OUTCOMES OF MASSAGE INTERVENTIONS ON TEEN MOTHERS AND THEIR INFANTS

by

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OUTCOMES OF MASSAGE INTERVENTIONS ON TEEN MOTHERS AND THEIR INFANTS

KRISTA LEE OSWALT

PSYCHOLOGY

ABSTRACT

The current study aims to determine whether teen mothers and their infants benefit from infant massage. A great deal of information related to the benefits of infant massage for premature infants is available in the literature, however, only a few studies have focused on infants of teen mothers. Because a number of risks have been associated with teen pregnancy, this population is a sensible choice for intervention. This study looks at the effects of infant massage on teen mothers and their infants, particularly in the areas of parental stress, depression, maternal confidence, and feelings about physical contact.
ACKNOWLEDGEMENTS

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Finally, I would like to express an infinite amount of thanks to my husband, Eric. Without his love and support my accomplishments would be few.
TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>ii</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>iii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>vi</td>
</tr>
<tr>
<td>LIST OF ABBREVIATIONS</td>
<td>vii</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Teaching Developmental Knowledge to Parents</td>
<td>2</td>
</tr>
<tr>
<td>Parents Impact on Infant Temperament</td>
<td>5</td>
</tr>
<tr>
<td>Parent Outcomes of Touch Therapy</td>
<td>8</td>
</tr>
<tr>
<td>Infant Developmental Outcomes of Infant Massage</td>
<td>9</td>
</tr>
<tr>
<td>Teen and Depressed Mother Characteristics Associated with Poor Infant</td>
<td>12</td>
</tr>
<tr>
<td>Outcomes</td>
<td></td>
</tr>
<tr>
<td>Conclusion</td>
<td>13</td>
</tr>
<tr>
<td>The Current Study</td>
<td>14</td>
</tr>
<tr>
<td>OBJECTIVES</td>
<td>15</td>
</tr>
<tr>
<td>RESEARCH DESIGN AND METHODS</td>
<td>17</td>
</tr>
<tr>
<td>Design</td>
<td>17</td>
</tr>
<tr>
<td>Participants</td>
<td>17</td>
</tr>
<tr>
<td>Recruitment</td>
<td>20</td>
</tr>
<tr>
<td>Procedures</td>
<td>21</td>
</tr>
<tr>
<td>Intervention Procedures</td>
<td>22</td>
</tr>
<tr>
<td>Materials</td>
<td>22</td>
</tr>
<tr>
<td>Demographic Questionnaire</td>
<td>22</td>
</tr>
<tr>
<td>Parent Stress Index</td>
<td>23</td>
</tr>
<tr>
<td>Maternal Confidence Questionnaire</td>
<td>23</td>
</tr>
<tr>
<td>Beck Depression Inventory-II</td>
<td>24</td>
</tr>
<tr>
<td>Questionnaire about Physical Contact</td>
<td>25</td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS (Continued)

DATA ANALYSIS ................................................................................................................. 27
  Analysis ............................................................................................................................. 27

RESULTS .................................................................................................................................. 29
  Participant Descriptive Statistics ...................................................................................... 29
  Primary Analyses ............................................................................................................... 30
    Hypothesis 1 ................................................................................................................... 30
    Hypothesis 2 ................................................................................................................... 32

DISCUSSION .......................................................................................................................... 35
  Implications ........................................................................................................................ 38
  Limitations .......................................................................................................................... 38
  Future Research ............................................................................................................... 40
  Summary .............................................................................................................................. 41

LIST OF REFERENCES ............................................................................................................ 42

APPENDIX: ........................................................................................................................... 45
  A ETHICAL APPROVAL ..................................................................................................... 45
  B MASSAGE MATERIALS .................................................................................................. 47
LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Curriculum in Young Mothers Program.</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>Means (standard deviations) for Demographics by Group.</td>
<td>19</td>
</tr>
<tr>
<td>3</td>
<td>Individual Demographic Information.</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>Correlations between Pre- and Post-test Scores.</td>
<td>28</td>
</tr>
<tr>
<td>5</td>
<td>ANOVA Comparing the Groups on Demographic Variables.</td>
<td>29</td>
</tr>
<tr>
<td>6</td>
<td>Means (Standard deviations) of Pre- and Post-Intervention Measures by Group.</td>
<td>30</td>
</tr>
<tr>
<td>7</td>
<td>Analysis of Covariance for Massage Intervention vs. Control.</td>
<td>31</td>
</tr>
<tr>
<td>8</td>
<td>Pearson Chi-Square ($X^2$) Comparisons of Categorical Measures.</td>
<td>32</td>
</tr>
<tr>
<td>9</td>
<td>Effect Sizes for Massage Intervention vs. Control.</td>
<td>34</td>
</tr>
</tbody>
</table>
# LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANCOVA</td>
<td>Analysis of Covariance</td>
</tr>
<tr>
<td>ANOVA</td>
<td>Analysis of Variance</td>
</tr>
<tr>
<td>BDI-II</td>
<td>Beck Depression Inventory-II</td>
</tr>
<tr>
<td>MCQ</td>
<td>Maternal Confidence Questionnaire</td>
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<tr>
<td>NICU</td>
<td>Newborn Intensive Care Unit</td>
</tr>
<tr>
<td>PSI</td>
<td>Parenting Stress Inventory</td>
</tr>
</tbody>
</table>
INTRODUCTION

A mother’s psychological state and consequently her interaction with her infant are positively influenced by knowledge about her infant (Bialoskurski, Cox & Wiggins, 2002; Mazurek-Melnyk, Fischbeck-Feinstein, & Fairbanks, 2002; Pridham, Limbo, Schroeder, Thoyre, & VanRiper, 1998). One intervention aimed at increasing parents’ knowledge and involvement with their infant is touch therapy. Massage therapy is an alternative therapy that has gained an increasing amount of interest over the last few decades. It dates back to the second century B.C. in China and shortly thereafter in India and Egypt where it was used as a medical treatment. Although massage therapy had been used previously in the United States, its use diminished with the advance of pharmaceuticals in the 1940s, but it has recently become popular again as interest in alternative medicine has increased. Two of the most notable people in relation to infant massage therapy are Vimala McClure, founder of the International Association of Infant Massage and Tiffany Field, director of the Touch Research Institute at the University of Miami School of Medicine. Although a number of methodological problems, including a lack of random assignment, small sample sizes, use of inappropriate statistic, and limited follow-up studies, has been found in early massage studies, many benefits have been discovered in response to infant massage (Field, 1998).

Positive outcomes for children include decreasing discomfort and tension, facilitating weight gain for premature infants, and improving breathing function for asthmatic children (McClure, 2000). Study findings have suggested that massage is
beneficial for cocaine-exposed infants as evidenced by enhanced weight gain and better motor behavior (Field, 1998). Studies with HIV-exposed infants demonstrated improved weight gain and reduced stress behaviors, and studies of massage with full-term infants demonstrated improvements in behavioral states, stress levels, and temperament (Field, 1998). Perhaps one of the greatest benefits of infant massage is that it can be provided by parents and loved ones. With a little training, this is something that any parent can do for his/her infant regardless of any financial, time, or educational constraints they may have (McClure, 2000).

Teaching Developmental Knowledge to Parents

Mothers desire knowledge about their infants (Bialoskurski et al., 2002; Mazurek-Melnyk et al., 2002; Pridham et al., 1998). Findings from numerous studies have suggested that when mothers have desired information they are less psychologically distressed, more focused on the infant’s needs, and better able to engage in positive mother-infant interactions. They are also more successful at forming an attachment with the infant (Bialoskurski et al., 2002; Mazurek-Melnyk et al. 2002; Reichman, Miller, Gordon, & Hendricks-Munoz, 2000). All of these positive outcomes result from simply sharing information. Therefore, it seems likely that increasing parental competence would increase parental involvement and consequently help to facilitate positive mother-infant interactions. Positive mother-infant interactions and increased levels of nurturing touch are associated with less emotional and behavior problems at age 2 years (Weiss, Wilson, St. John-Seed, & Paul, 2001).

