaire were based on findings from an earlier study conducted to determine persons' experiences with listening to CDs as part of a "mock trial" (Jacobson, Lewandowski, Palmieri, & Myerscough, 2011). Cronbach's alpha for the scale administered to both groups (GI and audiobook) at the completion of the postoperative period was .80 ($N = 75$).

Data Analysis

Diary Data

The five authors conducted the data analysis as a team. Four team members (AJ, WL, CD, JD) were each assigned approximately 20 of the participants' diaries to examine in depth. For each diary, the team member wrote short codes (phrases) that captured the essence of each of the participants' comments. A case-by-variable matrix as described by Miles, Huberman, and Saldaña (2014) was used to organize the codes. A row was designated for each participant and a column was designated for the variables of satisfaction, engagement, and perceived helpfulness. The columns were further sub-divided to differentiate codes related to the participants' pre-operative and post-operative experiences with the GI intervention. All the preliminary codes from each diary were placed in the appropriate cells. For example, one cell contained all codes related to Participant 1's satisfaction with the GI intervention prior to surgery, whereas another cell contained all codes related to Participant 2's perceptions of the perceived helpfulness of the GI intervention after surgery.

The research team gathered for a day-long analysis meeting to organize the codes into categories using a process of negotiated team consensus. Strategies described by Saldaña (2013) for developing categories from codes were used. While developing the categories, the team frequently returned to the participants' diaries to clarify the placement of the codes and the definitions and properties of the categories. A content-analytic table as described by Miles, Huberman, and Saldaña (2014) was used to display the codes that contributed to each category. For example, the satisfaction codes were grouped into categories about (a) GI intervention as a whole, (b) the content of messages in the GI scripts, (c) the background music, and (d) the speaker's voice. Team members then wrote narrative descriptions of each category that included comparison of pre-operative and post-operative codes and the integration of representative quotes from the diaries.

Low-Compliance and Dropout Interviews

All team members conducted an in-depth reading of the interview transcripts. Two team members were assigned to code each interview based on the research aims. The codes were placed in a case-by-topic matrix (Miles, Huberman, & Saldaña, 2014) when it was determined that the participants addressed four main issues: reasons for low compliance and dropout related to the intervention or the study, reasons for low compliance and dropout related to participants' unique situation, perceived positive aspects of the intervention

despite low compliance and dropout, and recommendations for improving the intervention. Categories were developed across each column addressing one of these topics, and these categories were compared and integrated with those developed from the diary entries.

The CD Use Questionnaire (CDUQ)

The research team noted that the survey items on the CDUQ resonated with several of the categories developed during the qualitative analysis. Therefore, the items on the CDUQ were arranged according to the major topics that structured the qualitative findings: satisfaction with, perceived helpfulness of, and engagement with the intervention. The number and percentage of participants who endorsed each response stem (e.g., a lot, a medium amount, a little, and not at all) on each item placed in one of the three major topics were examined (Table 3), and this information was used to supplement the discussion of each of the topics.

Results

The participants provided much information about their perceptions of the acceptability of the intervention. They described both their satisfaction with the overall intervention and several of its components and characteristics as well as details about their engagement with the intervention and their perceptions of factors that affected their engagement.

Satisfaction with the GI Intervention

Overall satisfaction

Some participants' overall satisfaction with the GI intervention changed over time. They found it to be enjoyable some days and not others, initially enjoyed it but later found it burdensome, found it more acceptable over time, or were satisfied with the intervention before, but not after, surgery. More often, however, participants were either generally satisfied or dissatisfied with the intervention over the course of the study.

Many participants were satisfied with the GI intervention both before and after surgery. They remarked that sessions were "pleasant," "enjoyable," "good," "interesting," and "nice." Some had stronger words of praise for the GI; these participants lauded it as "wonderful," "fantastic," "heavenly," or "inspirational." Several indicated they looked forward to the sessions and would miss them when the intervention ended. A 62-year-old female participant, for example, stated, "Ending [the intervention] is bittersweet. I will miss listening.... So glad I participated." Even some of the low-compliance and dropout participants made some positive comments about the intervention, acknowledging that they found some aspects of it to be enjoyable or relaxing.

