The Effect of Hand Massage on Preoperative Anxiety in Ambulatory Surgery Patients

LEANNE R. BRAND, RN, BA, MA; **DONNA J. MUNROE,** PhD, RN; **JULIE GAVIN,** CR, CMT

ABSTRACT

Anxiety in patients awaiting surgery and diagnostic procedures in an ambulatory department can affect the patient's physiological and psychological well-being and outcome. We conducted a quasi-experimental study at a midwestern US community hospital to determine the effects of hand massage on patient anxiety in the ambulatory surgery setting. We also investigated whether adding the hand massage procedure affected the timing and flow of procedures. The results indicated that hand massage reduces anxiety for patients awaiting ambulatory surgery and outpatient procedures. Participants who received hand massage experienced lower anxiety levels than those who received customary nursing care. In addition, the performance of hand massage did not affect the flow or timing of procedures. Hand massage is an easy procedure for nurses to learn and administer, and it is within the scope of perioperative nursing practice. *AORN J* 97 (June 2013) 708-717. © AORN, Inc, 2013. http://dx.doi.org/10.1016/j.aorn.2013.04.003

Key words: *preoperative anxiety, preprocedure anxiety, day surgery, ambulatory surgery, hand massage, alternative therapy.*

Preparing for an operative or other invasive procedure is typically an anxiety-producing experience for patients. Waiting periods in the preoperative area can contribute to stress by providing time for patients to think and worry about the upcoming procedure.[1-3] Patients often fear that something may go wrong during the procedure or they anticipate being in pain afterward. Anxiety and stress can affect the outcome of the surgery; for example, anxiety is the most common predictor of postoperative pain.[4]

Decreasing patient anxiety is a perioperative nursing practice goal, and the literature discusses several strategies that have been used to reduce patient anxiety in the preoperative period,[5] including music,[6,7] complementary and alternative medication therapies,[8] warming,[9] and teaching,[10,11] and in the use of essential oils[12] and massage.[13,14] Perioperative nurses understand the importance of reducing preoperative anxiety for patients; however, nurses also must balance providing appropriate support to waiting patients with the need for efficiency during and between procedures. Therefore, strategies used in the preoperative setting to manage patient anxiety must be practical and evidence based.

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PURPOSE AND RESEARCH QUESTIONS

We designed this quasi-experimental study to contribute to the growing body of knowledge on nurse management of preoperative patient anxiety in the ambulatory surgical setting. We sought to use a nursing intervention that would be efficient and effective for reducing patient anxiety. We developed the following research questions:

- Does hand massage reduce anxiety for patients awaiting outpatient surgery or other procedures?
- Do preoperative patients who receive hand massage experience lower anxiety than those who receive customary nursing care?
- Does the use of hand massage by perioperative nurses in the ambulatory surgery setting affect the timing and flow of procedures?

LITERATURE REVIEW

Anxiety is considered a normal part of the preoperative experience.[5] Because it is common, however, does not mean it should be ignored. Part of the nurse's role in the perioperative setting is to manage patient anxiety to support positive surgical outcomes and satisfaction with the surgical experience. The shift from inpatient hospital stays for surgery to same day surgery has been monumental; most patients undergoing surgeries that once required an overnight hospital stay now go home within hours of surgery.[3] Unfortunately, nurses and physicians have a fraction of the time they once had to achieve all of the postoperative goals and outcomes, including, but not limited to, pain management and postoperative education.[3]

Grieve[2] described causes of anxiety in the preoperative patient that could be potential barriers to achieving high levels of postoperative comfort, including expectations of pain or discomfort, alteration to body image, unwanted diagnostic results, possible loss of independence, loss of personal identity while in the hospital, uncertainty about the course of postoperative recovery, concerns about family and work, and a feeling that events are out of one's control. Yellen and Davis[15] reviewed the effects of anxiety and found that it can be detrimental to physical and emotional recovery, and that anxiety can contribute to poor outcomes and longer hospitalizations. These researchers also learned that, when patients felt valued and attained a high level of comfort, these beliefs were strong predictors of patient satisfaction.[15]

Anxiety triggers the stress response, stimulating the release of epinephrine and norepinephrine, which raises blood pressure and increases heart rate, cardiac output, and blood glucose levels.[16] Poorly managed anxiety can be life threatening in patients diagnosed with hypertension and coronary artery disease, increasing the chances for myocardial infarction or potential stroke.[16] Anxiety can also have a major effect on psychological symptoms and can inhibit learning, concentration, and routine tasks.[17,18] Keeping anxiety to a minimum is important because, if patients are anxious, then they may be unable to retain important home care instructions. Armed with this knowledge, nurses in the perioperative setting should be concerned about how anxiety can affect the outcomes for all surgical patients.