In a review of the literature on informational/behavioral interventions with parents
of low birth weight premature infants, Mazurek-Melnyk et al. (2002) found similar needs expressed by families in the NICU as the researchers mentioned above. There were three major and consistent results that were found across the reviewed studies. First, it is important to provide parents with educational information/anticipatory guidance about their premature infants’ development and behaviors. Second, providing informational/behavioral information about their premature infant improves parental responsiveness and maternal-infant interaction, which appears to positively impact the child’s development. Finally, helping parents establish a specific and ongoing role in the care of their hospitalized infants facilitates stronger beliefs in their ability to care for their infants and increased involvement in their care. Although these studies refer to parents in a neonatal intensive care unit, it is probable that this process of providing information to parents, which leads to more appropriate care and stimulation by the parents, in turn, has a positive result on the child’s development.

Sameroff’s transactional model has been used to explain this effect that maternal characteristics play in shaping infant responses and vice versa (Van Doesum, Hosman, & Riksen-Walraven, 2005; Goodman, Hans, & Bernstein, 2005). In other words, the relationship between mother and infant is cyclical with behavior or characteristics of one individual influencing the behavior or characteristics of the other. Studies have shown that maternal characteristics and behavior affect various infant outcomes in areas such as temperament and cognitive development. For instance, depressed mothers affect the infant through the mother-infant interaction. Specifically, mothers’ depression inhibits typical social interaction between mother and child that generally serves to facilitate infants’ social, emotion, and cognitive abilities (Van Doesum et al., 2005). Therefore, in
response to poor social and emotional experiences with their mothers, infants of
depressed mothers seem to mimic these social behaviors, which results in impaired
social-emotional as well as cognitive development (Murray & Cooper, 1996). At the
same time, however, infants’ behavior influences mothers’ emotions and behaviors.
Specifically, Secco and Moffatt (2003) found that difficult infant temperament was the
strongest and only significant predictor of parent stress. Barr, Kramer, Pless, Boisjoly,
and eLeduc (1989) also found that infant temperament may affect parenting competence
via parent-infant interaction and resulting parental satisfaction.

Due to the influence that both maternal and infant behaviors and characteristics
can have on each other, the use of a transactional model may be beneficial in creating an
intervention aimed at optimizing the mother-infant relationship. Specifically, infant
massage provides mothers with knowledge about infant cues. This knowledge may help
mothers recognize and react more appropriately to their infants’ needs, which in turn may
result in maternal perceptions of more satisfied and content infants. Additionally, more
content infants may be related to increased maternal confidence, as well as decreased
parenting stress and maternal depression because mothers perceive their actions and
behaviors as resulting in positive infant responses and outcomes. Positive infant
responses may then serve as reinforcers for mothers to utilize the knowledge that they
gained through infant massage training.

Providing knowledge about how to touch infants seems to be extremely important
because touch plays an important role in the development of emotional and behavioral
outcomes (Weiss et al., 2001). Specifically, infants who received more nurturing touch
had significantly fewer emotional and behavioral problems at age two. However, for less
responsive infants in particular, frequent and harsh touch was associated with increased aggressive and destructive behavior. It is possible that these results are related to the fact that this study did not teach parents about touching their infants and how to recognize stress cues. These findings therefore lend support to the argument of the importance of teaching parents about appropriate touching and the use of infant cues as a guide for amount and kind of touch. The findings by Appleton (1997) also suggest that adverse reactions to handling and touch are influenced to a greater extent by the failure of caregivers to provide stimulation dependent on the infant’s developmental level and current behavioral state than by under-stimulation or over-stimulation. Although a majority of infant massage research focuses on the direct benefits of touch in terms of physical stimulation, another important component when teaching parents infant massage includes providing information about recognizing infant cues that help adults determine when stimulation, such as massage, is appropriate or should be stopped.

In conclusion, NICU mothers and perhaps all mothers, including teenage mothers, desire knowledge about their infants. By providing parents with this knowledge, a positive mother-infant interaction along with appropriate mother-infant attachment may be facilitated (Bialoskurski et al., 2002; Mazurek-Melnyk et al., 2002; Pridham et al., 1998; Reichman et al., 2000). All of these relatively immediate outcomes are related to future outcomes. Therefore, these early experiences can positively or negatively impact the infants’ development later in life (Weiss et al., 2001).

Parents’ Impact on Infant Temperament

Optimal mother-infant interaction may also play a role in maternal perception of infant temperament. A study by Leerkes and Crockenberg (2002) investigated the
relationship between maternal self-efficacy, maternal sensitivity and infant characteristics. Infant soothability was associated with higher maternal self-efficacy. On the other hand, high infant distress was associated with lower maternal sensitivity, particularly when maternal self-efficacy was low and extremely high. These results indicate a relationship between infant temperament and maternal sensitivity behavior and point to the potential benefits of interventions, such as infant massage, aimed at increasing maternal sensitivity towards their infants.

This relationship between maternal self-efficacy and maternal perceptions of infant temperament has also been found within the adolescent mother literature. Younger adolescents (<17 years of age) rated their infants as having significantly more difficult temperaments than older adolescents (>17 years of age) (Secco & Moffatt, 2003). These results are consistent with previous research indicating significantly more disciplinary behavior (Buchholz & Korn-Bursztyn, 1993) and poor mother-infant interactions among adolescent mothers. For adolescent mothers, high parental stress was associated with increased maternal focus on more negative aspects of infant care such as crying and fussiness (Secco & Moffatt, 2003). These results suggest that the perception of difficult infant temperament is associated with parenting stress for adolescent mothers. The direction of this relationship is unclear but these results may also be interpreted as meaning that the high stress of parenting for adolescents may influence their perception of infant temperament. For this reason, an intervention like infant massage that provides information that may facilitate adaptive parenting skills could be useful for adolescent mothers, particularly by providing the mothers with the skills to assess infant behavior and respond in an appropriate manner.
Another study found that infant temperament, maternal sensitivity, and the negative mother-infant interactions that accompany difficult temperament and low maternal sensitivity remain stable over time (Kivijarvi, Raiha, Kaljonen, Tamminen, & Piha, 2005). At 1 year of age, infants of more sensitive mothers were described as less active by an observer than infants of less sensitive mothers. Sensitive mothers were defined as mothers who were aware of infant cues and appropriately respond, provided emotional support, anticipate infant behavior, and participated in infant-led interactions (Kivijarvi, Raiha, Kaljonen, Tamminen, & Piha, 2005). Researchers suggested that these findings may be related to the ability of more sensitive mothers to structure the infant’s environment. Results of this study also indicated that more positive temperaments were observed in infants of more sensitive mothers. The direction of the relationship between infant temperament and maternal sensitivity is debatable. In other words, infant behavior in response to maternal behavior may be predicted by infant temperament. Or, infant behavior and temperament may be predicted by maternal behavior and sensitivity. The stability of infant temperament during the first year of life provides support for both genetic and environmental influences on temperament because both of these factors should remain constant during this time period. In this study, maternal sensitivity behavior, an environmental factor, influenced infant activity, positive mood, and sociability (Kivijarvi, Raiha, Kaljonen, Tamminen, & Piha, 2005). Because maternal sensitivity behavior is an environmental factor, it can be manipulated through intervention. One intervention that may be useful increasing maternal sensitivity behavior is infant massage.
Parent Outcomes of Touch Therapy

Although research on the benefits of touch interventions on parents has not the primary focus of most infant massage studies, benefits have been found in the areas of parental depression, as well as, more appropriate care giving behavior (Onozawa, Glover, Adams, Modi, & Kumar, 2001; Weiss, Wilson, Hertenstein, & Campos, 2000). Additionally, the positive behavioral outcomes elicited by parental touch are associated more positive mother-infant interactions (Weiss et al., 2000). Consequently, one might expect that mothers trained in infant massage would feel increased maternal confidence, higher self-esteem, and positive feelings toward their infants. However, research is required to support these hypotheses.