On the other hand, some participants were not satisfied with the GI intervention either before or after surgery or both. They remarked that the sessions were "a big nothing," "a downer," "terrible," and "annoying." Some indicated that GI "was not for me," that they were leery of the approach, or they just wanted to "get on with things." A 66-year-old male dropout participant, for example, would have preferred a simple, straightforward explanation of the surgery rather than the GI, stating, "I am just a meat-and-potatoes kind of guy." Many

of the negative comments occurred post-operatively. A 56-year-old female participant, for example, stated, “I absolutely couldn't embrace these CD's after my surgery. Even though I had the time to listen to them, I dreaded hearing them and stopped on Sun[day].”

Satisfaction with the content of the messages

Many of the participants liked the content of the GI messages contained in the scripts (Table 2). Some participants appreciated hearing that their pain was temporary, that one could go to a “happy place” to deal with one's pain, and that one could “unplug” pain receptors. Several participants also mentioned that the messages about visualizing healing, thinking about surgery as “repair” rather than “replacement,” grieving the old knee, and having faith in doctors were helpful. A few participants valued the anatomical references to the knee. A 68-year-old male participant, for example, originally did not find the references to blood vessels and nerves to be beneficial, but later realized that these comments were meant to help him deal with pain after surgery. Fewer participants provided positive comments about the GI messages after surgery, although some mentioned that the messages encouraging physical therapy and “staying on track” were helpful.

Conversely, a number of participants both before and after surgery were not satisfied with the content of the GI messages. These participants complained that the messages were “sugar-coated,” “unrealistic,” “childish,” and “condescending.” A 56-year-old female participant, for example, said, “The words used - ‘lovingly accept’ - and others grated on my nerves – [it] just doesn't sound very realistic.” Some participants particularly objected to messages about “talking” to their knee, and a few objected to anatomical references in the messages. A few participants remarked that the messages made them feel like they were not progressing as they should, and this created anxiety. A 58-year-old male participant and a 66-year old female participant, for example, were both troubled by the message that one could put full weight on the new knee seven days after surgery. Because they could not do this, they felt they were not progressing normally. The dropout participants were particularly harsh about the content of the GI tapes. A 66-year-old male participant, for example, stated that the tapes were “juvenile,” “like kindergarten,” and “demeaning;” a 54-year old female participant said the messages were like “mind control,” and a 77-year-old female participant said some content was “smarmy.”

Satisfaction with the presentation of the messages

One aspect of the GI intervention that many participants objected to both before and after surgery was that messages were repeated from session to session. As a result, a number of the participants described the tapes as “boring,” “predictable,” “monotonous,” “redundant,” and “tedious.” A 69-year-old female participant, for example, complained about “having to listen to the same thing repeatedly.” She stated, “Parts I feel I know before they are even said.” Some participants were quite perturbed at the repetition. A 57-year-old male participant claimed that he would not “fill out any more comments [in the diary] until the CD changes.” A 54-year-old female dropout participant claimed the repetition was like *Groundhog Day* (a movie in which a character lives one day over and over again). Only a few participants indicated that they liked the repetitive nature of the tapes. A 62-year-old

female participant claimed, “The tape CD feels very familiar and reassuring. I am happy for the repetition, instead of [it] constantly changing.”

Satisfaction with the background music on the GI tapes

A few participants commented on the background music on the tapes, and these comments were usually positive. An 81-year-old male participant, for example, stated he was “hypnotized listening to the strings playing – oboe at times, guitar and possibly harp.” One participant said that the music was beautiful, and another said the music helped more than the content of the tapes. Only one person had a negative reaction to the music, claiming that it made her sad because it reminded her of her father's funeral.

Satisfaction with the speaker's voice

A few participants made comments about the voice of the GI speaker. Several appreciated her voice, finding it to be “soft” and “compassionate.” A 62-year-old female participant, who described the voice as “calming,” stated, “I usually listen more than once. The voice will be in my head for a long time.” On the other hand, a few participants did not like the voice. One participant found the voice to be too “syrupy” and thus not “realistic,” whereas another found it made her drowsy because it was too soft. The 77-year-old female drop-out participant particularly objected to the speaker's voice, which she called “patronizing” and “over-soothing,” arguing that the speaker used “baby-talk” and talked down to the listener.

