

A Study of Efficacy and Cost-effectiveness of Guided Imagery as a Portable, Self-administered, Presurgical Intervention Delivered by a Health Plan

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Background: Previous research indicates that immersive, mind-body interventions can improve the quality of a patient's surgical experience and clinical outcomes.

Objective: To describe the Blue Shield of California Presurgical Guided Imagery Program, assess its impact on surgical outcomes, patient satisfaction, and cost savings.

Method: Analysis of survey data conducted pre- and post-surgery among 905 eligible health plan members. Retrospective analysis of medical claims for a subset of 126 hysterectomy patients was compared with that of similar patients who did not use guided imagery for differences in length of stay and charges billed.

Results: The intervention yielded an adoption rate of 74%. Patients who used the guided imagery intervention reported significantly reduced anxiety and high levels of satisfaction. A trend toward shorter hospital stays (8% reduction, $P=.07$) was also observed in the imagery group, as well as reduced pharmaceutical costs (14% reduction, $P=.181$). In total, there was a 14% reduction in mean total charges billed per procedure in the imagery patients, amounting to an average savings of \$2003 per procedure. Although it was not possible to isolate differential cost of lab and imaging fees for the purposes of this study, it is likely these factors played a part in the billing differential as well.

Discussion: Health plans are well positioned to deliver guided imagery tools for patient self-management prior to scheduled surgery. While mind-body interventions are increasingly linked to cost savings and improved outcomes in a variety of clinical settings, a randomized controlled trial should be conducted to firmly establish their efficacy.

KEYWORDS

Guided imagery, guided meditation, guided relaxation, preoperative, surgery, mental rehearsal, hypnosis, patient education, psychoeducational, preoperative anxiety, non-pharmaceutical analgesia, hypnotic sedation.

BACKGROUND

Pre-approved, scheduled surgery, even for minor procedures, can produce considerable anxiety and feelings of helplessness in patients. Many individuals fear the outcome of the surgery or possible complications, not to mention anticipated pain, dependency on others, and the loss of control from being rendered unconscious under anesthesia. Preoperative anxiety can increase patients' perception of pain and can delay healing time or potentially contribute to other negative outcomes. In addition, an intensely anxious patient can present difficulties and delays for the staff members administering their care.

Although strictly cognitive interventions, such as preoperative education, have been shown to deliver modest benefits in patient outcomes, mostly around pain reduction,^{1,2} the more immersive, "right brain" class of mind-body interventions, such as relaxation, meditation, music therapy, hypnosis, and guided imagery, have demonstrated considerable clinical benefit both pre- and postoperatively.^{3,4}

Relaxation has been found to improve outcomes for patients undergoing coronary bypass surgery⁵; thyroid surgery⁶; breast core-needle biopsy⁷; and invasive, percutaneous, radiological procedures.⁸ Meditation has been shown to render benefit for people undergoing organ transplantation⁹ and for breast and prostate cancer patients.¹⁰ Music therapy has been shown to be efficacious in reducing pain for patients undergoing open heart surgery,¹¹ lessening pre-procedure anxiety for patients undergoing outpatient procedures,¹² reducing pre- and postoperative anxiety in patients undergoing prostate resection,¹³ lessening the perception of pain during surgical procedures,¹⁴ and helping patients manage anxiety during colonoscopies.¹⁵ Meta-analysis has revealed hypnosis to yield a variety of benefits to surgery patients,^{16,17} and more specifically, to be significantly helpful to patients during coronary angioplasty,¹⁸ and in accelerating postsurgical wound healing,¹⁹ promoting gastrointestinal motility,²⁰ and reducing postoperative nausea and vomiting.²¹