There is a link between preoperative anxiety and postoperative pain. In their systematic review of predictors for postoperative pain, Ip et al[4] found that anxiety ranked as the highest predictor. The measurable physiological and psychological changes that a patient may experience with anxiety have a direct effect on postoperative outcomes. According to Lin and Wang,[19] unrelieved postoperative pain has a negative effect on patients and delays postoperative recovery. In their literature review, Vaughn et al[18] found studies that correlated anxiety and pain, and concluded that "preoperative planning for patients with high levels of anxiety should be implemented to obtain optimal postoperative pain control."[18(p601)]

In her review of studies for strategies to decrease patient anxiety, Bailey[5] found that perioperative education and music therapy were successful. McRee et al[13] researched the use of music and massage as forms of improving postoperative outcomes. The study was a four-group experimental

design, including three intervention groups and one control group. Patients in group 1 received 30 minutes of massage and listened to 30 minutes of music before surgery, patients in group 2 received 30 minutes of massage before surgery, and patients in group 3 listened to 30 minutes of music before surgery. The control group received standard care. The findings provided evidence that patients who received preoperative music or music with massage had reduced anxiety, stress, and pain.[13]

In their review, Cooke et al[7] identified 12 studies that focused on the effect of music on anxiety in patients waiting for surgery or other procedures in the ambulatory setting. This comprehensive review identified music as being effective in reducing some or all of the anxiety measures in 11 of 12 studies. Other studies of the effects of music interventions in relation to anxiety and pain reduction have similar findings.[6,20] In the review by Nilsson,[20] half of the studies demonstrated that music had a statistically significant effect on reducing both anxiety and pain. Nilsson's review highlighted music as an affordable relaxation technique that can control and reduce perioperative patient distress.[20] The types of music that are relaxing to patients may need to be individualized, however, thus posing challenges to implementing this intervention.

Braden et al[12] studied the use of oil lavandin, which has relaxant and sedative effects, as a means to reduce preoperative anxiety in surgical patients. Patients were randomly assigned to one of three groups: standard care, standard care plus olfactory and topical application of jojoba oil, or standard care plus olfactory and topical application of essential oil lavandin. The researchers found that oil lavandin, an oil "with no known contraindications and low toxicity,"[12(p305)] was very effective in reducing preoperative anxiety in surgical patients. Similar to music, olfactory and topical application of oil lavandin has a low risk of adverse effects and is a cost-effective intervention that has proven successful in lowering patient anxiety on OR transfer.[12] However, the use of essential oils may pose challenges with infection control standards, which often specify the brand name (ie, source) of lotion products that can be used in the health care facility.

Kim et al[14] researched the effects of preoperative hand massage on patient anxiety before and during cataract surgery. Researchers assigned two groups of patients to the hand massage or control groups. They took physiological readings (eg, blood pressure, pulse rate, serum laboratory values) and used a visual analog scale (VAS) to measure anxiety. Patients in the hand massage group exhibited statistically significant decreases in anxiety and levels of epinephrine, norepinephrine, and cortisol. There were no significant differences in either group for blood glucose levels or neutrophil and lymphocyte percentages in white blood cell counts. The researchers concluded that hand massage decreased the psychological and physiological anxiety levels in patients having cataract surgery under local anesthesia.[14]

Of all the alternative methods used to alleviate anxiety in preoperative patients, we identified hand massage as a strategy that was consistent with the time constraints in the perioperative setting. Massage can be readily learned by nursing personnel, surgical patients' hands are easily accessible, and massage can be accomplished in 10 minutes. We were curious to see whether hand massage would improve patient outcomes and overall patient satisfaction. Results of previous research have shown that significant psychological and physiological changes take place after a hand massage.[14] Hand massage is also a high touch nursing care procedure that supports the concept of patients feeling valued and feeling the highest level of comfort during a time of stress and uncertainty.

