**ORIGINAL RESEARCH**

**Integrating Massage Therapy Into the Health Care of Female Veterans**

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**Background:** Female veterans experience higher rates of chronic pain, depression, and anxiety than do male veterans. Gynecologic examinations and procedures can be stressful, painful, and anxiety provoking. Research has shown that massage can help reduce pain and anxiety. The purpose of this study was to examine the relationship between massage and well-being in female veterans.

**Methods:** A pre- and postvisit study design was used. In advance of their clinic visit, female veterans were asked by clinic staff whether they would like a relaxation massage in conjunction with their visit. Effleurage massages were administered by licensed volunteer massage therapists in a private space and performed on the back, neck, hands/arms, legs/feet. Patients rated their pain intensity, pain unpleasantness, anxiety, shortness of breath, relaxation, and inner peace pre- and postmassage on 0 to 10 scales. Demographics and data were abstracted from the medical records.

**Results:** Results are based on the first massage received by 96 individuals: A majority of participants were aged ≤ 40 years (53%) and were White women (68%). Most (70%) were scheduled for an invasive procedure (eg, pelvic examination, biopsy). Seventy-nine percent had a history of chronic pain; 65% had a diagnosis of depression. Mean scores for pain intensity decreased by 1.9 points, pain unpleasantness by 2.0, and anxiety by 2.4. Relaxation increased by 4.3 points and sense of inner peace by 3.5 points. These changes were all statistically significant (P < .001).

**Conclusions:** Results from this pilot study suggest massage therapy may be an effective, inexpensive, and safe treatment for pain and/or anxiety in female veterans attending a gynecology appointment. Further research should assess the effects of massage therapy in female veterans with chronic pain and coexistent mental health conditions.

Here are approximately 2 million female veterans in the United States, representing about 10% of the veteran population.¹ In 2015, 456,000 female veterans used the US Department of Veterans Affairs (VA) health care services. The VA predicts an increase in utilization over the next 20 years.²

Female veterans are more likely to have musculoskeletal disorder multimorbidity compared with male veterans and have higher rates of depressive and bipolar disorders, anxiety, and posttraumatic stress disorder (PTSD).³,⁴ Compared with male veterans, female veterans are younger, more likely to be unmarried and to have served during the wars in Iraq and Afghanistan.³ Fifty-five percent of women veterans vs 41% of men veterans have a service-connected disability, and a greater percentage of women veterans have a service connection rating > 50%.³ The top service-connected disabilities for women veterans are PTSD, major depressive disorder, migraines, and lumbosacral or cervical strain.² In addition, one-third of women veterans using VA health care report experiencing military sexual trauma (MST).⁵ Military service may impact the health of female veterans both physically and mentally. Providing treatments and programs to improve their health and their health care experience are current VA priorities.

The VA is changing the way health care is conceptualized and delivered by implementing a holistic model of care known as Whole Health, which seeks to empower and equip patients to take charge of their health, blending conventional medicine with self-care and complementary and integrative health (CIH) approaches, such as massage therapy, yoga, acupuncture, and meditation.⁷ CIH therapies can help improve physical and mental health with little to no adverse effects.⁸⁻¹⁰

As part of the Whole Health initiative at the VA Ann Arbor Healthcare System (VAAAHS) in Michigan, the massage program was expanded in 2017 to offer relaxation massages to female veterans attending the women’s health clinic, which provides gynecologic care. Patients visiting a gynecology clinic often experience anxiety and pain related to invasive procedures and examinations. This is especially true for female veterans who experienced MST.¹¹ VAAAHS has 1 staff massage therapist (MT). To expand the program to the women’s health clinic, volunteer licensed MTs were recruited and trained in specific procedures by the staff MT.
Several studies have demonstrated the effect of therapeutic massage on pain and anxiety in predominantly male veteran study populations, including veterans needing postsurgical and palliative care as well as those experiencing chronic pain and knee osteoarthritis.\textsuperscript{12-16} Little is known about the effects of massage therapy on female veterans. The purpose of this pilot study was to examine the effects of massage therapy among female veterans participating in the women’s health massage program.

