The effects of Shiatsu on Lower Back Pain

Linda H. Brady, R.N., Ph.D.
Drake University

Kathryn Henry, Ph.D., L.M.T., O.B.T.
James R Luth, 11, L.M.T., O.B.T., E.M.T.
T'he Shiatsu Clinic and School

Kimberly K. Casper-Bruett, M.S.N.
Winterset Iowa Community School System

Shiatsu, a specific type of massage, was used as an intervention in this study of 66 individuals complaining of lower back pain. Each individual was measured on stateltrait anxiety and pain level before and afterfour shiatsu treatments. Each subject was then called 2 daysfollowing each treatment and asked to quantify the level of pain. Both pain and anxiety decreased significantly over time. Extraneous variables such as gender, age, gender of therapist, length of history with lower back pain, and medications takenfor lower back pain did not alter the significant results. These subjects would recommend shiatsu massagefor others sufferingfrom lower back pain and indicated the treatments decreased the major inconveniences they experienced with their lower back pain.

Lower back pain is at epidemic levels in the United States; up to 80% of all adults suffer at some time from this condition. Back pain is the leading reason for physician office visits, hospitalization and surgery, and work disability in the United States (Deyo, Cherkuin, Conrad, & Vohnn, 1991). Despite the variety of treatments available for lower back pain, no clear choice of an effective treatment has been documented (Deyo, 1983). Sarno (1998) indicated that the annual cost of medical care and disability compensation related to back pain may

soon **reach** $50 billion in the United States. Because conventional medical practice is unable to cure a large percentage of adults complaining of lower back pain, it is understandable that those who suffer from back pain are looking for alternative or complementary therapies to help alleviate this condition (Deyo, 1998).

Complementary and alternative care therapies include such measures as acupressure and massage (Astin, Marie, Pefletier, Hansen, & Haskell, 1998; Drivdahl & Miser, 1998; Eisenberg et al., 1998). The use of at least one of the complementary therapies in the United States increased from 33.8% in 1990 to 42.1% in 1997, with massage among the fastest growing of the therapies (Eisenberg et al., 1998).

Ferrell-Torry and Glick (1993) investigated the use of therapeutic massage to modify anxiety and perceived pain in cancer patients. Spielberger's (1983) State-Trait Anxiety Inventory was used to measure anxiety, and a visual analog scale was used to measure perceived pain. Therapeutic massage consisted of effleurage, petrissage, and myofascial trigger point therapy for 30 minutes on two consecutive evenings for nine clients. Anxiety and pain scores were measured before and after each of the two treatments. Massage therapy signfficantly reduced the levels of pain and anxiety.

Shiatsu, which literally means finger pressure (Luth & Henry, 2000), is derived from an ancient form of holistic Chinese medicine that combines massage and acupressure and has been in existence for more than 2,000 years (Fields, 1995; Stevenson, 1995). Defined as the medicinal art of applying thumb and finger pressure to acupuncture points (Luth & Henry, 1999), shiatsu is based on finding and treating areas of heightened neurological activity or hypercontractivity of the muscles (Luth & Henry, 2000). Life force, or qi, encompasses the two opposing energy forces, yin and yang, that flow through all things and follow pathways through the body. It is thought that an imbalance, depletion, or blockage of this energy results in certain symptoms that are treated by the therapist applying firm, gentle pressure to certain points to restore balance (Booth, 1993; Maxwell, 1997; Stevenson, 1995). Shiatsu massage, therefore, combines a knowledge of massage, which people have used for centuries to heal their aches and pains, with energy pathways that are interconnected and provides a holistic tableau for addressing mind, body, and spirit (Luth &
Henry, 2000).

Although Smith (1991) argued that most of Western medicine clinical practice has simply been taken for granted and does not rest on scientific findings, practices formerly seen as alternative or complementary are now being used more and more frequently in traditional patient care (Dossey, 1999; "The Mainstreaming of Alternative Medicine," 2000).

Although there are many different types of massage (jahnke, 1985; Owens & Ehrenreich, 1991), there is little research to demonstrate the scientific effectiveness of specific types of massage, including shiatsu. This study will add scientific findings to the body of knowledge about massage, specifically that of shiatsu massage.