CONCEPTUAL FRAMEWORK

We used Watson's human caring theory to provide the conceptual framework for our study.[21] Watson stated, "caring science is the essence of nursing and the foundational disciplinary core of the profession."[21(p17)] Furthermore, she suggested that establishing a caring relationship between the

nurse and patient can effectively promote healing and diminish patient fear. Interactions that demonstrate caring within the context of delivering nursing care services are essential to the nurse-patient relationship.[21]

Anxiety is a typical patient response to nursing and medical service delivery.[22] Anxiety can be from pain, fear of the hospital, physical injury, isolation, prognosis, and loss of self-control. Massage, an active form of supportive touch, may reduce anxiety, pain, and muscle tension.[13] In addition, it helps circulation, decreases heart rate and blood pressure, and increases mental relaxation. This form of caring is relatively simple and economical to provide.[22]

Watson's human caring theory[21] is central to the nursing model within our organization. In the pursuit of excellence in caring at our hospital, we look at what comforts (ie, auditory, sensory, tactile, neurological, kinesthetic) we can provide to patients. This involves nurses recognizing factors (eg, stress level, mood, environment, gastrointestinal and genitourinary function, pain) that affect the patient's senses.[23]

Relaxation strategies have been found to be helpful in decreasing patient anxiety.[5] The caring touch of a hand massage provided within the nurse-patient relationship is one therapeutic option that can reduce the patient's affective, physiological, behavioral, and cognitive responses to anxiety. The expected outcome, according to Watson's theory, is improved patient outcomes.[21]

STUDY DESIGN AND SAMPLE

We conducted our study in 2010 and used a quasi-experimental design with pretest and posttest evaluations and nonrandom assignment of patients to the intervention (ie, hand massage) and control groups. The institutional review board of our university and the health system for the hospital gave study approval. We provided information about the study to patients during the customary preoperative telephone contacts. We informed the patients that

Glossary of Massage Techniques

Hypertensive technique: At the midpoint of the skin crease running across the participant's wrist, the nurse holds gentle pressure while moving his or her thumb pad in a very small circular movement. Avoid using the tips of fingers for pressure and for squeezing the hand. Slowly, while still moving the thumb pad in a circular motion, the nurse should "walk" (ie, slowly inch) his or her thumb up the base of the patient's thumb toward the tip.

Jiggle technique: The nurse uses the hollow of his or her palms to cradle the patient's inner and outer wrist while applying pressure in a back-and-forth motion by using the heel of the palm to push the patient's hand from side to side. The nurse should jiggle the patient's hand as fast as possible without losing contact or control of the hand. This technique can elicit trust, allowing the patient to relax his or her forearm and hand.

Petrissage technique: The nurse applies a gentle lifting, squeezing, and rotating motion of the thumb pad, index finger pad, the webbing between each of the patient's fingers, and to the fleshy part of the base of the patient's thumb on the palmar surface.

Rubbing technique: Gently, by using warmed hands, the nurse supports the participant's palm while rubbing the back of the hand and fingers with his or her palm. He or she applies a gentle milking movement to the ulnar and radial side of the participant's hand.

Squeezing technique: The nurse uses his or her thumb pad and index finger pad to apply a gentle squeezing pressure, "walking" (ie, slowly inching) up each of the patient's fingers and the thumb, one by one, from the base to the fingertip.

the purpose of the study was to see whether certain activities would help them feel less anxious as they waited for their procedure, and we instructed all patients to avoid anxiety management medication on the morning of the procedure. At the time of admission to the day surgery unit, we again invited the patients who indicated an interest in participating in the study during the preoperative telephone contact to participate. Those who agreed to participate signed an informed consent for research.

We conducted the study in the ambulatory surgery center of a rural community hospital in the midwestern United States. Employees in the ambulatory center of this hospital perform procedures such as orthopedic and cataract surgery, and diagnostics such as cystoscopy and colonoscopy. We recruited only day surgery patients for the study and excluded patients if they were under 18 years of age, non-English speaking, had experienced a hand injury within the previous 30 days, were unable to see well enough to read, had a cognitive impairment requiring a power of attorney for health care, or were pregnant. We also excluded individuals who arrived for same-day or emergent procedures because they may be experiencing greater anxiety than normal and patients who indicated that they had taken antianxiety medication before coming to the hospital that morning.

We assigned participants to the intervention or control group based on a two-week cycle: for two weeks, we assigned all participants to the hand massage intervention; then, during the next two-week period, we assigned all participants to the control group (ie, no intervention). We followed this pattern for eight weeks.

Instruments

The data collection instrument had two sections: demographic data and the VAS for anxiety.[24] Demographic data included the type of procedure; the patient's age, gender, marital status, surgery and procedure history, current medications, and highest level of education; and methods used for relaxation. We collected these data either directly from the participants or from their medical records.