Most impressive to date are the collective results derived from a technique known as guided, a user-friendly form of strategic, directed daydreaming set to music and a soothing narrative voice that focuses on a desired outcome or set of outcomes. Because guided imagery often incorporates relaxation, meditation, hypnosis, and music, it is well positioned to deliver the multiple benefits of the entire class of mind-body interventions. Indeed, imagery has been found to reduce pain, anxiety, and length of stay in cardiac surgery patients,^{22,23} colorectal surgery patients,²⁴ and elderly

orthopedic surgery patients²⁵; to reduce pain in gynecologic laparoscopy patients²⁶ and in children after surgery²⁷; and to reduce pain and improve quality of sleep in anorectal surgery patients.²⁸ In addition, guided imagery decreased both postoperative pain ratings and length of stay in children²⁹ and reduced pain, length of stay, pre- and postoperative anxiety, and blood loss in adult patients undergoing lengthy surgeries.³⁰ Even more relevant to the health plan setting, guided imagery was found in one hospital study to reduce average length of stay, decrease average direct pharmacy costs, and reduce pain medication costs while maintaining high overall patient satisfaction with the care and treatment provided to cardiac surgery patients.³¹

Further, because guided imagery is most often provided in the form of a recording, it is a highly portable, self-administered intervention that requires only minimal professional guidance or monitoring; its cost is reasonable; and audio intervention is exactly the same for every subject every time it is used. It is simple to use, requires a limited commitment of time and effort from its end user, and is delivered at a highly teachable moment. At a time when patients are feeling anxious, helpless, and out of control, it serves as an empowering self-regulation tool that puts them back in charge of their emotional experience.

PURPOSE

Given guided imagery's practical nature as an intervention, the growing evidence of its clinical benefits, and the preliminary findings of financial savings and cost effectiveness, the clinical management team at Blue Shield of California (BSC) became interested in investigating whether a presurgical guided imagery recording could be effectively distributed by the health plan as opposed to by the usual hospital or outpatient clinical setting. In addition, the team wanted to assess whether guided imagery would yield similar results on clinical and economic outcomes and improve patients's objective experience of surgery when distributed in this manner. The guided imagery interventions fit in well with BSC's general strategy to empower members in their own healthcare and to make a variety of personalized options available to them. In June 2000, BSC launched the Presurgical Guided Imagery Initiative. The program has since expanded in scope to encompass other health challenges and still exists today. This article describes the initial distribution program and reports on clinical and financial outcomes.

THE PROGRAM

The Presurgical Guided Imagery Program was launched with a newly hired nurse health coach as coordinator, supported by 2 part-time administrative assistants. All were provided with training in guided imagery. Internal systems were set up to automatically generate reports whenever a request for preauthorization was approved for a targeted surgery involving a length of stay greater than 2 days. This tickler system allowed the program to send out a presurgical guided imagery tool kit containing an introductory letter and the presurgical guided imagery recordings in 2 formats, a CD and an audiocassette tape, to the identified member.

Based on a comparative assessment of recordings created by a range of authors,³⁰ the team chose the Health Journeys guided imagery recording, "Successful Surgery," by Belleruth Naparstek³² based on its performance in clinical trials.^{24,25,33} The audio program consists of a 20-minute immersive guided imagery narrative designed specifically for surgery and scored to soothing music. The patient was asked to listen to it before surgery. The preoperative imagery guides listeners to a favorite peaceful place, where they are invited to observe their upcoming surgery in a detached way, as if on a screen. The narrative describes the patient surrounded by capable medical staff members who are leaved with how well everything is proceeding. The imagery also encourages listeners to identify personally significant helpers and well-wishers to appear from the imaginal realm—real people or spiritual figures—in order to reduce anxiety, fear, and isolation and to increase the sense of protection. There are additional images that suggest positive outcomes, such as minimal bleeding, waking up comfortably, and healing readily. The content is designed to ease preoperative anxiety, reinforce motivation, engender confidence in the medical staff, help anticipate a successful outcome, and provide a general sense of uplift for the listener.

The materials were packaged with the BSC private label to identify the intervention with the health plan. They were given to patients to keep, and patients here encouraged to share them with family members, friends, physicians, and hospital staff members. The introductory letter offered a toll-free number, staffed by registered nurses, to answer member or provider questions.

