



RESEARCH STUDY

Massage therapy reduces pain in pregnant women, alleviates prenatal depression in both parents and improves their relationships

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Summary Prenatally depressed women ($N = 47$) were randomly assigned to a group that received massage twice weekly from their partners from 20 weeks gestation until the end of pregnancy or a control group. Self-reported leg pain, back pain, depression, anxiety and anger decreased more for the massaged pregnant women than for the control group women. In addition, the partners who massaged the pregnant women versus the control group partners reported less depressed mood, anxiety and anger across the course of the massage therapy period. Finally, scores on a relationship questionnaire improved more for both the women and the partners in the massage group. These data suggest that not only mood states but also relationships improve mutually when depressed pregnant women are massaged by their partners.

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Introduction

Pregnancy massage has been noted to reduce depression and anxiety in women as well as reduce

the stress hormone cortisol and lower the prematurity rate (Field et al., 2004b). The massages in that study were provided by the partners (putative fathers) who might also be expected to become less stressed by giving the massages, although the men were not assessed in that study. The massaged person has been noted to benefit as much as the massager, for example, in studies where elderly folks (Field et al., 1998) and parents provide the

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massages for infants or young children (Feijo et al., 2006; Field et al., 2004c, 2006b, c). In another study that exclusively assessed the partners who provided the pregnancy massages, the men experienced improved mood across the treatment period (Latifses et al., 2005).

Given that the rates of pregnancy-related depression are almost as high in fathers as mothers (12% versus 20% in one recent study, Morse et al., 2000), and given the high incidence of assortative¹ mating or dysphoric women being paired with symptomatic partners (Daley and Hammen, 2002; Matthey et al., 2003), the well-being of the fathers may be important for the mothers' well-being (Rubertson et al., 2003). Certainly the relationship between the pregnant couple would be affected by both partners, and the relationship, in turn, would impact the level of distress in the two partners (Bernazzani et al., 2004; Simpson et al., 2003). In one study, for example, men's peak distress was noted early in pregnancy, and lower relationship satisfaction was associated with distress (Buist et al., 2003). Pregnancy has been noted to be the most stressful period for men undergoing the transition to parenthood (Codon et al., 2004; Field et al., 2006a). Paternal and maternal depressed mood and partner relationships are then noted to affect postpartum adjustment to parenthood (Florsheim et al., 2003; Matthey et al., 2000).

Despite the apparent importance of the relationship for pregnancy well-being, very little research has focused on relationships or on pregnancy interventions for these relationships. In one recent study, the partners with non-optimal relationship scores also had higher depression and anxiety scores by the end of pregnancy (Figueiredo et al., 2007).

Pregnancy massage has been noted to decrease depression in both non-depressed pregnant women massaged by therapists (Field et al., 1999) and depressed pregnant women massaged by their partners (Field et al., 2004b). The purpose of the current study was to determine whether pregnancy massage by fathers could not only reduce leg and back pain and stress in the pregnant women but also could reduce the fathers' stress levels (depression, anxiety and anger) as well as improve their perception of their relationships with their partners. Pregnancy massages by the fathers were expected to lower pain in the pregnant women and lower stress and improve perception of the relationship in both partners.

¹Positive assortative mating is the tendency of like to mate with like; negative assortative mating follows the dictum that opposites attract.

Method

Participants

Fifty-seven pregnant women and their partners were recruited for this pregnancy massage study during their second trimester of pregnancy. They were recruited during their first ultrasound examination session at a large urban University Hospital. Women were excluded from participation in the study if they (1) were less than 18 years old, (2) had multiple fetuses and (3) reported HIV/AIDS status or medical complications.

The participants were between 18 and 40 years old ($M = 27.9$) and had between 0 (57%) and 4 previous children. The sample was comprised of women with a college (24%) or a high school degree or less (46%). The women had a predominantly low-to-middle socioeconomic status ($M = 3.7$ on the Hollingshead Two-factor Index of Social Status). Their ethnicity was distributed 59% Hispanic, 32% Black and 9% Caucasian. Almost all the women were in a relationship (95%). Forty-three percent of the mothers were "not happy when they found out that they were pregnant", and 51% of them reported "having a stressful situation during pregnancy".

Procedures

The women who expressed interest in participating in this study were asked to sign an informed consent. They were then given the SCID for a diagnosis, and both the mothers and fathers were interviewed for demographic data. The couples were then asked to complete the Relationship Questionnaire, as well as the Center for Epidemiological Studies-Depression Scale (CES-D) (Radloff, 1977), the State Anxiety Inventory (STAI) (Spielberger et al., 1970) and the State Anger Inventory (STAXI) (Spielberger et al., 1995).