The VAS is a vertical or horizontal 10-cm line, anchored by terms that represent extremes in the phenomenon under study.[24] The VAS for anxiety is considered an accurate and sensitive measure of state anxiety for ambulatory surgical procedures.[25] Williams et al[26] reported that the VAS correlated well with other anxiety measures ($r = 0.60–0.74$) and concluded that it was a valid and effective measure of anxiety. For our study, we used a vertical 10-cm line anchored with the extremes "the most nervous I have ever been" and "not nervous at all," which is consistent with a previous study.[24] We conducted interrater reliability of the VAS measurement by remeasuring 20% of the data forms at random. We found only three differences of 0.1 cm each ($r = 1$).

Procedures

Julie Gavin, CR, CMT, trained three nursing staff members on the hand massage procedure (Table 1) before the onset of the study. An explanation of the techniques is described in the sidebar. The purpose of the hand massage was to relax the participant by manipulating the soft tissue of the hands. The nurse applied massage in the direction of the participant's heart and began the massage on the participant's dominant hand. He or she massaged each of the patient's hands for five minutes. We conducted multiple hand massage training sessions before the study began. Gavin taught the hand massage techniques and then supervised return demonstrations. By acting as the "patient," Gavin coached the nurses in their performances until all the nurses were consistently competent in the hand massage protocol.

We developed a script and trained the nurses on how to inform patients about the study and about data collection to ensure consistency of information and procedures. Throughout the study, the nurses conducted customary preoperative nursing procedures. They asked each participant to change into a hospital gown, performed nursing assessments,

TABLE 1. Hand Massage Procedure

Slowly, gently, and with purposeful movements
- rub both palms together for warmth before beginning the massage.
- start with the subject's dominant hand.
- gently place your hands on the back of the patient's hand and begin using the rubbing technique.
- apply the jiggle technique.
- face the subject and gently loosen the patient's hand by placing your thumb pad into the center of the patient's palm with your four fingers resting on the dorsal surface of the patient's hand. Move your thumb in a small circular motion, beginning at the center and working toward the base of each finger and thumb.
- apply the hypertensive technique.
- apply the petrissage technique.
- apply the squeezing technique.
- apply the jiggle technique.
- place both of your hands over the massaged hand, giving it one last, gentle, overall rub when you are finished.
- move on to the second hand and repeat.

and invited family members into the preoperative area. The nurses presented each participant with the VAS for anxiety and asked the participant to draw a horizontal line at the "point on the line that best describes how you are feeling right now." For participants receiving the intervention, we then conducted the hand massage procedure. After the hand massage, the nurse initiated an IV and dimmed the lights. For patients in the nonintervention group, the nurse inserted the IV and dimmed lights immediately after asking the patient to draw the line. Immediately before each patient was transported to the OR, a nurse presented each participant with the VAS for anxiety and again asked the patient to draw a horizontal line at the "point on the line that best describes how you are feeling right now."

Data Analysis

We analyzed data by using Statistical Package for the Social Sciences version 18,[27] and we used descriptive measures for the demographic data. Dr Munroe measured the VAS results by using a millimeter ruler. We identified the "not nervous at all" point as zero. We used paired sample *t* tests to compare the means of pre- and postintervention VAS measures for the intervention and control groups. We used independent sample *t* tests to compare intervention and control groups on these measures.

RESULTS

Of the 276 patients scheduled for ambulatory procedures during the study period, 101 (37%) who met the inclusion criteria agreed to participate. Of these, 12 from the intervention group and three from the control group did not complete posttest data collection because of schedule changes that required them to be moved to the procedure room before the posttest could be administered. Therefore, there were 86 participants for whom we had complete data: 45 in the intervention group and 41 in the control group.

The characteristics of the patient groups are described in Table 2. There were no statistically significant differences between the intervention and the control groups. The average age of the patients in the intervention group was 45 years, and the average age of patients in the control group was 41 years. The majority of participants were women and married, and were undergoing a colonoscopy. The majority of participants had a history of a previous surgical or diagnostic procedure. Many of the participants reported the use of music, prayer, or deep breathing for relaxation. A small proportion