After the tool kit was sent, the BSC presurgical program nurse called the targeted patient before his or her scheduled surgery. The nurse provided general presurgical patient education, explained the guided imagery tool kit, and encouraged patients to see the recordings. (Note: For patients who elected not to use the recordings, the program nurse was trained to affirm these choices and in no way pressure patients to use the guided imagery tool kit.) The nurse was available to answer a variety of questions about guided imagery, surgery, and recovery. Within a week after discharge, a program nurse again called the patient to assess is or her postsurgical status and discuss discharge instructions and medications. At the end of the call, the nurse asked the patient to participate in a 5-10 minute survey to assess the effectiveness of the guided imagery tool kit.

It is worth noting that prior to the program's launch, BSC sent an explanatory letter to 10,000 network surgeons. The letter described guided imagery and how the program works and invited them to call the toll-free number to request a copy of the audio recording and related research articles. Physician response was minimal, with only 304 requests for samples and articles (3%), 11 complaints, and 6 endorsements of the idea (Table 1). This was in dramatic contrast to the response derived from the direct-to-member invitation, which was extremely robust. Of the 1395 preoperative patient invitations issued, 905 members took advantage of the program, resulting in an unusually high adoption rate of 74% compared with other Blue Shield patient-center health initiatives.

Table 1. Physician Response to Guided Imagery Program	
Number of letters mailed to physicians	10000
Number of requests for samples and research articles in the following month	304
Number of complaints <ul style="list-style-type: none"> • To the program nurse • To the Chief Medical Officer 	8 3
Number of contacts in support of the program	6

SAMPLE AND METHODS

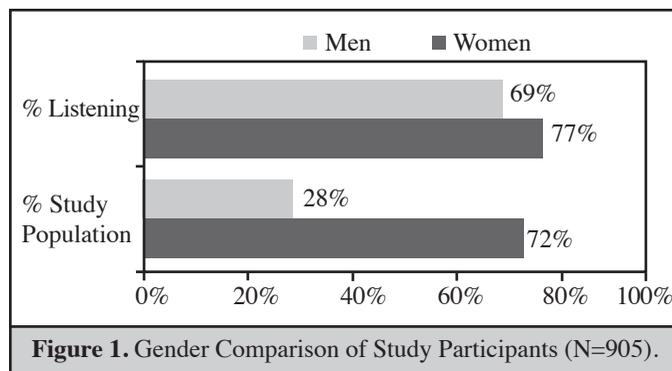
Measures of Adoption, Satisfaction, and Self-Reported Impact

The period for collecting data was from June 1, 2000 to May 31, 2001, during which time 905 adult members, both male and female, became the population to be studied. The investigation targeted patients facing common, high-volume surgeries, such as gynecological, orthopedic, genitourinary, and certain cardiac procedures, as long as their procedure date was at least 5 days away from the request for preauthorization for the surgery to allow time for the intervention and as long as the patients' length of stay in the hospital was estimated at 2 days or more to enable the measurement of a possible reduction in length of stay. The survey instrument was a structured questionnaire consisting of 16 items with true/false or multiple-choice responses (up to 5, including a "don't know" or no answer option). Patients evaluated the guided imagery materials, clarity of instructions, frequency of use, anxiety, pain, wound healing, and satisfaction. Completing the survey generally took 5 to 10 minutes. The responses were elicited by 1 of 3 program nurses and entered into a database. Additionally, since this program's inception, the program nurses have maintained a roster of spontaneous unsolicited comments (by telephone and mail) about BSC's decision to provide the guided imagery program.

Responses to the postoperative telephone survey form the data for the measures of adoption, anxiety, and satisfaction with the guided imagery tool kit. These responses reflect the inherent limitations associated with self-reported data and are subject to the biases introduced by using program personnel as the interviewers.

Measures of Cost

Hysterectomies were chosen as the study universe for the financial and clinical outcomes portion of the study. Although the guided imagery intervention was used for a wide variety of surgical procedures, hysterectomy formed the largest single subgroup and therefore was used for cost comparison to eliminate the confounding variables inherent in comparing different surgeries. The hysterectomy population was a predominantly healthy, middle-aged population of females. (It should be noted that in the larger population of all targeted surgical procedures, the adoption rate for men and women was roughly the same [Figure 1].)