The partners were then taught the pregnancy massage, given a DVD on the massage and then were asked to give the pregnant women the massage twice per week for the next 12 weeks. The assessments were then repeated at a follow-up visit at approximately 32 weeks gestation.

Massage therapy

Starting in the second trimester, the massage group received two 20-min massages per week over 16 weeks. Trained massage therapists taught the massage to the partners of the women, who then conducted the twice-weekly massages for the 16-week period. Each session began with the

mother in a side-lying position, with pillows positioned behind her back and between her legs for support. The moderate pressure massage was administered in the following sequence for 10 min: (1) head and neck: massaging the scalp, making small circles from the forehead along the hairline and down to the temples, and kneading the neck from the base up; (2) back: using the heels of the hands, moving along the spine; using the palms moving the hands with rocking movements from the top of the shoulder blades to the backbone; pressing fingertips along both sides of the spine from the neck to the backbone and then stroking upward from the hips to the neck; stroking the shoulder muscles (trapezius); inching up the back, using fingertips placed on the sides of the spine, starting from the hipbone to the neck and then reversing the direction downward using fingertips in a raking fashion; massaging the lower back from the backbone across the waistline using the heels of the hands to make large circles; long gliding strokes from the hip up and over the shoulders; (3) arms: making long sweeping strokes from the elbow up and over the shoulder; kneading the muscles from above the elbow to the shoulder; stroking from the wrist to the elbow; kneading the muscles between the wrist and the elbow; (4) hands: massaging the hand using thumbs to make small circles on the palm; on the back of the hand, rubbing between the spaces of the bones; sliding down each finger; legs: long sweeping strokes from the knee to the thigh, up and over the hip; kneading the muscles between the knee and the thigh; long sweeping strokes from the ankle up toward the knee; kneading the muscles between the ankle and knee; sliding the hand from the Achilles tendon up towards the upper calf and sliding down to the heel with less pressure several times; (5) feet: massaging the soles from the toes to the heel with fingers and thumbs and moving back towards the toes; sliding down each toe and rotating the toes three times; stroking the top of the foot towards the leg. The same routine was repeated once (for a total of 20 min) with the mother lying on her other side supported by pillows.

Instruments

Structured clinical interview for DSM-IV disorders (SCID)—All women in the study were given the SCID (research version) to determine depression and anxiety diagnoses and to screen out other disorders including bipolar disorder, schizophrenia and other psychotic disorders. The women were diagnosed with dysthymia or major depression on the SCID

based on DSM IV symptoms. The SCID was given by research associates following training and with continuing supervision by a clinical psychologist. In our experience (including a recent survey sample), the majority of the depressed pregnant women who attend the university ultrasound clinic were not taking anti-depressants and were not receiving other treatments for depression.

The Center for Epidemiological Studies-Depression Scale (CES-D) is a 20-item scale that assesses the frequency of depressive symptoms within the last week (Radloff, 1977). With scores ranging from 0 to 60, a cut-off score of 16 is used for classifying a major depressive episode. With only a 6% false positive and 36% false negative rate (Myers and Weissman, 1980), this scale has been shown to be reliable and valid for diverse demographic groups and has been successfully used as a self-report assessment of depression in a number of studies that involved similar populations (Diego et al., 2004).

The State Anxiety Inventory (STAI) is comprised of 20 items and assesses the intensity of anxiety symptoms (Spielberger et al., 1970). The scores range from 20 to 90, and the cut-off for high anxiety is 48. Research has demonstrated that the STAI has adequate concurrent validity and internal consistency, and the scale has been used in several studies with pregnant women (Da Costa et al., 2000).

State Anger Inventory (STAXI) (Spielberger et al., 1995) is a 10-item inventory that assesses general feelings of anger based on a 4-point Likert scale ranging from 1 (almost never) to 4 (almost always). Typical questions include “I am quick tempered” and “I fly off the handle”. Psychometric properties have been established for the STAXI on diverse ethnic groups including a reliability coefficient of 0.97.

The Relationship Questionnaire (Figueiredo et al., 2007) is comprised of 12 items on a 4-point Likert scale. The questionnaire was designed to be behaviorally focused, to be as relevant for women as for men, and to be focused on positive and negative aspects of the relationship. The positive dimensions include a sense of support and care, as well as satisfaction, closeness and joint interests and activities, and the negative dimensions include anxiety, irritability and criticisms that have been associated with undesirable outcomes.