TABLE 2. Comparison of Patient Characteristics at Baseline

	Control (n = 41)			Intervention (n = 45)			*t* Test		
	n	Mean	SD	n	Mean	SD	*t*	*df*	*P*
Age	41	54.56	14.54	45	57.87	13.82	1.08	84	.283
Baseline - reported anxiety	41	3.28	2.80	45	2.61	2.24	−1.23	84	.221
	n	Percentage		n	Percentage		χ^2	*df*	*P*
Female gender	25	61.0		30	66.7		0.30	1	.583
Married	36	87.8		34	75.6		2.54	3	.468
Some college	14	34.1		14	31.1		2.56	3	.464
Colonoscopy	22	53.7		26	57.8		3.70	5	.594
History of a previous procedure	39	95.1		44	97.8		0.45	1	.503
Anxiety management activities*									
	n	Percentage		n	Percentage		χ^2	*df*	*P*
Music	15	36.6		18	40.0		0.17	1	.683
Breathing	5	12.2		4	8.9		0.22	1	.642
Biofeedback	0	0		1	2.2		0.94	1	.332
Prayer	8	19.5		15	33.3		2.29	1	.131
Massage	3	7.3		6	13.3		0.90	1	.344
Aromatherapy	2	4.9		0	0		2.20	1	.138
Medication	5	12.2		11	2.4		2.28	1	.131
Other	19	46.3		13	28.9		2.80	1	.094

SD = standard deviation.

** Some patients used more than one anxiety-management activity.*

TABLE 3. Reported Anxiety at Baseline and Postintervention

	Baseline			Postintervention			*t* Test		
	n	Mean	SD	n	Mean	SD	*t*	*df*	*P*
Intervention	45	2.61	2.24	45	1.31	1.69	4.85	44	.000
Control	41	3.28	2.80	41	2.89	2.58	1.34	40	.187

SD = standard deviation.

of patients (ie, 11 in the intervention group, five in the control group) reported that they used prescription medication for relaxation. However, if on the day of surgery, a potential subject indicated that he or she had used prescription medication for anxiety that morning, we excluded that patient from the study.

Research question 1. Does hand massage reduce anxiety for patients awaiting outpatient surgery or procedures? At baseline, the mean VAS measurement for the 45 participants who received the hand massage intervention was 2.61 (standard deviation [SD] = 2.24). The postintervention mean was 1.31 (SD = 1.69). We found a statistically significant decrease in the postintervention anxiety measure ($t = 4.85$, $P < .0001$). For the control group, the mean VAS measurement also decreased, from 3.28 (SD = 2.80) to 2.89 (SD = 2.58). However, this

TABLE 4. Comparison of Reported Baseline and Postintervention Anxiety Levels Between Intervention and Control Groups

	Intervention			Control			*t* Test		
	n	Mean	SD	n	Mean	SD	*t*	*df*	*P*
Baseline	45	2.61	2.24	41	3.28	2.80	−1.234	84	.062
Postintervention	45	1.31	1.69	41	2.89	2.58	−3.372	84	.001

SD = standard deviation.

change was not statistically significant ($P = .187$). These findings are described in Table 3.

Research question 2. Do preoperative patients who receive hand massage experience lower anxiety than those who receive customary nursing care? We compared the mean VAS measurement between the intervention and control groups. At baseline, the mean VAS measurement was 2.61 (SD = 2.24) for the hand massage participants and 3.28 (SD = 2.80) for the control group. Although participants in the intervention group did have a lower mean anxiety measure at baseline, the difference between the two groups was not statistically significant ($P = .062$).

At postintervention, the mean VAS measurement for participants in the intervention group was 1.31 (SD = 1.69), and it was 2.89 (SD = 2.58) for the participants in the control group. The mean VAS measurement for the intervention group was significantly lower than for the control group ($t = -3.372$; $P = .001$). These findings are described in Table 4.

Research question 3. Does the use of hand massage by perioperative nurses in the ambulatory surgery setting affect the timing and flow of procedures? We found that performing a hand massage did not disrupt the flow of procedures to the procedure rooms during the study period. We did have 12 participants in the intervention group and three in the control group who did not complete the postintervention VAS measurement because of an accelerated timeline of procedures on those days. However, the hand massage was accomplished well within the usual waiting period for ambulatory procedures at our facility.

DISCUSSION

Our findings suggest that preoperative hand massage has a significant effect on patient-reported anxiety in the ambulatory surgical setting. All of our participants reported some anxiety while awaiting their procedures. This is similar to findings by Leach et al,[1] who noted that 44% of their sample reported anxiety in anticipation of surgical procedures. In the waiting area, all the participants reported a decrease in anxiety immediately before transfer to the procedure room. However, those who received hand massage reported a significantly lower anxiety level. This is consistent with the findings of Kim et al,[14] who found that hand massage decreased psychological and physiological anxiety for cataract surgery patients.