Satisfaction as measured with the CDUQ

Several items on the CDUQ addressed the participants' satisfaction with the intervention. As seen in Table 3, most participants indicated they enjoyed listening to the CDs, would use the CDs again in the future, and would recommend the CDs to others “a lot” or a “medium amount,” both pre- and post-operatively. A small group of participants, however, indicated that they enjoyed listening to the CDs and would use the CDs again in the future, but would recommend the CDs to others only “a little” or “not at all.”

One item on the CDUQ addressed participants' satisfaction with the content of the intervention. As with general satisfaction with the intervention, the majority of the participants indicated that they liked the content of the CD “a lot” or a “medium amount,” but a smaller group indicated that they liked the content of the CD only “a little” or “not at all.” One item on the CDUQ addressed participants' satisfaction with the background music on the CDs, and an overwhelming majority indicated that they liked the background music “a lot” or “a medium amount.” One item on the CDUQ addressed whether the participants perceived the images on the CD to seem real. The participants' responses were fairly evenly divided on this item. Overall, therefore, the participant responses to satisfaction items on the CDUQ supported the results of the qualitative analysis. Most participants were satisfied with the intervention but there was a small but important group who were not, mostly likely due to their dissatisfaction with the content of the CDs. A result not obvious in the qualitative findings was that almost half of the participants did not believe the images seemed real.

Perceived Helpfulness of the Intervention

Although a few participants denied that the intervention was beneficial in any way, most described ways in which they believed the intervention had helped them. Some indicated that the benefits they received from GI “carried over,” that is, GI continued to help them when they experienced other stressful situations or threats to their health after the study was over. A few even indicated that GI added to their long-term “personal growth.” The most common benefits attributed to GI were relaxation, enhanced pain management, and improved outlook and mood.

Relaxation

Both before and after surgery, many participants indicated that GI helped them relax. They stated that GI made them feel “calm” and “peaceful.” They especially appreciated this effect when they were in pain, unable to sleep, or feeling particularly tense. A few participants indicated that GI provided “down time” and offered an escape. A 56-year-old male participant stated, “I believe I am learning to be able to more completely calm myself.... I look forward to my daily relaxing session...” For some participants, GI helped relax their bodies or their muscles. For others, the relaxation resulting from GI promoted sleep and rest. A few participants indicated that the deep breathing component of the GI helped with relaxation, although some indicated that the breathing was helpful in itself. Even several of the low-compliance and dropout participants acknowledged that the GI helped them relax.

Enhanced pain management

In addition to promoting relaxation, many participants indicated that GI aided them in enduring and managing their pain both before and after surgery. Especially during the post-operative period, participants indicated that GI helped to distract them from their pain, understand and minimize their pain, develop a pain management plan, recognize the temporary and healing aspects of pain, and focus on something other than their pain. A 58-year old male participant stated that GI helped him realize that “pain and discomfort are temporary. They will go away in time. Pain and discomfort are part of the healing process.” Some participants stated that the GI worked well in conjunction with pain medication. Though several participants stressed that the GI reduced their pain but did not eliminate it, a few indicated that they experienced no pain after GI or felt the pain leaving during the sessions. The breathing component of the GI facilitated pain management for some participants.

Outlook and mood

Many participants indicated that GI made them feel more hopeful, reassured, and confident. They indicated that the GI provided positive thoughts, infused a positive attitude, and convinced them that “things will be better.” Before surgery, GI reduced anxiety and worry, and after surgery, it promoted a sense of optimism and vitality. Participants indicated that GI increased their motivation and sense of efficacy, promoted their determination to “stay the course,” and reinforced the seriousness and importance of physical therapy and exercise. A 70-year-old male participant indicated that GI provided him with “reassurances of my own capabilities” and indicated that GI “reinforced [my] determination to push myself.” Some

participants compared GI to meditation because it gave them a sense of empowerment and distracted them from pain and worry.