\section*{METHODS}

The setting for this pre-post intervention study was VAAAHS. Veterans were called in advance by clinic staff and scheduled for 60-minute appointments either before or after their clinic appointment, depending on availability. MTs were instructed to provide relaxation massage using Swedish massage techniques with moderate pressure, avoiding deep pressure techniques. Swedish massage was selected to compare with previous veteran studies and because these techniques were approved for delivery by volunteer MTs. Massages were given in a private space on a massage table and were limited to the back, neck, head/face, and extremities.

The volunteer MTs gave the participants a survey to provide comments and to rate baseline pain and other symptoms prior to and following the massage. The MT left the room to provide privacy while completing the survey. The staff included the symptom data in the massage note as clinical outcomes and entered them into the electronic health record. Massages were given from October 1, 2017 to June 30, 2018. Data including symptom scores, demographics, the presence of chronic pain, mental health diagnoses, patient comments, and opioid use were abstracted from the electronic health record by 2 members of the study team and entered into an Excel database. This study was approved by the VAAAHS Institutional Review Board.

\section*{Study Measures}

Pain intensity, pain unpleasantness (the affective component of pain), anxiety, shortness of breath, relaxation, and inner peace were rated pre- and postmassage on a 0 to 10 scale. Shortness of breath was included due to the relationship between breathing and anxiety. Inner peace was assessed to measure the calming effects of massage therapy. Beck and colleagues found the concept of inner peace was an important outcome of massage therapy.\textsuperscript{17} The scale anchors for pain intensity were “no pain” and “severe pain”; and “not at all unpleasant” and “as unpleasant as it can be” for pain unpleasantness. For anxiety, the anchors were “no anxiety” and “as anxious as I can be.” Anchors for relaxation and inner peace were reversed so that a 0 indicated low relaxation and inner peace while a 10 indicated the highest state of relaxation and inner peace.

Chronic pain was defined as pain existing for > 3 months. A history of chronic pain was determined from a review and

\begin{table}[h]
\centering
\caption{Patient Demographics (N = 96)}
\begin{tabular}{|l|c|}
\hline
Variables & Results, No. (%) \\
\hline
Age, y & \\
21-40 & 51 (53) \\
> 40 & 45 (47) \\
\hline
Race & \\
White & 65 (68) \\
African American & 19 (20) \\
\hline
Married & 32 (33) \\
\hline
Previous massage & 77 (80) \\
\hline
Opiate use & \\
Current & 7 (7) \\
Previously & 3 (3) \\
\hline
Chronic pain & 76 (79) \\
\hline
Migraine diagnosis & 29 (30) \\
\hline
Mental health diagnoses & \\
Posttraumatic stress disorder & 30 (31) \\
Depression & 62 (65) \\
Anxiety & 42 (44) \\
\hline
Timing of massage & \\
Before appointment & 79 (82) \\
After appointment & 3 (3) \\
Unknown & 6 (6) \\
No women’s health appointment & 8 (8) \\
\hline
Invasive procedure performed during visit & 67 (70) \\
\hline
\end{tabular}
\end{table}

*Procedures include pelvic examination, removal, or insertion of intrauterine device, removal or insertion of implant, incision and drainage, biopsy, and colposcopy.
synthesis of primary care and specialty care recorded diagnoses, patient concerns, and service-connected disabilities. The diagnoses included lumbosacral or cervical strain, chronic low back, joint (knee, shoulder, hip, ankle), neck, or pelvic pain, fibromyalgia, headache, migraine, osteoarthritis, and myofascial pain syndrome. The presence of mental health conditions, including depression, anxiety, bipolar disorders, and PTSD, were similarly determined by a review of mental health clinical notes. Sex was determined from the gynecology note.

**Statistical Analysis**
Means and medians were calculated for short-term changes in symptom scores. Due to skewness in the short-term changes, significance was tested using a nonparametric sign test. Significance was adjusted using the Bonferroni correction to protect the overall type I error level at 5% from multiple testing. We also assessed for differences in symptom changes in 4 subgroups, using an unadjusted general linear model: those with (1) chronic pain vs without; (2) an anxiety diagnosis vs without; (3) depression vs without; and (4) a PTSD diagnosis vs without. Data were analyzed using SPSS 25 and SAS 9.4.