The hand massage that nurses used in our study was easily taught, and we determined it to be within the scope of perioperative nursing practice. Similarly, two additional studies support that massage is within the scope of perioperative nursing practice.[13,28] Quattrin et al[28] had nurses provide foot massage to patients undergoing chemotherapy treatments, and McRee et al[13] had nurses provide massage therapy to preoperative patients.

We found that hand massage facilitated being able to start the IV in the preoperative area, which was an unexpected and positive finding for both nurses and patients. It seemed that the hand massage facilitated vasodilatation because of the warmth of the nurses' hands and the tactile stimulation of massage. Hand massage was well received by our patients. Since the cessation of the study, several returning patients have requested hand massage.

Although all perioperative nurses were supportive of the study, we find it challenging to convince more nurses to learn the hand massage intervention. Currently only four nurses, including the unit director, are trained to perform the procedure. We speculate that some nurses may be uncomfortable with the degree of familiarity or intimacy that exists during the hand massage procedure. Nurses who performed the hand massage reported a more personal "connection" with the patient that is inherent to massage. In addition, conducting hand massage requires the nurse to remove him- or herself from the bustling activity of nursing care in the unit and to slow down to achieve a therapeutic moment with the patient. For some nurses, this change in focus throughout the day may be challenging. We are contemplating strategies to provide incentives via performance evaluations for nurses who take the hand massage training and implement it in the clinical setting. In addition, as new nurses are hired for the unit, we are explicit with the expectation that they will learn hand massage and incorporate this nursing intervention into their practice.

Limitations

We identified several limitations of our study. Limited statistical power because of the sizes of our samples (n = 45, n = 41) may have affected the significance of the statistical comparisons we conducted. A post hoc power analysis revealed that, for the independent-sample *t* tests, our sample sizes were well within recommended levels (intervention group, $r = 0.9066$; control group, $r = 0.8778$). However, when comparing the intervention and control groups, we would need a sample size of approximately 65 participants in each group to obtain statistical power at the $r = .80$ level. The nonsignificance of the baseline comparison between the intervention and control groups may be because of our small sample sizes.

We used one setting, and our sample was too small to allow us to adequately analyze the effect of select participant characteristics (eg, strategies used to manage anxiety) and type of procedure on reported anxiety. In addition, our sample was primarily women, and this group may be more receptive to hand massage than men. We did not control for the effects of family member presence on anxiety during the preoperative waiting period. In addition, the hand massage provided the opportunity for additional attention from the nurse, which may itself decrease anxiety.

RECOMMENDATIONS FOR FUTURE RESEARCH

We believe that our study adds to the literature related to complementary alternative therapies for anxiety management. We recommend that future studies use larger and more culturally and gender-diverse groups as well as multiple sites. The use of physiological measures of anxiety, such as blood pressure and heart rate, also would add credibility to the self-report of anxiety by the participants. We encourage further investigation into the reluctance of nurses to engage in hand massage with patients. Finally, controlling for family member presence and procedure type would help to target those patients who would derive the greatest benefit from hand massage.

CONCLUSION

Preoperative hand massage has been shown to be an important patient satisfaction indicator for our patients, based on independent survey scores. Adopting the hand massage procedure has fundamentally changed how we care for our patients. Collectively, our nursing staff members are more aware of patients' nonmedical needs and what role nurses can play to best improve our patients' overall ambulatory surgery experience. AORN

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Leanne R. Brand, RN, BA, MA, is the former surgical services director, Valley West Community Hospital, Sandwich, IL, and the current manager for the Centers of Digestive Health and Pain Clinic, Rush-Copley Medical Center, Aurora, IL. *Ms Brand has no declared affiliation that could be perceived as posing a potential conflict of interest in the publication of this article.*

Donna J. Munroe, PhD, RN, is a professor in the School of Nursing and Health Studies at Northern Illinois University, DeKalb, IL. *Dr Munroe has no declared affiliation that could be perceived as posing a potential conflict of interest in the publication of this article.*

Julie Gavin, CR, CMT, is a former surgical services technologist, a certified reflexologist (CR), and a certified massage therapist (CMT), Valley West Community Hospital, Sandwich, IL, and is currently a CMT and surgical technologist for the Center for Digestive Health and Pain Clinic at Rush-Copley Medical Center, Aurora, IL. *Ms Gavin has no declared affiliation that could be perceived as posing a potential conflict of interest in the publication of this article.*