Perceived helpfulness as measured by the CDUQ

Two items on the CDUQ addressed whether the participants perceived the CDs to be helpful. As seen in Table 3, the majority of participants indicated that listening to the CD was helpful “a lot” or “a medium amount,” whereas a smaller number indicated that listening to the CD was helpful “a little” or “not at all.” A large majority, especially pre-operatively, indicated that they felt relaxed after listening to the CD “a lot” or a “medium amount,” whereas a smaller group indicated that they felt relaxed after listening to the CD “a little” or “not at all.” These results, therefore, also substantiate the qualitative findings that most participants found the intervention to be helpful, but a small minority did not. Most participants, especially before the surgery, perceived relaxation as a benefit of the intervention.

Engagement with the Intervention

Many of the participants remained engaged with the intervention throughout the course of the study. Before surgery only one participant showed low compliance, and after surgery only five showed low compliance. Only five participants dropped out of the study. Most indicated that they continued with the GI because they enjoyed it or derived benefit from it, although a few indicated that they completed the GI because they had given their “word” and felt obligated to complete the study.

Those participants who were highly engaged with the intervention indicated that they completed the sessions regularly; could visualize vividly; were “tuned in” and interested; and remained clear-headed, awake, and alert during the sessions, even after surgery. Those participants who were not highly engaged with the intervention indicated that they often skipped sessions, completed them grudgingly, or did not “tune in” to the GI messages. Most participants provided information about factors that influenced their degree of engagement with the intervention.

Facilitators of engagement

For many participants both before and after surgery engagement with the intervention was facilitated because they were able to schedule it at a time that was convenient for them. They chose times that fit with their lifestyle or daily demands or to augment the benefit from GI, such as scheduling a session right after physical therapy in the post-operative period to help relieve pain. A 74-year-old female said, “I can't believe how easy it is to participate. Got me through some uncomfortable days.” In addition, a few indicated that their engagement was facilitated by the surgical staff who introduced the study and the research staff who carried out the study. Several participants revealed personal strategies that facilitated their engagement with the intervention; one mentioned turning up the volume of the CD player to increase concentration, another indicated sitting or lying down for a while to lessen pain before doing GI, and another indicated using a tanning bed during GI because the warmth improved focus.

Barriers to engagement

Participants revealed many barriers to engagement. Common barriers included problems with concentration, physical pain and discomfort, emotional distress, session interruptions, and mechanical difficulties. Although barriers occurred before and after surgery, they were especially pronounced post-operatively.

Difficulty concentrating—The barrier to engagement that was most frequently mentioned by participants both before and after surgery was difficulty concentrating or focusing on the GI script. These participants described their minds wandering, being easily distracted, not being able to “quiet” their thoughts, and being unable to “tune in.” A 54-year-old female participant explained that “at first [it was] hard to get settled because my mind was busy with the day’s events.” Some participants revealed that they were worried about family problems or other life stressors and those worries interfered with their GI sessions.

Physical discomfort and pain—Many participants indicated that their physical status interfered with their fully engaging with GI. Several pointed out that it was difficult to listen to the tapes because they were in pain, sneezing, coughing, itching, or nauseated. Pain, pain medications, and fatigue made sessions difficult if not impossible after surgery. In fact, some participants stressed that high levels of pain and the effects of pain medication, including disorientation and drowsiness, early in the pre-operative period prohibited them from doing any GI. A 62-year-old female participant explained that early in the post-operative period she could not “focus on books or TV. Every time I have Percocet I drift off. So I started and restarted the CD numerous times.”

Emotional distress—Some of the participants indicated that they had difficulty concentrating or were not interested in doing GI because they were depressed or anxious. A 70-year-old low-compliant female participant, for example, was depressed after surgery and claimed she “rebelled” against the intervention because of her depression. She acknowledged, however, that she did feel better after doing GI despite the depression. A 77-year-old drop-out participant reported that she did not engage with the intervention because she was “angry and scared” that her surgery had to be postponed for a cardiac work-up.

Session interruptions—Several participants indicated that their GI sessions were frequently interrupted. Both before and after surgery, telephone calls, unexpected company, holidays, life events that required their attention, and background noise interfered with their beginning or completing sessions. A 58-year-old male participant, for example, reported that his attention was diverted from the GI session when he heard of a local school shooting and became “glued” to the TV. Sessions were frequently interrupted during the immediate post-operative periods by medical staff needing to perform care.