Perception of control may be an important mediating mechanism in the benefits of touch therapy. Lack of control has been found to be associated with increased distress and confrontive and escape-avoidant coping for mothers of NICU infants. On the other hand, accepting responsibility was predictive of decreased distress for these mothers (Reichman et al., 2000). These results seem to support the hypothesis mentioned above that providing mothers with information about infant behavior may increase her perception of control resulting in increased maternal confidence and a perception of a more adaptive infant temperament and might also generalize to other parents, including teenage mothers. By encouraging mothers to accept responsibility and become involved in the care of their infant, it is anticipated that the mother’s well-being will be positively influenced. Miller and Holditch-Davis (1992) also suggest that parental contact with preterm infants in the NICU has psychological benefits for parents. Therefore, positive infant behaviors that are elicited by infant massage, such as smiling, may promote parent-
infant attachment in other populations.

Several studies demonstrated the effect of infant massage on maternal outcomes. For example, mothers who attended an infant massage class improved more in their depression scores as compared to mothers who did not attend (Onozawa et al., 2001). At this point, it is unclear what aspects of the massage class were responsible for the benefits. In addition to teaching the mothers how to massage their infants, the class also taught mothers to recognize and respond appropriately to their infants’ cues. One would expect that this knowledge would influence mother-infant interactions and the mothers’ caregiving behaviors.

Weiss, Wilson, Hertenstein, and Campos (2000) explicitly assessed the relationship between maternal nurturing touch and maternal caregiving behaviors. For preterm infants who were responsive to nurturing touch, nurturing touch was associated with mother’s warmth toward the infant. Those mothers who did not display nurturing touch also displayed less optimal caregiving behavior. These findings suggest that education about nurturing touch might lead to more appropriate caregiving behaviors.

In conclusion, some initial support has been found to indicate that mothers also benefit from touching their infants. Currently, psychological benefits have been reported (Miller & Holditch-Davis, 1992; Reichman et al., 2000) along with appropriate caregiving (Weiss et al., 2000). Future research needs to examine the impact positive parental outcomes resulting from participation in infant massage have on long-term developmental effects for infants.

Infant Developmental Outcomes of Infant Massage
In one study, massage therapy was provided to hospitalized premature infants for three 15-minute sessions per day for 5 days to determine the effects of massage on weight gain and behavioral state (Dieter, Field, Hernandez-Reif, Emory, & Redzepi, 2003). On average, the massage group, which had a mean gestational age of 30.1 weeks, gained significantly more weight per day than the control group, which had a mean gestational age of 31.1 weeks. On the last day of massage, the massage group slept less than the control. The massage group also spent more time in the drowsy state than the control group. These findings suggest that the massage may help to enhance the development of sleep/wake patterns in preterm infants. Additionally, it is of importance to mention that the weight gain in the massage group was rather rapid, only over a 5 day period, which is half of the previously investigated duration of massage. These results suggest that significant effects can be found with much less intervention time. On the other hand, researchers must consider the potential infant outcomes that may result from more long-term massage provided by parents.

Another aspect of infant response concerns stress. Because some critics of touch therapy for preterm infants have suggested that this intervention might induce stress, studies have been designed to test this speculation. For instance, salivary cortisol levels, a measure of stress, were analyzed in response to skin-to-skin contact and massage as a noninvasive measure of stress response (Gitau, Modi, Gianakoulopoulos, Bond, & Glover, 2002). Skin-to-skin contact significantly reduced salivary cortisol, while massage elicited both increased and decreased cortisol levels, which serve as an indicator of stress. However, it is important to note that the time of both interventions was not based on the infant’s state and behavior cues. Also, different outcomes typically were invoked from
the two different interventions. Although the skin-to-skin contact group usually went to sleep, some infants in the massage group had an increase in alert/wake state, perhaps related to stimulation from the massage. These babies may have benefited from this stimulation. Similar to the interpretation of the results of the previous study by Dieter et al. (2003), Gitau and colleagues suggest that perhaps the increase in salivary cortisol demonstrated increased development in sleep/wake patterns.

Field and colleagues (1986) found an increase in motor activity and more alertness for preterm infants who received tactile and kinesthetic stimulation for three 15-minute sessions per day for 10 days. These infants also gained more weight, scored higher on the Brazelton scale, a measure of babies’ strengths, adaptive responses and possible vulnerabilities, and had shorter hospital stays than control infants. The stimulation and controls both entered the study with similar group mean gestational ages equal to 31 weeks and mean birth weights near 1300g. At 1 year of age, these massaged infants continued to weigh proportionately more than the control group infants and performed better on the Bayley Scales of Infant Development (Field, Scafidi, & Schanberg, 1987). These outcomes are believed to be attributed to increased stimulation by parents, which in turn encouraged gains in physical growth and development. These results suggest that parent behavior can be an important factor in determining infant outcomes. Specifically for infant massage, parents increased attention to infant needs seems to facilitate both physical and cognitive development.

Although the immediate short-term effects of massage, such as weight gain, increased alertness and motor activity, and shorter hospital stays are beneficial to preterm infants, researchers, medical staff, and parents are most interested in the long-term effects
of touch and massage interventions (Dieter et al., 2003; Field et al., 1987; Gitau et al., 2002). Most touch intervention studies with preterm infants used medical or research staff to provide the intervention but the long-term outcomes mentioned above such as higher scores on the Bayley Scales of Infant Development suggest that greater long-term outcomes result from interventions by parents (Field et al., 1987). A study by Ferber and colleagues (2002) found similar weight gains for infants massaged for three 15-minutes sessions per day for 10 days by medical staff and by the infants’ parents. Despite these findings, it is important to consider the long term effects of such an intervention and the role parent-infant interaction plays in facilitating these long-term outcomes. In addition to the physical stimulation associated with infant massage, this intervention appears to benefit parents and infants through optimal parent-infant interactions, which are encouraged by teaching parents about infant cues and behaviors and the appropriate responses to these behaviors.

Teen and Depressed Mother Characteristics Associated with Poor Infant Outcomes

As the transactional model indicates, maternal and infant characteristics have the potential to affect the responses of the other partner. Research has shown that this is true in a negative way for both teen mothers and depressed mothers. Dukewich, Borkowski, and Whitman (1999) reported that teen mothers are less knowledgeable about normal child development; display fewer and poorer quality vocalizations; are less aware of and responsive to their child’s needs; are less likely to spend time looking at their babies; and are more ambivalent about being a mother. Secco and Moffatt (2003) suggested that infants of teen mothers are at high risk for less positive mother-infant interaction and
cognitive stimulation. Also, children of teen mothers are more likely to suffer from mental, language, and social development deficits. In light of the transactional model, these two findings seem to go together.

Similarly, poor infant developmental outcomes are associated with depressed mothers. Teen mothers, who are at increased risk for depression, are in particular need of an intervention aimed at strengthening the mother-infant relationship because of the combined risks associated with being a teen mother and at risk for depression. Depressed mothers and infants were rated as having poorer interaction scores than non-depressed mothers and their infants (Field et al., 2000). Infants of depressed mothers have also been found to have poorer cognitive performance later in childhood (Hay & Kumar, 1995).

Conclusion

Benefits of infant massage have been found to have positive short-term and long-term effects on the infants’ development, positively influence mothers’ depression, and facilitate mother-infant interactions. Teaching parents about their infants’ development and behavioral cues helps these parents provide a nurturing and developmentally appropriate environment for their infants. This in turn helps ensure that these infants will have good developmental outcomes.

Because negative characteristics associated with both depressed and teen mothers have been identified in the literature, and these negative characteristics are also associated with poor infant outcomes, there is clearly a need for an intervention aimed at this population. Although the transactional model explains why negative maternal characteristics are associated with poor infant outcomes, the transactional model can also
be used to explain why an intervention focused on improving maternal characteristics and behavior should result in positive infant behaviors and outcomes.