T'he nurse has a responsibility to educate and support patients seeking answers to chronic health problems that traditional medicine may not be able to relieve. To provide the education consumers need to make informed choices, nurses must have reliable research studies on which to base treatment recommendations and referrals.

Lower back pain is a problem encountered by a great many adults (Deyo et al., 1991). Anxiety often accompanies pain, has been accused of being the cause of lower back pain (Lampe et al., 1998), and may be a factor for an individual anticipating his or her first massage. The purpose of this study was to explore the effects of shiatsu on the pain and anxiety associated with lower back pain.

MET'HOD

Design

A quasi-experimental pretest-posttest single-group design was used to answer the following six research questions:

1. Does lower back pain of adults differ significantly before and after each of four shiatsu treatments?
2. Does lower back pain of adults differ significantly at the completion of a shiatsu treatment and 2 days following the treatment?
3. Does anxiety of adults complaining of lower back pain differ significantly before and after each of four shiatsu treatments?
4. Does the pain or anxiety experienced by adults complaining of lower back pain differ as a function of gender, age, the gender of the shiatsu therapist, medications taken prior to the study, type of hobbies, type of employment, years of low back pain, or history with shiatsu massage?
5. Does shiatsu massage significantly decrease the major inconveniences experienced by adults with lower back pain?
6. Would adults who experienced four shiatsu treatments for lower back pain recommend this treatment approach to their friends or relatives with a similar condition?

Sample

Inclusion criteria for participants in the study were older than the age of 18, have no open sores or lesions on their back, have no diagnosis of bone cancer, complaining of lower back pain, and agree to undergo four shiatsu treatments in a 4- to 8-week period. Potential subjects were informed that the benefits of their participation in this study included receiving four shiatsu treatments at a reduced rate as well as experiencing the therapeutic effects of shiatsu as an adjunct to their routine plan of medical care.

There were 66 participants in the study, 39 (59%) women and 27 (41%) men. Participants' ages ranged from 18 to 68, with an average age of 39.58. Thirteen of the participants (19.6%) indicated they had had a shiatsu massage treatment previously; 53 (81.4%) of these participants, therefore, had their first shiatsu treatment at the beginning of this study. AU participants in this study were Caucasian.

Men indicated an average of 7.7 years of lower back pain, and the women indicated an average of 9.6 years. Of the participants, 23 (34.8%) were under the care of a health professional for their lower back pain, 9 seeing medical doctors and 14 seeing chiropractors. Seventeen of these 23 first visited the health care professional about their lower back pain within the previous 7 months. Only 28 (42%) indicated they had ever had any diagnostic tests regarding their lower back pain, and 12 of them were diagnosed within the last 2 years. Seven participants were diagnosed 2 to 4 years ago, and the remaining 9 were diagnosed between 5 and 20 years ago.

The four most frequent responses to questions about illness or conditions experienced at the beginning of the study were neck pain (n = 38,57.5%), upper back pain (n = 31,46.9%), headaches (n = 28,42.4%), and joint pain (n = 26, 39.3%).

Instruments

Pain was measured as the respondent's self-report using the Visual Analogue Scale (VAS) (Huskisson, 1974). The VAS is widely recognized as a valid and reliable tool for measuring an individual's perception of his or her own pain (Huskisson, 1974; Pope et al., 1994). The VAS possesses both concurrent validity and discriminant validity (Gift, 1989), and the reliability of the VAS has been demonstrated as r =.71 using a test-retest method (Reville, Robinson, Rosen, & Hogg, 1976). The VAS is a 10-centixneter line marked from 0, meaning no *pain,* to 100, meaning *pain as bad as can be.* The respondent was asked to mark or identify the position between the two extremes that best described the degree of pain intensity being experienced at that moment. The test-retest reliability of the VAS as used with this sample was r = .621.

Anxiety was measured using the State-Trait Anxiety Inventory (Spielberger, 1983). Developed in 1966, this inventory has been used more extensively in psychological research than any other anxiety measure (Buros, 1978). Trait anxiety is a measure of one's general perceptions of stressful situations, whereas state anxiety is a measure of one's anxiety at that moment in time (Spielberger, 1983). The test-retest reliability coefficients for each inventory ranged from.27 to .86, and the measures of internal consistency, such as the alpha coefficient, demonstrated a median coefficient of .93 for the samples of working adults. Construct validity has been determined for both instruments, as have high correlations (r =.90 to r =.94) between these instruments and other tools of anxiety measurement (Spielberger, 1983).