Financial data measuring length of hospital stay and charges billed for 126 hysterectomy patients were extracted from BSC's claim database. Although length of stay is a comparatively straightforward measure, determining the appropriate cost values required adjustments. To avoid the biases inherent in "claims allowed" and "claims paid" values, which reflect contracting variation and patient co-payment and deductible status, hospital charges billed were chosen to form the basis for the financial measures.

This data set was refined to exclude outliers, defined as patient procedures with an allowed billing amount of more than \$10000, and low-volume hospitals, defined as those that performed fewer than 3 procedures during the study period. Finally to account for interfacility practice variation, the study population was further refined to include only cases where a de facto control group of hysterectomy patients was available – patients who had been billed by the same hospital during the same time period but who had either chosen not to listen to the guided imagery or who did not receive it because of inadequate lead time. (This was for administrative rather than clinical reasons.) Of the 12 hysterectomy patients in this subject, 53 had participated in the presurgical guided imagery program, and 73 had not. Of the 73 nonparticipating patients, 32 had received an invitation but chose not to listen to the guided imagery, and 41 did not have adequate lead time to receive the intervention from BSC.

FINDINGS AND DISCUSSION

Adoption

Post-intervention survey data among the 905 survey respondents show remarkable results with respect to adoption of the program, with an overall adoption rate of 74%. Nearly half the sample (44%) listened to the recording 3 or more times, and almost one-third (31%) listened 1 or 2 times, as reported by the patient and then recorded by staff members. This far exceeds the usual adoption rates of the health plan's more established disease management programs, such as arthritis program (36%), the prenatal education program (17%), the asthma self-management programs (17%), and the cardiovascular program (10%). (Figure 3).

The high adoption rate in the study can be attributed to 3 fundamental elements inherent in the program design: (1) the

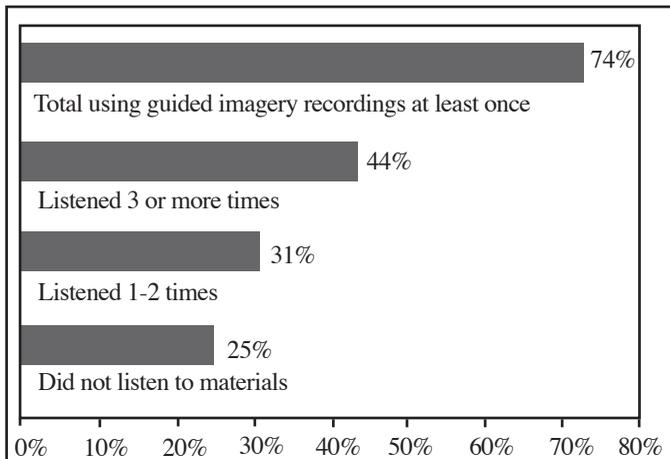


Figure 2. Frequency of Guided Imagery Use (N=905).

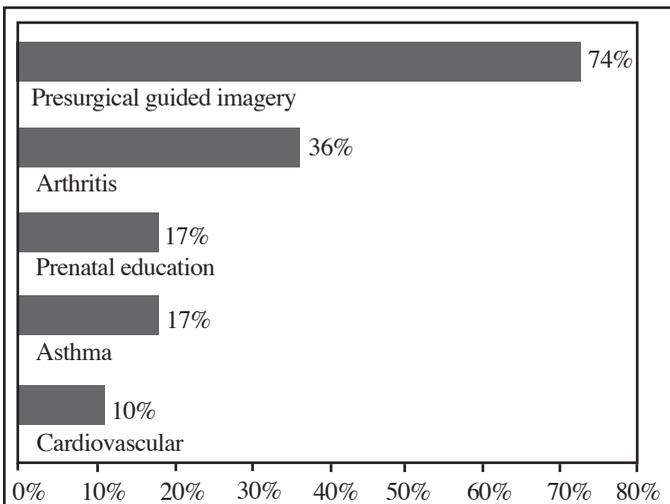


Figure 3. Comparative Adoption Rates in Health Management Programs (6/1/00-5/31/01)

systematic, early identification of patients at a critical time of need, (2) the outreach and one-on-one contact with program nurses, and (3) the offering of a relevant, safe, and easy-to-use low-demand tool that is a “high-touch” antidote to the “high-tech” invasiveness of surgery and hospitalization.