Mechanical problems—Several participants described mechanical problems both before and after surgery that served as barriers to the engagement with GI. Dead batteries, the CD machine malfunctioning, and flaws in the CDs disrupted the sessions for a few participants.

Barriers to engagement as measured by the CDUQ—Three items on the CDUQ addressed barriers to engagement with the intervention. As seen in Table 3, most participants indicated that they were able to focus on the intervention; these participants indicated that their mind wandered during the CDs and they had difficulty concentrating on the CDs “not at all” or “a little.” A smaller group indicated that they had trouble focusing on the intervention; these participants indicated that their mind wandered during the CDs and they had difficulty concentrating on the CDs “a medium amount” or “a lot.” Similarly, the majority of the participants indicated that they had difficulty creating images during the CDs “not at all” or “a little,” whereas a smaller group indicated that they had difficulty creating images during the CDs “a medium amount” or “a lot.” The results, therefore, are consistent with the qualitative findings that suggest most participants were engaged with the intervention, but that those who were not likely had problems concentrating or creating images as is required by the intervention.

Discussion

We investigated the acceptability of a pre- and post-operative GI intervention for patients undergoing TKR. By incorporating “real time” journaling into the GI intervention design, along with retrospective interviews of participants who did not comply with the intervention or dropped out of the study, we were able to conduct qualitative analyses that heightened our understanding of how the intervention was actually experienced by participants. Journal and interview data elicited both general and specific feedback about the GI intervention.

Qualitative findings enhanced the meaningfulness of this RCT by elucidating variation in participant responses to the GI intervention and evaluating the intervention in a “real life” context (Sandelowski, 1996). Findings from analyses of the CD Use Questionnaire (CDUQ) data supported those from journal and interview data related to participants’ satisfaction and barriers to engagement with the GI intervention and the perceived helpfulness of the intervention.

Participants largely found the GI intervention to be acceptable. Most expressed satisfaction with the intervention overall and most of its components and characteristics. The majority of participants in the study, even those who were low compliers or dropouts, were able to identify some benefit(s) from the GI intervention. Relaxation, enhanced pain management, and improved outlook (e.g., optimism) and mood (e.g., hopefulness) were described. Many participants reported being engaged with the intervention, and very few were not compliant or dropped out of the study. The results suggest that a GI intervention is an acceptable approach for many patients undergoing TKR and warrants further development.

Aspects of the intervention that the participants did not find acceptable provide foundational information for refining the intervention. The major complaint about the GI intervention was that the CDs were too repetitious. Three CDs were used in the study, one each for the pre-, and post-operative periods and one for the day of surgery. Participants were requested to listen daily for two weeks to the pre-operative CD and daily for three weeks to the post-operative CD. (The CD for the day of surgery was provided for optional listening if the participant elected to do so.). Given the feedback that many participants objected to the repetition in the CDs, some quite vehemently, further development of the intervention will

call for a greater assortment of pre- and post-operative GI CDs or revision of the dose of the intervention.

The findings related to common barriers to engagement also offer information that can be considered as the intervention is refined and implemented. Difficulty concentrating (e.g., inability to tune into the GI), physical pain and discomfort (e.g., itching), emotional distress (e.g., anger), session interruptions (e.g., unexpected company), and mechanical problems (e.g., flaws in the CD) were the most significant. A discussion with patients about ways of reducing these barriers and protocols that permit flexibility to overcome the barriers should be considered.

The immediate 2- to 3-day post-operative period in the hospital gave rise to the most troublesome barriers, especially severe pain, difficulty concentrating, recovery from anesthesia, and multiple interruptions from hospital staff and visitors. These barriers may interfere with patients' ability to generate images and become absorbed in them. Because these skills are crucial components of imaging ability, a characteristic that influences a person's capacity to successfully use GI (Kwekkeboom, Huseby-Moore, & Ward, 1998), the immediate post-operative period may not be conducive to the use of GI.