Leg pain and back pain (VITAS)—Participants completed pre- and post-session VITAS pain scales, with reference to leg and back pain, on the first and last days of the study. Pain perception is rated on a visual analog scale (VAS) ranging from 0 (no pain) to 10 (worst possible pain), and anchored with 5 faces. The faces, located at two point intervals,

range from very happy (0), to happy (2); contented (4), somewhat distressed (6), distressed (8) and very distressed (10).

Results

Group by repeated measures analyses of variance followed by post hoc *t*-tests for group by day interaction effects suggested the following (see Table 1) for the massaged versus the control pregnant women by the end of the study: (1) decreased leg pain ($t = 4.13, p < 0.001$) and back pain ($t = 3.91, p < 0.001$); (2) decreased depression ($t = 5.06, p < 0.001$), anxiety ($t = 5.81, p < 0.001$) and anger ($t = 2.49, p < 0.01$) and (3) improved relationship with partner ($t = 3.06, p < 0.01$) and for the fathers who massaged their partners versus the control group fathers: (1) decreased depression ($t = 3.34, p < 0.01$) and anxiety ($t = 3.61, p < 0.01$) and (2) improved relationship with partner ($t = 2.14, p < 0.05$).

Discussion

The decrease in leg pain and back pain in this study is consistent with other studies on reduced back pain following massage (Field et al., 2007; Hernandez-Reif et al., 2001) and may be related to enhanced sleep and reduced substance P that have been noted following massage therapy with fibromyalgia patients (Field et al., 2002). The reduced pain may, in turn, contribute to less negative mood.

The decrease in depression and anxiety in pregnant women is consistent with the literature showing attenuation of those mood states in non-depressed pregnant women massaged by therapists (Field et al., 1999) and depressed women (Field et al., 2004a, b, c) massaged by their partners. These are important findings inasmuch as prenatal depression and anxiety are noted to persist as stable mood states across pregnancy (Field et al., 2006b, c), and they contribute to prematurity and low birthweight (Field et al., 2004a). The reduced depression and anxiety in the putative fathers is also beneficial given the negative effects of parental depression on both pregnant women and infants. The partners (putative fathers) may have experienced decreased depression and anxiety as a result of the massage stimulation, not unlike the elderly people who massaged infants in another study (Field et al., 1998).

Improved relationships following massage is a relatively novel finding, although marital quality has notably improved following partners massaging their pregnant wives (Latifses et al., 2005). Improved relationships would also be expected to result from diminished pain in the pregnant women and the decreased depression and anxiety in both partners. More sophisticated data analyses such as path analysis on larger samples would be needed to explore the interactions between these variables. Nonetheless, these data further support the significant effects of massage therapy on pregnant women and their partners.

Table 1 Means for pre-post massage period self-report measures for depressed massage and control mothers and their partners (fathers) (S.D.s in parentheses).

	Groups			
	Control		Massage	
	First day	Last day	First day	Last day
Mothers				
Leg pain	3.73 (2.88)	2.84 (2.36)	3.41 (2.98)	0.94 ^{****} (0.38)
Back pain	4.39 (2.53)	3.05 (2.36)	4.77 (2.88)	1.19 ^{****} (1.08)
Depression (CES-D)	23.63 (8.22)	21.37 (10.04)	21.29 (9.12)	16.51 ^{****} (8.85)
Anxiety (STAI)	43.10 (10.42)	39.39 (11.79)	40.42 (9.03)	29.26 ^{****} (8.75)
Anger (STAXI)	22.69 (9.26)	21.11 (8.67)	20.02 (7.94)	17.02 ^{**} (6.32)
Relationship with partner	3.11 (0.85)	3.07 (0.89)	3.13 (0.71)	3.39 ^{***} (0.52)
Partners				
Depression (CES-D)	14.00 (4.24)	19.50 (4.95)	11.00 (5.83)	6.20 ^{**} (3.46)
Anxiety (STAI)	36.75 (8.77)	34.00 (12.25)	37.43 (8.79)	32.57 ^{**} (8.55)
Anger (STAXI)	22.75 (9.18)	20.75 (6.24)	16.64 (2.37)	15.14 (2.31)
Relationship with partner	3.38 (0.78)	3.50 (0.45)	3.28 (0.59)	3.77 [*] (0.24)

* $p = 0.05$, ** $p = 0.01$, *** $p = 0.005$, **** $p = 0.001$ indicate significant difference for first day/last day measures for massage group.

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