The Current Study

The current study aims to determine whether teen mothers and their infants benefit from infant massage. A great deal of information related to the benefits of infant massage for premature infants is available in the literature, however, only a few studies have focused on infants of teen mothers. Because a number of risks have been associated with teen pregnancy, this population is a sensible choice for intervention. This study looks at the effects of infant massage on teen mothers and their infants.
OBJECTIVES

The overall purpose of the current study was to expand the research in infant massage therapy to the teen mother population and use theory to develop, implement, and evaluate a massage intervention that would have direct and indirect benefits for both mother and infant. Because all of the teen mothers in this study also participated in a parent education program, maternal characteristics assessed initially and again 3 months later may have improved regardless of group assignment. However, improvements associated with the massage intervention were expected beyond the effects of the education program.

Aim 1: There are several maternal characteristics that are believed to impact the quality of infant care. These characteristics include mood, maternal confidence, and parenting stress. The first aim of this study is to assess the impact of infant massage on the outcomes of teen mothers. It was hypothesized that teen mothers who learn to massage their infants will have lower depression, higher maternal confidence, lower parenting stress, and more positive feelings about physical contact after 2 months of massage intervention than teen mothers who do not learn to massage their infants (Hypothesis 1).

Aim 2: The second aim was to evaluate the impact of infant massage training on teen mothers’ perceptions of infant temperament. Infant massage training involves teaching mothers massage strokes to use on their infants in addition to providing
information about infant cues. Research has found that maternal perception of infant temperament can be influenced. Similar changes are expected for teen mothers’ perception of infant temperament due to improved care provided by teen mothers who were taught about infant cues during infant massage training and the association of adaptive infant behavior with appropriate care. In summary, it is hypothesized that infants who receive infant massage from their mothers will be perceived by their mothers as having more adaptive temperaments at 2 months after massage training than infants who do not receive infant massage from their mothers (Hypothesis 2).
RESEARCH DESIGN AND METHODS

Design
The current study involved a 2 (Group) x 2 (Time) mixed factorial design. The within-subject factor was Time, which had two levels (baseline and post-intervention). The between-subject factor was Group, and it had two levels (control and massage intervention).

Participants
Twenty-five African-American teen mothers ($M = 16.13$ (1.15)) attending classes through a Young Mothers Program in Alabama participated in the project. This Young Mothers Program serves as a parent training program for high school students. The Alabama curriculum for parenting, along with an additional infant care course is used in this Young Mothers Program (see Table 1). This program focuses on educational and vocational concerns for the mother along with attempting to increase knowledge of child development and improve attitudes and perceptions about parenting.
Participants were from two different urban schools that offer the Young Mothers Program. Students enrolled in the program may have originated from the two Young Mothers Program schools or have transferred from another high school with the permission of their school administrator. Due to difficulty in tracking participants who transferred to original or different schools or were unable to be contacted via the phone or in person, follow-up data was obtained for 15 participants. Data analysis is based on these participants who completed both baseline and follow-up measures. The teen mothers in the sample ranged in age from 14 years to 18 years and were currently in the 9th to 12th grade. All of the participants were African American. Demographic information by group and individual is presented in Tables 2 and 3.

Table 1
Curriculum in Young Mothers Program

<table>
<thead>
<tr>
<th>Name of Class</th>
<th>Duration of class in semesters</th>
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<tbody>
<tr>
<td>Child care and elderly services</td>
<td>2</td>
</tr>
<tr>
<td>Parenting with laboratory</td>
<td>2</td>
</tr>
<tr>
<td>Parenting and careers</td>
<td>1</td>
</tr>
<tr>
<td>Infant Care</td>
<td>1</td>
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</tbody>
</table>

Note. Parenting and careers class included a day care component.
Table 2
Means (standard deviations) for demographics by group

<table>
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<tr>
<th>Variable</th>
<th>Control</th>
<th>Massage Intervention</th>
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<tbody>
<tr>
<td></td>
<td>Included (N=8)</td>
<td>Total (N=16)</td>
</tr>
<tr>
<td>Mother's Age</td>
<td>16.25 (0.89)</td>
<td>16.13 (1.15)</td>
</tr>
<tr>
<td>Grade</td>
<td>10.50 (1.11)</td>
<td>10.20 (1.21)</td>
</tr>
<tr>
<td>Birth weight</td>
<td>6.28 (1.51)</td>
<td>6.92 (2.21)</td>
</tr>
<tr>
<td># Weeks in YMP</td>
<td>10.13 (2.95)</td>
<td>12.44 (3.20)</td>
</tr>
<tr>
<td>Baby's Age</td>
<td>1.81 (0.59)</td>
<td>2.22 (0.73)</td>
</tr>
</tbody>
</table>
Table 3
Individual Demographic Information

<table>
<thead>
<tr>
<th>ID #</th>
<th># Weeks in YMP</th>
<th>Mother's Age</th>
<th>Original School</th>
<th>Current Grade</th>
<th>Baby's Age at Baseline (in months)</th>
<th>Baby's Birth Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15</td>
<td>15</td>
<td>yes</td>
<td>9</td>
<td>3</td>
<td>2lb.14oz.</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>17</td>
<td>no</td>
<td>11</td>
<td>1 1/2</td>
<td>7lb.10oz.</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>16</td>
<td>no</td>
<td>11</td>
<td>1</td>
<td>7lb. 5 oz.</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
<td>16</td>
<td>yes</td>
<td>9</td>
<td>2</td>
<td>7lb. 10oz.</td>
</tr>
<tr>
<td>5</td>
<td>11</td>
<td>17</td>
<td>yes</td>
<td>12</td>
<td>2</td>
<td>6lb. 13oz.</td>
</tr>
<tr>
<td>6</td>
<td>11</td>
<td>15</td>
<td>no</td>
<td>10</td>
<td>2</td>
<td>5lb. 4oz.</td>
</tr>
<tr>
<td>7</td>
<td>11</td>
<td>17</td>
<td>no</td>
<td>10</td>
<td>1 1/2</td>
<td>7lb. 5oz.</td>
</tr>
<tr>
<td>8</td>
<td>11</td>
<td>17</td>
<td>yes</td>
<td>10</td>
<td>1 1/2</td>
<td>6lb. 5oz.</td>
</tr>
<tr>
<td>9</td>
<td>15</td>
<td>17</td>
<td>yes</td>
<td>12</td>
<td>7</td>
<td>6lb. 2 oz.</td>
</tr>
<tr>
<td>10</td>
<td>5</td>
<td>17</td>
<td>yes</td>
<td>12</td>
<td>2 1/2</td>
<td>7lb. 6oz.</td>
</tr>
<tr>
<td>11</td>
<td>6</td>
<td>18</td>
<td>yes</td>
<td>12</td>
<td>2</td>
<td>8lb. 4oz.</td>
</tr>
<tr>
<td>12</td>
<td>11</td>
<td>19</td>
<td>yes</td>
<td>12</td>
<td>1 1/2</td>
<td>6lb. 10oz.</td>
</tr>
<tr>
<td>13</td>
<td>11</td>
<td>16</td>
<td>yes</td>
<td>9</td>
<td>1 1/2</td>
<td>5lb. 14oz.</td>
</tr>
<tr>
<td>14</td>
<td>11</td>
<td>16</td>
<td>yes</td>
<td>9</td>
<td>1 1/2</td>
<td>7lb. 4oz.</td>
</tr>
<tr>
<td>15</td>
<td>13</td>
<td>17</td>
<td>no</td>
<td>10</td>
<td>3</td>
<td>6lb. 4oz.</td>
</tr>
</tbody>
</table>

*Note.* Original school column refers to whether the student transferred schools in order to attend the Young Mothers Program.

Recruitment
Participants were recruited for three semesters from the Young Mothers Program located at two urban high schools. With permission of the superintendent and both high school principals, the principal investigator attended Young Mothers Program classes, explaining the study requirements and procedures. Before beginning the project the consent form for the project was explained, students signed the form, and were then given a copy.