T'he test-retest reliability coefficient for the state anxiety instrument in this sample was r =.647, and it was r =.886 for the trait anxiety instrument. For the participants in this study, internal consistency was demonstrated by the alpha coefficient that ranged from.82 to.93 on the state anxiety instrument and .90 to .95 for the trait anxiety instrument.

Each instrument contains 20 questions that are answered using a 4-point Likert scale. On the state inventory, the responses range from *not at all* to *very much so.* On the trait inventory, the responses range from *almost never to almost always.* The least anxiety possible on each scale is a score of 20, whereas the greatest anxiety on each scale is a score of 80.

A demographic questionnaire developed by the research team asked the participants to identify their age, gender, type of employment, hobbies, history with lower back pain, any pain medication(s) they were taking, and five inconveniences they were experiencing due to their lowerback pain. An exit questionnaire, also developed by the research team, asked participants to indicate medication(s) taken during the study, how the treatments had affected the major inconveniences of lower back pain they had identified at the beginning of the study, and if they would recommend shiatsu treatments to friends or relatives with a similar complaint. The final component of the exit questionnaire was an open-ended question that invited participants

to write anything they wished about shiatsu, the therapists, or the research study.

Procedures

This study was approved by the university's institutional review board for human subjects. Volunteer participants were recruited for a convenience sample using printed advertising as well as word of mouth. Potential participants contacted The Shiatsu Clinic & School and were informed of the requirements for participation in the study. En addition, participants were told of the usual pricing structure for shiatsu treatments, the reduced price for those who volunteered for the study, and the reftmd schedule should a participant not complete all four treatments. Prior to their first treatment, participants were asked to read and sign an informed consent form and were given a copy of the signed form to keep.

Participants were randomly assigned to a therapist. Random assignment was performed by the participant rolling one of a pair of dice; even numbers were assigned to the male therapist, odd numbers to the female therapist. In addition, whenever the therapists had a client who could qualify for the study, they informed the client and invited him or her to join the study. These subjects were not randomly assigned because they were already at the clinic with one or the other of the therapists.

Both therapists are nationally certified in therapeutic massage and bodywork and licensed massage therapists in the state of Iowa. These therapists are both on the faculty of The Shiatsu Clinic & School. Each subject received massage from the same therapist and in the same private room throughout the study.

Prior to each of four shiatsu treatments, each subject completed Spielberger's (1983) State-Trait Anxiety Inventory and indicated on the VAS (Huskisson, 1974) the degree of lowerback pain being experienced at that time. A full-body shiatsu treatment taking 50 to 60 minutes followed. Immediately after the treatment, the subject again completed the State-Trait Anxiety Inventory and described the level of lower back pain using the VAS. Two days following the completion of the treatment, the subject was contacted by telephone and asked once again to describe, using the VAS, the level of lower back pain being experienced at that time. This pattern continued throughout four shiatsu treatments, all scheduled within an 8-week period of time for each subject.

At the conclusion of the final treatment and after completing the anxiety inventories and the VAS, each subject completed the exit questionnaire.

FINDINGS

T'he first research question addressed the pain experienced by the subjects before and after each of the four treatments. This question was tested using an ANOVA, which yielded a significant finding of $F = 12.890$, $p < .0001$. A Scheff6 post hoc test (- = .05) indicated that each pretreatment pain score, as measured by the VAS, was significantly higher than the posttreatment pain score ($p < .0001$). In addition, the pain score reported before the first treatment was significantly higher than the pain score reported before the second treatment ($p < .0001$), the pain score before the second treatment was significantly higher than the pain score reported before the third treatment ($p <.001$), and the pain score reported before the third treatment was significantly higher than the pain score reported before the fourth treatment ($p <.001$).

The second research question addressed the pain experienced by the subjects at the completion of each treatment and 2 days following the treatment. This question was tested using an ANOVA, which yielded a significant finding of F = 11.69, p <.Ol. A Scheff6 post hoc test indicated that each posttreatment pain score was significantly lower than the score obtained 2 days later, with the exception of the last treatment, where there was no difference between the posttreatment pain score and the pain reported 2 days later.