Satisfaction

The majority of listeners (86%) reported that the imagery helped them imagine their healing progress; 82% reported they would be very likely to use the intervention again in the event of another surgery; and 83% said they would recommend the recordings to a friend (Figure 4). Even more compelling, however were the verbatim comments given to the interviewers. To date, BSC has received hundreds of unsolicited testimonials and comments that chronicle members’ experience with guided imagery in this program, ranging from pleased to heartfelt gratitude for what is frequently described as an unexpected and profoundly meaningful service. This is in striking contrast to the expected tenor of member communications in the era of rampant dissatisfaction with managed care. Comments peppered with exclamation points were commonplace:

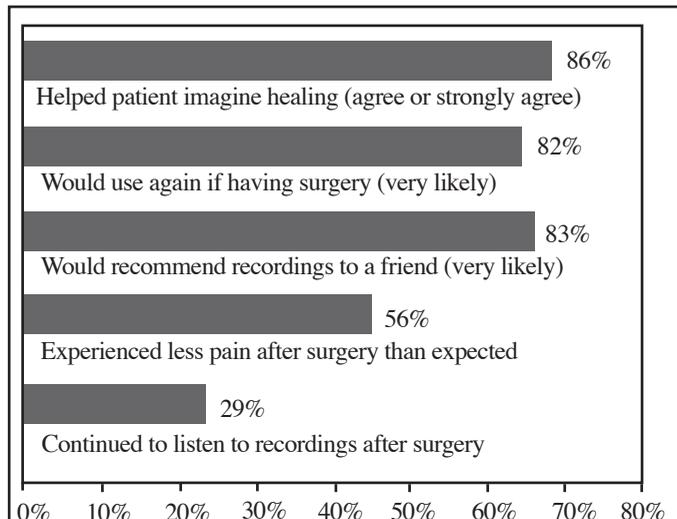


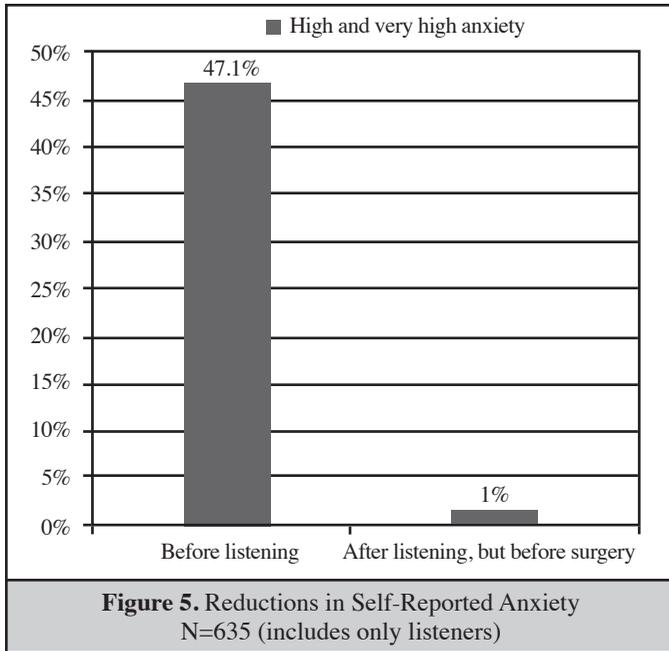
Figure 4. Adoption, Compliance, and Satisfaction N=669 (listeners only)

“I loved BSC’s program! I listened to the CD prior to my surgery about 20 times”; “The guided imagery program is wonderful! ... I am very impressed with BSC to have such an awesome program!”; “I can’t say enough about guided imagery”; and “I appreciate BSC doing this program for members. It’s uncommon for insurance companies to care so much about their members!”

It is important to note that the nurse health coach reaching out to the members and making herself available for general question and concerns about the guided imagery or the surgery itself was a critical factor in the success of this program according to 80% of the patients, who reported that the nurse coach added value. Therefore, the high satisfaction rating cannot be attributed to the imagery recordings alone. The program as a whole generated this highly favorable response.