A smaller but important sub-group of the sample found most aspects of the intervention to be unacceptable, seemingly because they did not embrace the overall tenets of a complementary approach and found the GI intervention to be contrived and unrealistic. This finding suggests that potential consumers of the intervention might need to be pre-screened to determine if any are likely to be highly resistant to an intervention that does not provide straight-forward information about the surgery and recovery or in which the mechanisms by which the intervention produces effects are not clear and obvious. These individuals may benefit from an opportunity to voice their concerns and be provided with clear explanations about the intervention that are tailored to their concerns. If they remain skeptical, alternative options for interventions should be offered.

A major limitation of this study is that it lacked racial diversity; over 95% of the participants were white. The sample was also restricted to persons who proactively initiated involvement in the study and may not include those who were most cautious of research or the use of complementary modalities. Because the interviews with patients who were low compliers or dropouts provided retrospective accounts of their experiences with the GI intervention, these data may be limited by recall biases.

Future research should be directed toward tailoring the GI intervention to meet individual patients' needs and preferences. Research is needed to determine which patients will benefit most from a GI intervention and which clinical symptoms are best addressed with this approach. Research is also needed to determine the long-term efficacy of GI for patients undergoing TKR.

Our findings may be useful for nurses and other health care providers who want to implement the use of GI in the care of persons undergoing TKR. These clinicians could play an important role in educating patients on evidence-based treatment interventions that might complement and enhance their conventional care. Offering a variety of complementary

modalities in clinical settings for persons preparing for and recovering from TKR might be advisable. Findings from studies designed to allow participants to self-select from a menu of possible complementary strategies (Kwekkeboom, Abbott-Anderson, & Wanta, 2010; Wyatt, Sikorskii, Siddiqui, & Given, 2007) increases the likelihood the interventions will be effective. Nurses need to learn more about which patients will benefit the most from specific complementary therapies. Also, it is crucial for nurses to understand which complementary therapies target and help which set of clinical symptoms. Qualitative findings in this study suggest that a GI intervention tailored to the experiences and needs of patients undergoing TKR can be a useful way to promote relaxation, pain management, and positive outlook and mood during the pre-, intra-, and post-operative period.

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Table 1

Characteristics of participants experiencing guided imagery intervention (N = 42)

Sex	
Female	23 (54.8%)
Male	19 (45.2%)
Ethnicity	
White	40 (95.2%)
African American	2 (4.8%)
Marital Status	
Married	33 (78.6%)
Divorced	4 (9.5%)
Widowed	4 (9.5%)
Separated	1 (2.4%)

Table 2

Excerpts from guided imagery scripts in audio recording

Time Frame	Script Sample
Preoperative	“...Direct your attention to the area of the knee that will be repaired. Take a moment and notice how worn out this knee is, (pause 5 sec.) notice how much pain it has been in, (pause 5 sec.) and how this knee no longer works well (pause 5 sec.). Imagine... that you can have a conversation with this knee. You are invited to thank this knee for all the good work it has done for you over its lifetime. But now, it isn't able to work well anymore, has been in a lot of pain, and needs to be repaired. (pause 5 sec.) You can let it know that the newly repaired knee will be much stronger, and able to bear your full weight easily and comfortably. Your repaired knee will work so much more efficiently, and...allow you to move, freely and effortlessly, just like you used to. Your repaired knee is durable and made to give you the mobility you want. Even though there will be some pain after the surgery, it will be different....a healing pain and will go away with time.”
Intraoperative	“...You can tell yourself that while you are having surgery, you will really enjoy your special place, focusing on the soothing and calming qualities of this place. (pause) As you enjoy your special place, you can ignore the conversations of the medical team because they are meaningless to you. You simply stay focused on your special place. (pause) You are invited to recall a time, however long ago, when you were able to move easily, and with good energy. A time when you were active and your knees felt strong and steady. Recall how it felt to have... full range of motion, how it felt to be.... free from pain. (Pause 10 seconds) Now, imagine that image of yourself back then, standing right in front of you now, facing you...smiling. Notice how this person is full of energy...strong and confident on their feet. Imagine that you take a step forward and step right into that image of yourself.”
Postoperative	“...Notice now, the feeling of a positive outlook - you feel strong and confident, telling yourself, this is just one day...tomorrow will be better and able to focus on what is going well...expecting the best. You can breathe in this feeling of positive thinking. Notice how it feels throughout your whole being – an ability to do what it takes. (pause 10 sec.) Take a moment, and tap into the feeling of calm motivation. (pause 5 sec.) Notice how it feels to be calm and motivated to stay the course...keeping your focus on reaching your goals. Recognizing your body has its own schedule for healing and recovery. You can tap into this feeling of motivation when you need it, to stay the course when the healing process seems like it is 3 steps forward and 2 steps back. Remember, that this is just temporary...remaining calm and focused on your goals. You remind yourself to stay the course and do your exercises completely, every time.”