**Procedures**

All procedures occurred at the student’s school or over the phone. Baseline assessments were gathered when mothers returned to school approximately 4 weeks after delivery and included a demographic questionnaire, the BDI-II, the MCQ, the PSI, and the Questionnaire about Physical Contact. The participants were assigned to the control of intervention group on an alternating basis. A time for infant massage training was scheduled for those students in the intervention group. Infant massage training was completed one-on-one and occasionally in groups of two at the participant’s school. Students were provided with an instruction booklet and 3-ounce bottle of massage oil. These participants were asked to massage their infants for approximately 10 minutes each day for 2 months.

Follow-up assessments were completed at the student’s school or over the phone approximately 2 months after baseline measures were administered. All measures were completed at follow-up except the demographic questionnaire. Students in the control group were taught infant massage after completion of the measures if desired. All control group participants were interested in learning how to massage their babies.
Intervention Procedures

Participants in the intervention groups were taught infant massage using the Baby’s First Massage curriculum created by Teresa Ramsey (www.babysfirstmassage.com). Each training session lasted approximately 30 minutes and took place at the participant’s school after baseline assessments were collected. Infant ranged from 1 month to 8 months of age with a majority infants falling between 1 ½ months to 2 ½ months of age. The massage training was conducted by the principal investigator who is a certified infant massage instructor in the Baby’s First Massage program. Massage training began with a description and explanation of both welcoming and time-out infant behavioral cues. Specific facial expressions, body movements, and physical characteristics are used to determine the infant’s readiness for the stimulation of massage. Other information includes interpretation of infant cries and the benefits of massage for both parent and infant. Although many strokes for various parts of the body are taught, a major emphasis of this curriculum is sensitivity to infant cues and responses. The massage strokes were demonstrated on the participant’s infant if possible; however a majority of the participants were trained using a doll. Parents also received a booklet with all the information discussed as well as diagrams of the massage strokes.

Materials

Demographic Questionnaire

Demographic information for all groups was obtained using a self-report questionnaire. Information gathered included age, race, education, and number of
Parenting Stress Index

The Parenting Stress Index (PSI) (Abidin, 1995) was completed to identify stress in parent-child dyads, which may put them at risk for future dysfunctional parenting behaviors or childhood emotional or behavior problems. It consists of 120 statements about parents’ perceptions of child behavior and attitudes about parenting. Questions are rated on a 5-point Likert scale, ranging from strongly agree to strongly disagree. Responses correspond to 6 subscales on the child domain (distractibility/hyperactivity, adaptability, reinforces parents, demandingness, mood, acceptability), which measure temperament, and 7 subscales on the parent domain (competence, isolation, attachment, health, role restriction, depression, spouse). Total scores on the child domain and parent domain were used in data analysis to examine mother’s perception of infant temperament and parenting stress, respectively. Perceptions of infant temperament were assessed using statements such as, “My child seems to cry or fuss more often than most children”, and “My child gets upset easily over the smallest thing.” Statements such as, “I feel trapped by my responsibilities as a parent”, and “There are quite a few things that bother me about my life” are used to examine parenting stress. Higher scores indicate less adaptive infant temperament and higher parenting stress.

For the current study, internal consistency of the PSI was high, with an alpha coefficient of .84 for the child domain, and .88 for the parent domain.

Maternal Confidence Questionnaire
The Maternal Confidence Questionnaire (MCQ) (Parker & Zahr, 1985) measures the degree of confidence in a parenting role. It is made up of 14 statements rated on a 5-point Likert scale, ranging from never (1 point) to always (5 points). Total scores range from 14 to 70. The MCQ is unidimensional with a higher score indicating a higher perceived competence. Examples of items are “I know what makes my baby happy,” and “I can feed my baby adequately.”

Evidence of face and content validity for the MCQ has been established (Zahr, 1991, 1993). A positive correlation between the MCQ scores and the Parenting Sense of Competence Scale, where $r = .53, p < .05$ was used to establish concurrent validity (Gibaud-Wallston & Wandersman, 1977). For this study, the internal-consistency reliability has been found to be .79, with a test-retest reliability of .93 over a period of 2 to 3 months.

**Beck Depression Inventory-II**

The Beck Depression Inventory II (BDI-II) (Beck, Steer, & Brown, 1996) was used as a pre- and post-test measure to assess maternal depression. The BDI-II is a questionnaire consisting of 21 groups of statements, with each item scored on a 4-point scale indicating the presence and severity of depressed feelings/behaviors/symptoms. Items include topics such as sadness, self-dislike, and crying. Possible scores range from 0 to 63 with higher scores indicating greater levels of depression. For this study, scores were analyzed as a categorical variable with scores greater than or equal to 12 indicating depression.

Evidence for convergent and discriminant validity has been reported in the BDI-II
manual (Beck et al, 1996). The internal-consistency reliability for this study has been found to be .94, with a test-retest reliability of .69 over a 2 to 3 month time period.

**Questionnaire About Physical Contact**

The Questionnaire about Physical Contact created by Sandra Weiss (personal communication, November 2005) was administered as both a pre- and posttest measure. It consists of 3 sections with a total of 24 questions that address an individual’s thoughts and feelings about physical contact with others during three different time periods including one’s ongoing life, childhood, and current relationships with family and friends. Each item is scored on a 4-point likert scale.

Responses from the ongoing life and current relationships sections were used to determine the effects of the infant massage intervention on feelings of physical contact. Statements such as “I appreciate a hug when I need comforting”, and “I am comfortable putting my arm around a friend’s shoulder” are used to assess comfort with touch as part of one’s ongoing life. Questions that assess touch in current relationships include, “How often are you hugged, kissed or caressed by your friends and family”, and “To what extent does the touch you receive from friends and family provide a supportive sense of security in your life?” The section, which is related to physical contact as part of one’s ongoing life, measures attitudes towards touch and consists of 10 questions with possible scores ranging from 10 to 40. The section related to physical contact within current relationships measures an individual’s feelings of security with touch provided by significant other and consists of 6 questions with possible scores ranging from 6 to 24. For both sections, higher scores indicate positive experiences and higher comfort with
physical contact.
DATA ANALYSIS

Analysis

Statistical analysis of the data consisted of descriptive statistics, bivariate correlations, an Analysis of Covariance (ANCOVA) for each continuous measure, and a Chi Square for categorical measures. Analysis of covariance was used to test for post-test differences in the scores on the PSI, Questionnaire about Physical Contact, and MCQ between teen mothers who have received training in infant massage and those who did not after adjusting for the effects of pretest scores. Due to the categorization of BDI-II scores into high ($>12$) and low ($\leq11$), differences between groups were explored using chi square. The Statistical Package for Social Science (version 14.0: Chicago, Ill) was used to calculate the statistics. Descriptive statistics were first generated to examine the distribution of scores and were examined for kurtosis and skewness. In addition, Levine’s method was used to test the homogeneity of variances. No significant differences in the variance were found between groups. These analyses indicated that the assumptions of ANCOVA were met and the results are consequently valid.

Analysis of Covariance (Maxwell & Delaney, 1990; Rogosa, & Willett, 1983) was used to study the contributions of the intervention on measurement outcomes. The purpose of covariates in ANCOVA is to adjust for their relationship to the dependent variable in an effort to control error variance. Specifically in this study, pre-test scores were used as covariates, while post-test scores served as the dependent variables.
Correlations between pre- and post-test scores provided evidence for the use of pre-test scores as covariates (See Table 4). Correlations ranged from .50 to .87.

Table 4
Correlation between pre- and post-test scores

<table>
<thead>
<tr>
<th>Name of Measure</th>
<th>Correlation Coefficient</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDI-II</td>
<td>0.63</td>
<td>0.02</td>
</tr>
<tr>
<td>MCQ</td>
<td>0.87</td>
<td>0.00</td>
</tr>
<tr>
<td>PSI child domain</td>
<td>0.79</td>
<td>0.00</td>
</tr>
<tr>
<td>PSI parent domain</td>
<td>0.76</td>
<td>0.00</td>
</tr>
<tr>
<td>Physical Contact 1</td>
<td>0.50</td>
<td>0.06</td>
</tr>
<tr>
<td>Physical Contact 3</td>
<td>0.79</td>
<td>0.00</td>
</tr>
</tbody>
</table>

*Note.* Physical Contact 1 refers to overall life feelings about physical contact, while Physical Contact 3 refers to current feelings about physical contact.
RESULTS

Participant Descriptive Statistics

All continuous variables demographic were analyzed using an Analysis of Variance (ANOVA) and are displayed in Table 5. The teen mothers in the intervention were marginally older than those in the control group, $F(1, 24) = 4.50, p < .10$. Groups differed marginally on mother’s current grade level, $F(1, 21) = 3.77, p < .10$. Groups did not differ significantly on infant’s birth weight, $F(1, 23) = 0.03, p = .93$.