The decreasing nature of the pain reported by the subjects throughout the entire study, as demonstrated by the mean pain (VAS) scores at each observation, is evident in Figure 1, which incorporates the reported pain scores addressed in Research Questions 1 and 2.

T'he third research question addressed the anxiety experienced by the participants before and after each of the four treatments. This question was tested using ANOVA. The ANOVA performed using the scores from the trait anxiety inventory indicated no significant differences between measures throughout the study, F = 1.715, p =.1036. The ANOVA performed using the scores from the state anxiety inventory yielded a significant finding of F = 5.397, p <.0001. A Scheff6 post hoc test (- = .05) indicated that the state anxiety scores were signfficantly higher before each treatment than they were following the

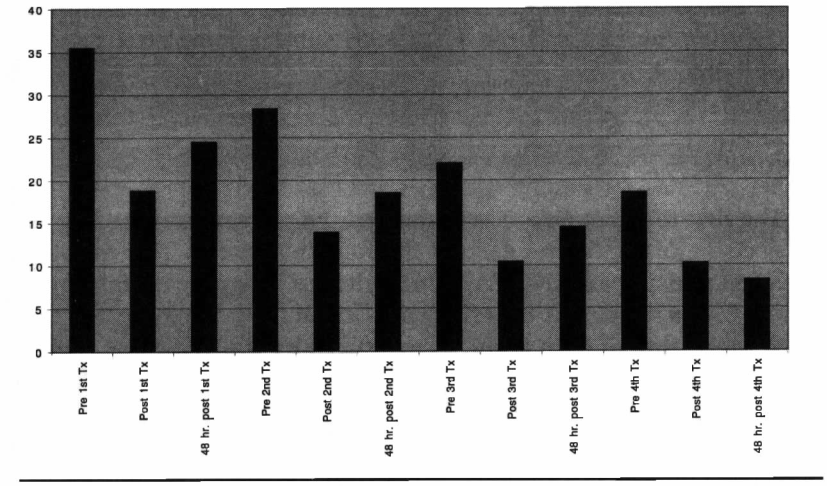

Figure 1: Means of Visual Analogue Scale scores for total sample

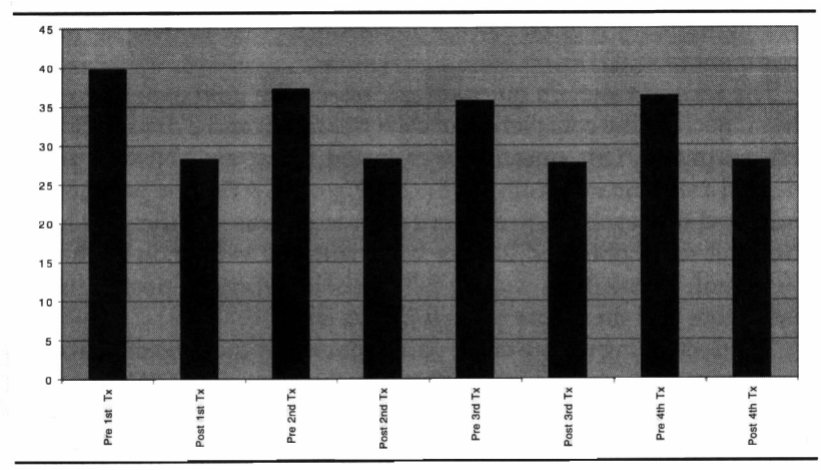

Figure 2: Means of state amiety scores for total sample

treatment (p < .001). The nature of the state anxiety of the subjects across the four treatments, as measured by the means of the state anxiety inventory, is evident in Figure 2.