Anxiety

The guided imagery intervention was reported by users to significantly reduce their anxiety about the surgical procedure. During the telephone survey conducted by the program nurse within a week after the surgery, patients who had listened to the audio-recordings (n=669) were asked to rate their experience of anxiety prior to surgery before using the recordings and after using the recordings. Before using the recordings, 47% of patients reported anxiety levels as “high” or “very high.” After listening to the recordings, but still before their surgeries, only 1.6% of patients reported that their anxiety level was still “high” or “very high” (Figure 5). Movement toward decreased anxiety was seen across the board among all self-rated categories; the moderately anxious and barely anxious also benefited from listening to the recordings. But the most dramatic relief was found among those suffering the greatest anxiety, where the ratings virtually plummeted. It is possible that the recordings allowed the highly anxious to focus on a readily available, easy-to-use self-management tool that gave them a sense of control during a vulnerable time.



Anticipated Pain

Listeners also were asked to compare their actual experience of pain with the expectation of pain they had prior to the surgery. Consistent with trends reported in the literature,^{22,24,27,30} the majority of respondents (57%) experienced less pain than expected, and their frequency of guided imagery use tended to be higher than those experiencing no difference in pain or more pain. Unfortunately, it is not within the purview of this study to measure actually differences in the use of analgesics between the study group and the controls. Most patients who listened to the recordings 4 or more times experienced a decreased perception of pain. It is possible that some patients needed to listen to the recording more than 3 times to learn mastery over their pain response. It is also possible that patients responded in the moment (ie. based on the amount of pain they were experiencing when the survey was taken).

Inpatient and Pharmaceutical Costs

Consistent with earlier studies,^{22,24,30} there was an 8% reduction in length of stay for the guided imagery group ($P=.07$), as compared with the controls (Table 2). The guided imagery group stayed in the hospital an average of 2.62 days, whereas the control group stayed an average of 2.85 days. Although this is a less robust finding than what was reported in earlier studies by Dreher³⁰ in 1998 and by Tusek²⁴ in 1997, it is important to note that since the time of those studies, the average length of hospital stay has decreased dramatically. The patients in the Dreher study stayed an average of 5 days and in the Tusek study, 7 days. This explains the greater reductions in length of stay yielded by the earlier studies. Because the length of stay in this sample averaged 2 to 3 days, we can conclude that although the length of stay outcomes are less dramatic, they are consistent.

Perhaps the most startling finding was the 14% overall reduction in total mean charges billed, amounting to a dramatic total cost savings of \$2003.09 per procedure in the guided imagery group ($P=.055$). The average charge for the control group was \$13962, whereas the average charge for the guided imagery group was \$11959. Included in those differential sums but not entirely explaining them was the difference in pharmaceutical charges. The control group billed, on average, \$1964 in medications, as compared with the guided imagery group, which billed \$1695, on average. Along with the 8% reduction in length of stay and the reduced medication costs, other factors driving the claims difference likely would be other hospital services, such as laboratory and radiologic costs associated with complications and increased length of stay. This is conjecture, however. It was not possible to analyze the claims at this refined a level.

CONCLUSION

Retrospective observational data collected from the medical records reveal a significant reduction in patient anxiety and a dramatic savings in surgical charges bill (\$2003 per procedure). Equally notable was the ease of distribution of this program, thanks to the unique capability of a health plan to automatically