Table 5
ANOVA Comparing the Groups on Demographic Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>df</th>
<th>$f$</th>
<th>$p$</th>
<th>Control (N=8)</th>
<th>Massage (N=7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother’s Age</td>
<td>1,24</td>
<td>4.50</td>
<td>0.05*</td>
<td>16.25 (0.89)</td>
<td>17.14 (1.07)</td>
</tr>
<tr>
<td>Infant’s Birth Weight</td>
<td>1,23</td>
<td>0.03</td>
<td>0.93</td>
<td>6.28 (1.51)</td>
<td>6.75 (1.10)</td>
</tr>
<tr>
<td>Mother’s Current Grade</td>
<td>1,21</td>
<td>3.77</td>
<td>0.07*</td>
<td>10.50 (1.11)</td>
<td>11.00 (1.41)</td>
</tr>
</tbody>
</table>

*Note.* * indicates $p < .10$.

Baseline scores were collected for all measures. Pre-intervention means are found in Table 6.
Primary Analyses

_Hypothesis 1_

It was hypothesized that teen mothers who learn to massage their infants will have lower depression, higher maternal confidence, lower parenting stress, and more positive feelings about physical contact at 3 months after the birth of their infants than teen mothers who do not massage their infants (Hypothesis 1). To analyze the impact of infant massage training on maternal confidence, parenting stress, and feelings about physical contact, separate ANCOVAs were run for each measure. For these analyses, the independent variable was the group (massage intervention or control). The dependent variables were the MCQ, PSI child domain, PSI parent domain, PSI total stress, Questionnaire about Physical Contact (ongoing and current) post-test scores, and the covariates were the pre-test scores for each corresponding measure. Using the pre-test scores as covariates allowed an adjustment for any difference between the groups prior to
intervention. Chi square was used to assess group differences on depression scores.

The first set of analyses compared the change in maternal confidence, parental stress in the parent domain, and feelings about physical contact (ongoing and current) for the teen mothers who received infant massage training with that of the teen mothers who did not receive the training (see Table 7). There was a significant difference in current feelings about physical contact, $F(1, 12) = 7.50, \ p < 0.05$. Teen mothers in the intervention group indicated more positive and comfortable feelings about physical contact with their current relationships than those in the control group (adjusted $Ms$ 19.57 and 17.25, respectively). However, there was no significant difference between control and massage intervention groups in maternal confidence, parental stress in the parent domain, or ongoing feelings of physical contact. As shown in table 8, the chi square revealed that the groups differed on depression scores, $\chi^2 (1, 10) = 4.57, \ p < 0.05$. Teen mothers who were trained in infant massage had significantly lower depression scores than teen mothers without massage training.

### Table 7
Analysis of Covariance for Massage Intervention vs. Control

<table>
<thead>
<tr>
<th>Measure</th>
<th>Adjusted Post-test means</th>
<th>df</th>
<th>$F$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control</td>
<td>Intervention</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCQ</td>
<td>60.63 (7.05)</td>
<td>67.00 (2.35)</td>
<td>1,10</td>
<td>2.39</td>
</tr>
<tr>
<td>PSI child domain</td>
<td>63.00 (30.06)</td>
<td>28.57 (19.52)</td>
<td>1,12</td>
<td>5.52</td>
</tr>
<tr>
<td>PSI parent domain</td>
<td>69.38 (29.57)</td>
<td>44.29 (24.05)</td>
<td>1,12</td>
<td>2.19</td>
</tr>
<tr>
<td>Physical Contact ongoing</td>
<td>29.38 (5.07)</td>
<td>32.14 (3.53)</td>
<td>1,12</td>
<td>2.57</td>
</tr>
<tr>
<td>Physical Contact current</td>
<td>17.25 (3.06)</td>
<td>19.57 (4.72)</td>
<td>1,12</td>
<td>7.50</td>
</tr>
</tbody>
</table>

*Note.* * indicates $p < .05
Hypothesis 2

The second hypothesis was that infants who receive infant massage from their mothers would be perceived by their mothers as having more adaptive temperaments at 3 months of age than infants who do not receive infant massage from their mothers. Although infant development outcomes were not directly assessed, mother’s perception of child temperament was measured by the PSI child domain subsection. These results were used to indicate the impact massage had on infant behavior. To analyze the impact infant massage had on infant behavior, an ANCOVA was run for PSI child domain scores by group (control and massage intervention). The PSI child domain pre-test score was used as the covariate and the PSI child domain post-test scores as the dependent variable. The independent variable was the group (control and massage intervention).

ANCOVA results showed that there was a significant difference in perceived child temperament, $F(1, 12) = 6.52, \ p < 0.05$. Teen mothers in the intervention group reported significantly more adaptive temperament than teen mothers in the control group (adjusted $Ms$ 28.57 and 63.00, respectively).

Table 8
Pearson Chi-Square ($X^2$) Comparisons of Categorical Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>N</th>
<th>df</th>
<th>$X^2$</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDI-II</td>
<td>14</td>
<td>1</td>
<td>4.6</td>
<td>0.03*</td>
</tr>
</tbody>
</table>

*Note. * indicates $p < .05$

The results of these two sets of analyses suggest that the massage intervention had a positive impact on mothers’ current level of comfort with physical contact, maternal depression, and parental perceptions of more adaptive child temperaments. However,
significant group differences were not found in other measures. Although these analyses failed to show significant group differences on a number of measures, these findings may not be truly indicative of the effects of an infant massage intervention on teen mothers and their infants.

Due to small sample size and large within group variability, effect sizes for each measure were calculated in order to determine the degree of impact the massage intervention had on each variable compared to controls. Cohen’s $d$ was calculated by subtracting the corrected intervention post-test mean from the corrected control post-test mean for each measure and dividing this result by the pooled standard deviation for each measure ($d = (M_1 - M_2)/\sigma_{\text{pooled}}$). According to Cohen (1988), effect sizes can be defined as small ($d=.2$), medium ($d=.5$) or large ($d=.8$). Using these guidelines, the massage intervention exhibited a medium effect on feelings of physical contact with current relationships ($d=-0.59$). A large effect of massage intervention was found for parental stress, maternal perception of infant temperament and ongoing feelings of physical contact ($d=0.92, 1.34, \text{and} -0.62$, respectfully). Also, a large effect of massage intervention was found for both depression and maternal confidence ($d=0.91 \text{and} -1.10$, respectively). Effect sizes are displayed in Table 9.
Table 9
Effect Sizes for Massage Intervention vs. Control

<table>
<thead>
<tr>
<th>Measure</th>
<th>effect size</th>
<th>$d$</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSI child domain</td>
<td>large</td>
<td>1.34</td>
</tr>
<tr>
<td>MCQ</td>
<td>large</td>
<td>-1.1</td>
</tr>
<tr>
<td>PSI parent domain</td>
<td>large</td>
<td>0.92</td>
</tr>
<tr>
<td>BDI-II</td>
<td>large</td>
<td>0.91</td>
</tr>
<tr>
<td>Physical Contact ongoing</td>
<td>large</td>
<td>-0.62</td>
</tr>
<tr>
<td>Physical Contact current</td>
<td>medium</td>
<td>-0.59</td>
</tr>
</tbody>
</table>
DISCUSSION

Previous massage studies have identified positive impacts on infant development, mother’s psychological well-being and mother-infant interactions in relation to infant massage (Field et al., 1986; Onozawa et al, 2001). However, the primary focus of infant massage research has been in the preterm infant population and related to the physical aspects of massage. The purpose of this study was to examine the effects of an infant massage intervention for teenage mothers and their infants. The results of this study provide some support for the usefulness of teaching infant massage to teen mothers as a way of enhancing maternal-infant physical contact and lowering depression. This study also supports the use of teaching infant massage as a way of increasing maternal awareness of infant states, providing teen mothers with the skills to assess infant behavior and the ability to interact with their infant based on sensitivity to the baby’s readiness for stimulation can influence the mother’s perception of infant temperament. Maternal confidence in the intervention group increased although this change did not prove to be significant. However, the large effect sizes found in this study were suggestive of important effects that need to be investigated in future studies with larger samples.