The fourth research question, which asked if various attribute variables affected the findings regarding pain and anxiety, was addressed using each demographic variable as a blocking variable and testing the state, trait, and VAS results using ANOVA. The group was divid-

TABLE I
ANOVA Results for Demographic Variables

	State Anxiety		*Trait Anxiety*		*Pain (Visual Analogue Scale Scores)*	
	F	p	F	p	F	p
Gender	0.863	.532	0.296	.233	0.480	.915
Age	0.483	.847	1.21	.294	1.07	.383
Gender of therapist	0.712	.660	0.877	.524	1.07	.387
Medications prior	0.875	.586	0.741	.733	1.23	.193
Hobbies	0.683	.745	0.474	.792	0.576	.680
Employment	0.960	.621	0.560	.695	0.349	.876
Years of lower back pain	0.367	.920	0.975	.449	0.508	.897

ed equally by age using a median split (median = 39.7); subjects were compared above and below 40 years of age. Those individuals who were taking medications for pain prior to the study (n = 29) were compared to those who were not taking medications (n = 37). Hobbies were divided into categories of high-, medium-, and low-impact activity There were 16 subjects who had high-impact hobbies (running, hiking, and weight training), 28 who had medium-impact hobbies (gardening, golf, walking, and swimming), and 18 with low-impact hobbies such as sewing, reading, crafts, and computers. Employment status was divided into two groups, professional (n = 36) and other (n = 26). Four years of lower back pain was the median length of history of pain for this sample, so the subjects were divided equally using the median to determine ff history with pain influenced the pain or anxiety results. Table 1 indicates that there was no difference between the groups in state anxiety scores, trait anxiety scores, or pain (VAS) scores when the subjects were divided according to the various demographic variables.

There were 13 participants who had experienced shiatsu prior to the study. When these 13 participants were compared to the other 56 on state anxiety, trait anxiety, and VAS scores, a Mann-Whitney U was used due to the low number in the group who had experienced shiatsu. The results of the Mann-Whitney U indicated that the two groupsdidnotdifferonstateanxietyscores(z=-1.694,p=.0904),trait anxiety scores (z = -1.630, p =.1032), or pain (VAS) scores (z = 1.713, p .1223).

TABLE2

Mean Responses to

"How Are Inconveniences Affecting You Now?'

	m	n
Five inconveniences	1.94	36
Four inconveniences	2.01	55
T'hree inconveniences	2.09	62
Two inconveniences	2.15	65
One inconvenience	1.96	66

The fifth research question asked if shiatsu massage decreased the major inconveniences of lower back pain each subject identified at the beginning of the study and then rated at the conclusion of the study. Using the demographic questionnaire, participants were given an opportunity to identify five major inconveniences they were experiencing at the beginning of the study. At the conclusion of the study, on the exit questionnaire, participants were asked to indicate for each inconvenience they had identified if it was now bothering them *not at all (1), less (2), the same (3), more* (4), or *much more* (5). Table 2 illustrates that the subjects believed their inconveniences were affecting them less after four shiatsu treatments.

To address the last research questions, participants were asked if they would recommend shiatsu treatments to a friend or relative suffering from lower back pain. One subject did not answer this question. The other 65 indicated they would reconnnend shiatsu, and a majority put an exclamation point after the question, underlined it, or otherwise indicated not only agreement but apparent emphatic agreement.

Participants were asked to share their thoughts about shiatsu, the therapists, or the research study at the conclusion of the exit questionnaire. Forty (60.6%) of the subjects responded to this question, and positive responses were written by 39 of the 40 (97.5%). Comments included how relaxed they felt after the treatments (n = 15), the decrease in lower back pain since starting the treatments (n = 12), the fact that they had been sleeping better since beginning shiatsu treatments (n = 5), and the desire to continue with shiatsu (n = 5). Both shiatsu therapists were praised highly throughout these comments, and 9 of the 40 thanked the specific therapist for helping so much. The 40 respondents also included three negative comments. Two of the 40 mentioned the rebound pain the day after treatment, and the one person who provided only negative comments found the sporadic nature of applying pressure interfered with relaxation but wished the treatments were longer.

DISCUSSION

Participants in this study reported a very positive experience with shiatsu as an intervention for their lower back pain. Their report of pain decreased significantly after each treatment and throughout the study period, although the reported pain after each treatment was significantly lower than it was reported to be 2 days later. State anxiety, which is commonly associated with pain (Spielberger, 1983) and may be a factor for individuals experiencing massage for the first time, decreased after each treatment, whereas trait anxiety, which is purported to be a stable construct (Spielberger, 1983), did not vary across the four treatments.

Pain and state anxiety decreased throughout the study regardless of the subject's gender, age, hobbies, employment, years of lower back pain, history with shiatsu, or the fact that some took pain medications prior to the study and some did not. There was no difference in perceived pain or state anxiety related to any of these demographic variables.