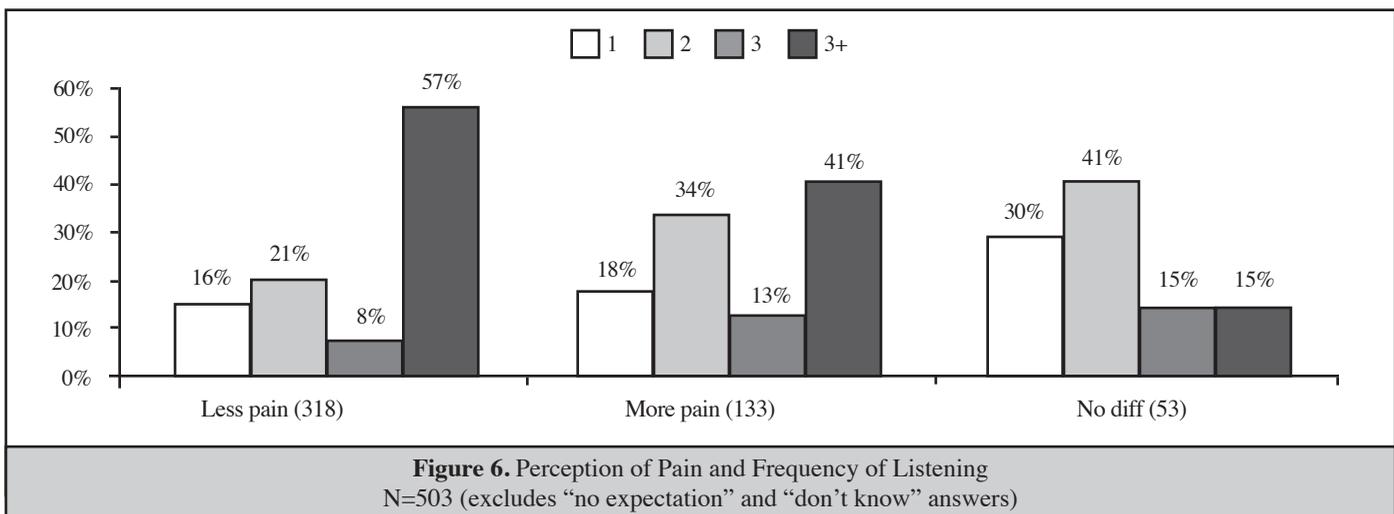


Table 2. Hysterectomy Charges Billed and Length of Stay same facilities, > 2 cases, outliers excluded

	Comparison Group (N=73)	Intervention Group (N=53)	Difference	t-test
Mean total billed	\$13962	\$11959	(\$2003) -14%	P=.055
Mean pharmacy billed	\$1964	\$1695	(\$268) -14%	P=.181
Mean length of stay (days)	2.85	2.62	-0.23 -8%	P=.074

generate preauthorization reports for targeted members. Most impressive was the extreme economy of this program. Allowing for the cost approximately \$40 per case, or 2% of the avoided charges (that is, savings).

The Presurgical Guided Imagery Program launched in BSC demonstrates that distributing portable, self-administered guided imagery recordings to presurgical patients through the vehicle of a health plan is a feasible, economically viable initiative that reduces preoperative anxiety and results in substantial member appreciation and satisfaction.

IMPLICATIONS

The adoption of guided imagery has been hampered in the clinical setting by lack of clinician and patient awareness of this modality as well as budgets already strained to include more favored, conventional practices. Concerns about provider resistance to an intervention that could be negatively characterized as unproven and “new age” did not materialize. Physician reaction was very low in light of the fact that the guided imagery tools were being offered to their patients on a widespread basis. While this may not imply tacit endorsement of presurgical guided imagery, it certainly suggests that any concerns about vocal resistance were unfounded.

Widespread use of tools such as guided imagery in health-care also might be limited by a bias favoring proven pharmaceutical and technological interventions over mind-body approaches. Based on the indications of acceptance and effectiveness, guided imagery should be studied further in controlled settings as a substitute for, or complement to, more costly, standard preoperative regimens, such as pharmacologic or educational interventions dependent on skilled professionals. Given the virtual absence or risk associated with self-administered guided imagery recordings, in addition to the positive outcomes identified in this study, there is ample evidence to continue, expand, and replicate this program in comparable settings.

Health insurance providers, medical groups, and physician networks are in a good position to administer presurgical guided imagery programs because of their centralized patient registries and authorization systems. BSC has continued to distribute the guided imagery tool kit to surgical patients throughout its network. Presently, any BSC member, regardless of his or her health plan, surgery type, or estimated length of stay, can request the guided imagery tool kit, which is featured in newsletters and on the company’s website. In addition, guided imag-

ery tools have also been added to various disease management programs, BSC continues to enjoy strong patient satisfaction results and indications that the outreach program is delivering a unique advancement in patient care.

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