First, a large effect size for maternal confidence suggests that infant massage training may have a positive influence on maternal confidence for teen mothers. Although this study failed to find significant differences in maternal confidence scores between mothers who were trained in massage and those that were not, the large effect
size for this measure indicates a need for additional research on this topic with a larger sample. The potential findings of this future research may have significant implications for infant outcomes. When mothers are knowledgeable and confident in their parenting abilities, infants’ needs are quickly and appropriately met. Consequently, a trusting relationship between mother and infant is formed and the infant has a healthy platform to begin his/her development. A number of items on the measure of maternal confidence were directly related to recognizing infant cues. This lends support to the interpretation of the importance of infant behavioral cue knowledge in the establishment of maternal confidence. However, general statements about the parenting role were also included.

Second, significant differences were found between the control and intervention groups in the area of depression. Along with the large effect size associated with post-intervention depression scores, these findings indicate that the massage intervention was associated with lower depression in teen mothers. Categorizing these scores into high and low depression served to decrease variability within this measure. Although both groups showed improvement in depression scores from baseline, teen mothers in the massage intervention group had much larger improvements in depression scores than their controls. These results replicate the findings of Onozawa and colleagues (2001), who also found improvement in depression scores among mothers who were trained in infant massage. Although the aspects of this relationship are still unclear, it is possible that increased knowledge of infant cues may facilitate positive mother-infant interaction, which in turn may benefit the mother’s depression.

Third, teen mothers were significantly more comfortable with physical contact among family and friends after the massage intervention. These results may have effects
on mother-infant interactions because of the benefits of physical touch on attachment. In addition, enhanced comfort with physical contact from family and friends may serve as a protector against depression. However, significant differences between groups in individuals’ attitudes toward touch were not found.

Finally, maternal perception of infant temperament was significantly influenced by the massage training. Teen mothers trained in infant massage rated their infants more positively in terms of temperament. This result supports the idea that the mother-infant relationship is transactional. In other words, because mothers are better equipped to recognize and understand infant behavior, they may respond appropriately to these behaviors. This appropriate response by the mother reinforces the infant’s behavior because the infant’s needs are met, resulting a satisfied and presumably content infant. Finally, this display of contentment and happiness by the infant serves to verify the mother’s confidence in parenting. So, this finding suggests that teen mothers trained in infant massage may be better prepared to interpret infant behavior and respond appropriately, which leads to positive assessment of infant behavior.

This study serves the purpose of integrating a number of separate areas of research. Previous research has emphasized the benefits of providing information about infants to their mothers (Bialoskurski et al., 2002; Mazurek-Melnyk et al., 2002; Pridham et al., 1998) and interventions that facilitate nurturing touch (Field et al., 1987). Because infant massage combines both of these variables, it is possible that both information sharing and physical touch are responsible for the benefits associated with infant massage. The population in this study was particularly appropriate for training in both of these areas. These teen mothers indicated low levels of comfort and experience with
physical contact at baseline. Teen mothers have also been shown to be less knowledgeable about child development (Mann et al, 2004). Therefore, the massage training intervention served the purpose of providing teen mothers with the knowledge they were lacking about both normal infant behavior and the benefits of physical contact.

Implications

The purpose of this study was to examine the effects of an infant massage training intervention on teen mothers’ knowledge and attitudes about parenting and their infants’ behavior. The results of this study provide some support for the teaching of infant massage. This study did not assess the effectiveness of current methods employed with the teen mothers in this particular parent education program; however, results indicate that infant massage training may lead to improvements beyond those achieved with a typical parent education curriculum. The desire for all control participants to be trained in infant massage after completion of the study suggests that this form of intervention may be accepted and perhaps even enjoyed by teen parents in parenting education classes. Infant massage training shows potential as a supplement to current teen mother education in high schools.

Limitations

The attempt to extend infant massage research to the teen population did not come without limitations. The particular population used for this study was a group of urban, African-American students whose families tend to be quite mobile. This made follow-up data collection difficult because students moved to different schools and often could not
be located using previously collected phone information. Additionally, many of the
students enrolled in the Young Mothers Program originally attended another high school
prior to enrolling in the program. This means that after one or two semesters in the
program, these students would return to their original high school and therefore could not
be located in classes for the Young Mothers Program. A poor retention rate made it
difficult to generalize these results and contributed significantly to the small sample size.

Since the participants were high school students, it was also difficult to schedule
baseline assessments. For this reason, a variation in the initiation of massage among
participants in the massage intervention group occurred with infants ranging from 1 to 3
months old. Due to rapid development in early infancy, this variation may have also had
an impact on the results of this study.

A few limitations in study design are also important to highlight. All measures
were self-report and therefore subject to intentional and unintentional misinformation.
Additionally, infant development outcomes were not possible to be directly assessed with
an objective measure. A longitudinal study that could evaluate infant outcomes across a
longer time period is important in confirming this study’s findings.

Finally, the inability to monitor compliance with the massage intervention was
another limitation of this study. The mothers were asked to massage their infants daily
for 2 months and complete a worksheet that would document each massage session.
Unfortunately, no worksheets were completed and returned. Therefore, it is unclear
whether the findings are related to actually massaging their infants or simply being
provided with the knowledge about infant behavior. Future studies should ask
participants about massage frequency at follow-up in order to assess compliance with the
massage intervention. It is also not clear how length of treatment is related to the effectiveness of the massage intervention. This study implemented the massage intervention for 2 months; however, a shorter duration may have been just as beneficial. These limitations indicate a need to replicate these findings with a larger sample, using more objective measures, and across varying time spans.

Future Research

Despite some significant findings of this study, answers to a number of questions remain unclear. In order to determine the separate role that different components of infant massage play in both parent and infant outcomes, knowledge about infant behavior and physical stimulation through massage need to be compared as separate and distinct interventions. Although prior research has shown the benefit of sharing information with parents, research about the impact of knowledge on the topic of infant behavior is lacking (Bialoskurski et al., 2002; Mazurek-Melnyk et al., 2002; Reichman et al., 2000).

The results of the current study gave some support for the notion that infant development is influenced by the mother. Due to the short interval between baseline and follow-up data collection, this relationship is still unclear. Future studies should utilize a longitudinal design with multiple data collection point to determine the persistence of group differences over time. Additionally, infant development outcomes may be more easily evaluated with older infants, making inferences about developmental outcomes more valid.

The large variability found within the depression scores indicates a need consideration of other measures for depression assessment in the future. Shorter and
more postpartum specific depression measures such as the Edinburgh Postnatal Depression Scale are suggested.

Summary

In summary, this study investigated the effects of an infant massage intervention on the outcomes of teen mothers and their infants. Although further investigations are necessary, the current study provides insight into the feasibility and effectiveness of teaching infant massage as a component of schools’ teen parenting education curriculum. Infant massage is well-researched, inexpensive, and innovative technique that provides both hands-on experience and intellectual enhancement. This study indicates the potential benefits of a massage intervention to both mother and infant as a supplement to the traditional parent education curriculum taught in high schools today.
LIST OF REFERENCES


Miller, D. B. & Holditch-Davis, D. (1992). Interactions of parents and nurses with high-


APPENDIX A

ETHICAL APPROVAL
Form 4: IRB Approval Form
Identification and Certification of Research Projects Involving Human Subjects

UAB's Institutional Review Boards for Human Use (IRBs) have an approved Federalwide Assurance with the Office for Human Research Protections (OHRP). The UAB IRBs are also in compliance with 21 CFR Parts 50 and 56 and ICH GCP Guidelines. The Assurance became effective on November 24, 2003 and expires on February 14, 2009. The Assurance number is FWA00005960.