VVhen asked to identify up to five of the inconveniences experienced as a result of their lower back pain, all 66 participants responded with at least one. The most common complaints were the pain itself, sleep disturbances, problems with Iffting and/or bending, trouble sitting, increased irritability, and being unable to play with their children as they would like. When asked at the conclusion of the study to identify how these inconveniences were bothering them now, participants' rankings gathered around a 2.0, which corresponds to *less* on the 5-point scale. All of the participants indicated they would recommend shiatsu massage to a friend or relative who was experiencing lower back pain, and 39 of the 40 who responded to the open-ended question about the therapy and study were positive and grateful for this experience.

It was interesting to note throughout this study that referrals for participants came from chiropractors, a pain clinic, and an arthritis clinic. A request for a future study on bum clients came to the therapists from the physicians in the local bum clinic.

The significant decreases in perceived pain and anxiety scores found in this study are consistent with the findings from the study on cancer patients reported by Ferr-eH-Torry and Glick (1993). FerrellTorry and Ghck's study was limited to 9 male participants who experienced massage in a variety of environments. These authors suggested future studies include women, larger samples, a controlled envirorunent for all participants, and longitudinal measures.

In a critique of the methodology of research studies evaluating massage, Cawley (1997) noted that many studies had small samples and administered only one or two massages. Cawley recommended larger samples and longitudinal measures in future research.

Although this investigation adds important information to the body of knowledge about shiatsu massage and has incorporated several suggestions from earlier researchers, it must be noted that there are many limitations to this study. The most important limitation is the absence of a control group. Pain and anxiety were measured frequently throughout this study to control for maturation as well as for statistical regression, but these threats cannot be completely eliminated until a study is carried out with a control group experiencing the same type of pain as the treatment group. The repeated measures itself is a limitation because subjects may become very familiar with the instruments, especially when the time interval is only the one hour required for a treatment. Another limitation is the socioeconomic status of these subjects. Because shiatsu is not reimbursed by health insurance, Medicare, or Medicaid, the subjects in this study all paid a reduced price of $120 for four shiatsu treatments. For that reason, the findings of this study apply only to those individuals with lower back pain who can afford such intervention. Subjects in lower socioeconomic groups may not take advantage of this alternative therapy at this time due to the cost. In addition, this study was carried out in one small Midwestern town and in one shiatsu clinic. Replication with other groups in other settings would validate methods as well as findings.

It must also be noted, however, that the findings of this study add another option for holistic nurses and other health professionals who are working with clients with lower back pain. These clients are often frustrated and trying alternative treatments on their own without assistance or advice from health care professionals (Eisenberg et al., 1998). Shiatsu massage, a noninvasive therapy, was not only a positive experience, it was very effective in reducing the pain and state anxiety in these subjects complaining of lower back pain.

Further research in this area will expand the types of illnesses and conditions that can be alleviated to some degree by shiatsu massage. In addition, it would be interesting to determine the differences, if any, between shiatsu massage and other types of massage as an alternative therapy for clients with specific chronic and acute health problems.

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Linda H. Brady, R.N., Ph. D., is the associate dean of nursing at Drake University in Des Moines, Iowa, and the research director of The Shiatsu Clinic & School in Iowa City, Iowa. Her research interests include Therapeutic Touch as well as otherforms of alternative health care practices. Recent publications include articles in journal of Nursing Education and Nursing Outlook.

Kathryn Henry, Ph.D., L.M.T, O.B.T, *is the associate directorand research coordinator of The Shiatsu Clinic & School in Iowa City, Iowa, and she is an independent shiatsu therapist. Her research interests include the qualitative and quantitative effects offocused touch shiatsu. Recent publications include a brochure,* Lower Back Pain?, *with 1. F. Luth.*

James F Luth, II, L.M.T, O.B.T, E.M.T, *is the director and founder of The Shiatsu Clinic & School in Iowa City, Iowa, and the creator Offocused touch shiatsu. His research interests are the most effective and reliable integration of traditional Chinese medicine and Western bodyworkforms. Recent publications include a brochure,* Lower Back Pain?, *with K. Henry.*

Kimberly K. Casper-Bruett, M.S.N., is a recentgraduate ofdrake University. Her research interests includealternative health carepractices. This is herfirst publication.