Table 3

Indices of participants' satisfaction with, perceived helpfulness of, and engagement with the GI intervention as measured by the CDUQ (n = 42)

CDUQ Items	A lot	A medium amount	A little	Not At All
	n (%)	n (%)	n (%)	n (%)
Satisfaction with the Intervention				
I enjoyed listening to the CDs	17 ¹ (45.9%) 15 ² (40.5%)	12 ¹ (32.4%) 10 ² (27.0%)	7 ¹ (18.9%) 7 ² (18.9%)	1 ¹ (2.7%) 5 ² (13.5%)
I would use CDs again in the future	12 ¹ (32.4%) 17 (45.9%)	13 ¹ (35.1%) 8 ² (21.6%)	7 ¹ (18.9%) 4 ² (10.8%)	5 ¹ (13.5%) 8 ² (21.6%)
I would recommend listening to CDs to a friend or family member	12 ¹ (32.4%) 19 ² (51.4%)	13 ¹ (35.1%) 7 ² (18.9%)	6 ¹ (16.2%) 5 ² (13.5%)	6 ¹ (16.2%) 6 ² (16.2%)
I liked the content of the CDs	11 ¹ (29.7%) 16 ² (43.2%)	14 ¹ (37.8%) 10 ² (27.0%)	10 ¹ (27.0%) 8 ² (21.6%)	2 ¹ (5.4%) 3 ² (8.1%)
I liked the background music in the CDs	23 ¹ (62.2%) 21 ² (56.8%)	11 ¹ (29.7%) 14 ² (37.8%)	2 ¹ (5.4%) 1 ² (2.7%)	1 ¹ (2.7%) 1 ² (2.7%)
The images of the CD seemed real	10 ¹ (27.8%) 10 ² (27.8%)	11 ¹ (30.6%) 9 ² (25.0%)	12 ¹ (33.3%) 9 ² (25.0%)	3 ¹ (8.3%) 8 ² (22.2%)
Perceived Helpfulness of the Intervention				
Listening to the CDs has been helpful	11 ¹ (29.7%) 17 ² (45.9%)	14 ¹ (37.8%) 9 ² (24.3%)	12 ¹ (32.4%) 9 ² (24.3%)	0 ¹ (0%) 2 ² (5.4%)
I felt relaxed after listening to the CDs	22 ¹ (59.5%) 20 ² (54.1%)	10 ¹ (27.0%) 9 ² (24.3%)	4 ¹ (10.8%) 7 ² (18.9%)	1 ¹ (2.7%) 1 ² (2.7%)
Engagement with the Intervention				

	Not at all	A little	A medium amount	A lot
I had difficulty creating images during the CDs	16 ¹ (43.2%) 13 ² (35.1%)	11 ¹ (29.7%) 9 ² (24.3%)	7 ¹ (18.9%) 11 ² (29.7%)	3 ¹ (8.1%) 4 ² (10.8%)
My mind wandered while listening to the CD	2 ¹ (5.6%) 7 ² (18.9%)	23 ¹ (63.9%) 15 ² (40.5%)	5 ¹ (13.9%) 9 ² (24.3%)	6 ¹ (16.7%) 6 ² (16.2%)
I had difficulty concentrating on the CD	10 ¹ (27.0%) 12 ² (32.4%)	18 ¹ (48.6%) 11 ² (29.7%)	6 ¹ (16.2%) 9 ² (24.3%)	3 ¹ (8.1%) 5 ² (13.5%)

¹Data collected 2 weeks after start of pre-operative intervention

²Data collected 3 weeks after start of post-operative intervention