**RESULTS**
Results are based on the first massage received by 96 unique individuals (Table 1). Fifty-one (53%) patients were aged 21 to 40 years, and 45 (47%) were aged ≥ 41 years. Most participants (80%) had had a previous massage. Seven (7%) participants were currently on prescription opioids; 76 (79%) participants had a history of one or more chronic pain diagnoses (eg, back pain, migraine headaches, fibromyalgia) and 78 (81%) had a history of a mental health diagnosis (eg, depression, anxiety, PTSD). Massage sessions ranged from 30 to 60 minutes; most patients received massage therapy for 50 minutes.

Prior to massage, mean scores were 3.9 pain intensity, 3.7 pain unpleasantness, 3.8 anxiety, 1.0 shortness of breath, 4.0 relaxation, and 4.2 inner peace. Short-term changes in symptom scores are shown in Table 2. The mean score for pain intensity decreased by 1.9 points, pain unpleasantness by 2.0 points, anxiety by 2.4 points. The greatest change occurred for relaxation, which increased by 4.3 points. All changes in symptoms were statistically significant ($P < .001$). For subgroup comparisons, there were no significant differences in symptom scores for patients with a diagnosis of anxiety vs without and depression vs without (Table 3). However, anxiety in patients diagnosed with PTSD decreased by 3.3 points compared with 2.0 in patients without PTSD ($P = .005$). For patients with chronic pain, inner peace increased 3.9 points compared with an increase of 2.0 in patients without chronic pain ($P = .002$).

Verbal feedback and written comments about the massage experience were all favorable: No adverse events were reported.

<p>| TABLE 2 Short-Term Change in Symptom Scores in All Patients After Massage |
|---------------------------------|----------|-----------------|--------|--------|</p>
<table>
<thead>
<tr>
<th>Symptoms</th>
<th>No.</th>
<th>Mean (SD)*</th>
<th>95% CI</th>
<th>Median#</th>
<th>IQRc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain intensity</td>
<td>95</td>
<td>1.9 (1.8)</td>
<td>1.7 - 2.1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Pain unpleasantness</td>
<td>95</td>
<td>2.0 (1.8)</td>
<td>1.6 - 2.4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Anxiety</td>
<td>95</td>
<td>2.4 (2.2)</td>
<td>2.0 - 2.9</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Shortness of breath</td>
<td>95</td>
<td>0.7 (1.8)</td>
<td>0.3 - 1.1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Relaxation</td>
<td>95</td>
<td>4.3 (2.2)</td>
<td>3.8 - 4.7</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Inner peace</td>
<td>93</td>
<td>3.5 (2.4)</td>
<td>3.0 - 3.9</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Abbreviation: IQR, interquartile range.
*All changes are calculated so that large positive values correspond to large improvement in symptom.
#For every symptom, a 1-sided sign test for median change scores being > 0 gave a $P < .001$; $P < .01$ corresponds to evidence for a significant short-term improvement, adjusting for multiple comparisons.
+Calculated as 75th percentile minus 25th percentile.
DISCUSSION

Massage therapy may be a useful treatment for female veterans experiencing chronic pain, anxiety disorders, depression, or situational anxiety related to gynecologic procedures. After receiving a relaxation massage, female veterans reported decreased pain intensity, pain unpleasantness, and anxiety while reporting increased relaxation and feelings of inner peace. The effects of massage were consistent for all the symptoms or characteristics assessed, suggesting that massage may act on the body in multiple ways.

These changes parallel those seen in a palliative care population primarily composed of male veterans. However, the female veterans in this cohort experienced greater changes in relaxation and feelings of inner peace, which may be partly due to relief of tension related to an upcoming stressful appointment. The large mean decrease in anxiety level among female veterans with PTSD is notable as well as the larger increase in inner peace in those with chronic pain.

Many patients expressed their gratitude for the massage and interest in having access to more massage therapy. Female patients who have experienced sexual trauma or other trauma may especially benefit from massage prior to painful, invasive gynecologic procedures. Anecdotally, 2 nurse chaperones in the clinic mentioned separately to the massage program supervisor that the massages helped some very anxious women better tolerate an invasive procedure that would have been otherwise extremely difficult.

Female veterans are more likely to have musculoskeletal issues after deployment and have higher rates of anxiety, PTSD, and depression compared with those of male veterans. Determining relationships between and causes of chronic pain, depression, and PTSD is very challenging but the increased prevalence of chronic pain and comorbid mental health conditions in female veterans may be partially related to MST or other trauma experiences.

Female veterans are most likely to have more than one source of chronic pain. Female patients with chronic musculoskeletal pain report more pain-related disability. Furthermore, greater disability in the context of depression is reported by women with pain compared with those of men. Most (78%) female veterans in a primary care population reported chronic pain. Similarly, 79% of the female veterans in this study population had chronic pain and 81% had a history of mental health disorders, including depression, anxiety, and PTSD.

Studies have shown that massage therapy improves pain in populations experiencing chronic low back, neck, and knee pain. A 2020 Agency for Healthcare Research and Quality review determined there is some evidence that massage therapy is helpful for chronic low back and neck pain and fibromyalgia. Research also has demonstrated that massage reduces anxiety and depression in several different population types. Li and colleagues showed that foot massage increased oxytocin levels in healthy males. Although further research is needed to determine the mechanisms of massage therapy, there are important physiologic effects. Unlike most medications, massage therapy is unique in that it can impact health and wellness through multiple mechanisms; for example, by reducing pain, improving mood, providing a sense of social connection and/or improving mobility.

Patients using CIH therapies report greater awareness of the need for ongoing engagement in their own care and health behavior changes. MTs provide health education and can refer patients to educational resources or programs. While talking to the MT, patients often feel comfortable discussing their exercise or eating habits. Therefore, access to massage therapy may serve as a doorway to other therapies and educational opportunities offered within the Whole Health program or other integrative health care programs, including health coaching, health education and wellness classes, and other CIH therapies. Exploring how massage can lead to self-care and health behavior changes is an opportunity for further research.

Driscoll and colleagues reported that women veterans are interested in conservative treatment for their chronic musculoskeletal pain and are open to using CIH therapies. Research suggests that veterans are interested in and, in some cases, already using massage therapy. Access to massage therapy and other CIH therapies offers...
patients choice and control over the types and timing of therapy they receive, exemplified by the 80% of patients in our study who previously received a massage and sought another before a potentially stressful situation.

Access to massage therapy or other CIH therapies may reduce the need for more expensive procedures. Although research on the cost-effectiveness of massage therapy is limited, Herman and colleagues did an economic evaluation of CIH therapies in a veteran population, finding that CIH users had lower annual health care costs and lower pain in the year after CIH started. Sensitivity analyses indicated similar results for acupuncture, chiropractic care, and massage but higher costs for those with 8 or more visits.44

The prevalence of comorbid mental health conditions with MSD suggests that female veterans may benefit from multidisciplinary treatment of pain and depression.3,26 Women-centered programs would be both encouraging and validating to women.39 Massage therapy can be combined with physical therapy, yoga, tai chi, and meditation programs to improve pain, anxiety, strength, and flexibility and can be incorporated into a multimodal treatment plan. Likewise, other subpopulations of female veterans with chronic pain, mental health conditions, or cancer could be targeted with multidisciplinary programs that include massage therapy.

**Limitations**
This study has several limitations including lack of a control group, a self-selected population, the lack of objective biochemical measurements, and possible respondent bias to please the MTs. Eighty percent had previously experienced massage therapy and may have been biased toward the effects of massage before receiving the intervention. The first report of the effects of massage therapy in an exclusively female veteran population is a major strength of this study.

Further research including randomized controlled trials is needed, especially in populations with coexisting chronic pain and mental health disorders, as is exploring the acceptability of massage therapy for female veterans with MST. Finding viable alternatives to medications has become even more important as the nation addresses the challenge of the opioid crisis.45,46

**CONCLUSIONS**
Female veterans are increasingly seeking VA health care. Although further research is needed, results from this pilot study
suggest massage therapy may be an effective, inexpensive, and safe treatment for pain and/or anxiety in female veterans. Massage may be especially beneficial for female veterans who experience both chronic pain and mental health conditions. Providing female veterans with access to massage therapy may encourage better self-care and utilization of other Whole Health services, leading to overall improved health and well-being. VA Whole Health programs should consider targeting female veterans for massage therapy services.

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Ethics and consent
This study was approved by the Veterans Affairs Ann Arbor Healthcare System Institutional Review Board.

References


27. Keogh E, McCracken LM, Eccleston C. Gender moderates the association between depression and disability in chronic pain patients. Eur J Pain. 2006;10(9):413-422. doi:10.1016/j.ejpain.2005.05.007