Principal Investigator: OSWALT, KRISTA L
Co-Investigator(s):
Protocol Number: F051212008
Protocol Title: Outcomes of Massage Interventions on Teen Mothers and Their Infants

The IRB reviewed and approved the above named project on 11/29/2006. The review was conducted in accordance with UAB's Assurance of Compliance approved by the Department of Health and Human Services. This Project will be subject to Annual continuing review as provided in that Assurance.

This project received FULL COMMITTEE review.

IRB Approval Date: 11/29/2006
Date IRB Approval Issued: 12-08-06
Identification Number: IRB00000726

Ferdinand Uthaler, M.D.
Chairman of the Institutional Review Board for Human Use (IRB)

Investigators please note:

The IRB approved consent form used in the study must contain the IRB approval date and expiration date.

IRB approval is given for one year unless otherwise noted. For projects subject to annual review research activities may not continue past the one year anniversary of the IRB approval date.

Any modifications in the study methodology, protocol and/or consent form must be submitted for review and approval to the IRB prior to implementation.

Adverse Events and/or unanticipated risks to subjects or others at UAB or other participating institutions must be reported promptly to the IRB.
APPENDIX B

MASSAGE MATERIALS
This booklet is for people who have just given birth to a baby, or for those who are caring for a newborn. It is a little book about something very important. It describes "how to" touch your newborn baby in a nurturing, gentle way that not only satisfies your baby's need for touch, but also helps you begin to communicate.

Understanding early cues your baby gives you will help build a foundation for a lifetime of positive communication. Communication is a vital element in parent-child relationships; the need for "hearing" and being "heard" is as lasting as families. Stroking your baby is one of the most natural things to do as a parent, and is the first form of communication a baby experiences... as an embryo developing inside the uterus. The skin is the first organ to develop, and touch is the first sense to develop. You will come to understand that massage feels good to the hands (and heart) of the person doing the strokes. When we touch, we are touched; and when we pay attention in a soft and easy way, we begin to make little miracles happen... we learn to love.

The strokes you will learn are so simple that a young child could learn them, and any member of the family can share in this experience. If you are gentle, and go slowly through these instructions, you will do these strokes perfectly the first time.

Terese Kirkpatrick Ramsey

Benefits of Massage For Your Newborn

- Feedings are digested better, which may help the baby gain weight easier and grow at a faster pace.
- Stimulating the nervous system through the skin may help build muscle tone, coordination and brain functioning.
- The baby receives special attention from you, which helps you grow closer to each other.
- Circulation is improved, which may speed healing of birth-related trauma.
- Massage has a calming effect which leads to deeper, more restful sleep.
- The immune system is stimulated through the skin by at least five minutes of rubbing daily.
Getting Started...

Newborns have special needs while healing from the birth experience and settling into life outside the uterus. For the first time, they are using energy to breathe, to keep warm, and digest food. They are coping with enormous changes! Help them by protecting their available energy. Keep them warm, not hot.

If your baby is working hard to keep warm, then do the strokes over top of clothing. (No need for lubricant!) Keep them comfortable (learn the "time-out" cues in the next section; stop the stroking if they begin to "talk" to you in this way). Keep the cord clean and free of oil or cornstarch. Newborns are unusually sleepy the first few days, but may be massaged even if asleep.

- These strokes help "turn on" the digestive system. If you do these simple strokes before feeding, digestion will be improved. If you are breast feeding, you can stroke the baby right after feeding. If you are feeding the baby formula, either stroke before the feedings, or wait 30 minutes afterwards.

- Take your time; this is pleasurable for you and the baby. Let this be a restful experience for you while you are healing, too. After you gather the necessary items and have washed your hands, find a comfortable place to sit down.

- You will need a cold-pressed vegetable, nut oil, baby lotion or corn-starch as a lubricant. Some light oils that feel nice on the skin are almond, sunflower, sesame, pecan, hazelnut and safflower. Do not use any perfumes on your infant's skin until your baby is at least 3 months old.

- Remember: if your baby is cold (some newborns take a little time to be able to keep themselves warm) do the strokes over the top of clothing—without any lubricant.

- You will need a pillow or thick blanket to support the baby - soft enough to be comforting but NOT smothering. Keep your baby wrapped in a lightweight blanket during the massage for warmth and a sense of security. If necessary, change the baby's diaper before you begin.

- Repeat a stroke several times in each area. Apply gentle pressure, using the pads of your fingers, gliding over the baby's skin without pulling on it.

- Stroke more slowly/gently in any tender areas, but do so as this may speed the healing process.

- Always keep one hand on the baby's body while you do the strokes. Your baby will feel more secure and will accept the stroking much more readily.

- Remember: there is no "perfect" way to massage a baby. The important thing is to touch and stroke the baby so that he or she can feel your love and calming influence.

- If the baby starts crying or fussing, stop stroking and use the calming techniques that are described to you in the next pages. When the baby is calm again, continue the strokes.
A few words about crying...

Maybe you feel like crying! Go ahead, you’ll feel better! Crying is one of your infant’s most powerful ways to let you know he or she needs your help. One thing we don’t know how to teach are the specifics about each and every cry. Your baby is an individual and will teach you what each of her/his cries mean.

In three or four weeks, you will be an expert with this, so relax. You might want to go to a library and ask about books on crying, or talk to someone you respect in how they have parented their children.

As a newborn care teacher for several years, I noticed these things regarding crying:

There are basically two kinds of cries: Help me, someone! and Please listen to me! If your baby wants you to listen, you listen. Your baby will be able to look you in the eyes, to look back and make nice little reassuring sounds back to him or her; when the baby is “talked out,” they’ll go to sleep, and sleep very well knowing they have been heard. You WILL NOT spoil your child.

The I need help cry is very easy to spot. All you have to do is figure out what your baby needs help with! It could be hunger, needing to burp, or a diaper change; too tight clothing, thirst, being overly tired or sleepy; gas (See page 12), and whatever else you can think of... Then, as soon as you can (and without a lot of tension), give the help your baby needs. Here is what these cries are like:

Very soon, you become the expert with your Infant. You begin to notice what is normal and not normal, and will be able to respond correctly to your baby’s cries... and both of you will be very pleased!

Ways to calm your baby...

It is very interesting how babies begin to cry after you leave the hospital. Most babies are too tired at first, and sleep most of the time. But, your baby will wake up, and will probably be fussy at times. Very sensitive babies often are very fussy babies, and will need lots of your time and attention. Ask for help if you are feeling overwhelmed. Your baby seems to know when you feel upset, and will actually become more upset! So begin with yourself... Take a few slow, deep breaths like you did during labor.

Learn baby’s early cues of distress:

- Arching the back
- Spitting up or hiccups (not related to eating)
- Avoiding looking into your eyes
- Spreading his or her fingers as if to say “STOP”
- Crying the I Need Help cry

Explore some causes for your baby’s fussiness, such as:

- Hunger, needing to burp
- Gassiness (see Step 3, 4, 5 & 6 for “gas relief”)
- Needing a diaper change
- Over stimulation
- Overly tired

These are some simple things to try which may calm your baby:

- Place the baby in the fetal position with head down, arms tucked in, knees tucked up.
- Rest your hands on baby for a few seconds without moving them. Breathe deeply and relax.
- Wrap the baby snugly except where you are stroking, especially arms and hands.
- If baby wants to suck, use a pacifier, bring the baby’s fingers to the mouth for sucking, or if breastfeeding, put baby to the breast.
- Stop talking or playing music.
- One person take the baby to a darkened room.
- Wrap your baby snugly and cradle, rock or walk your baby.
- Place your baby on your chest, up by your left shoulder, stroke from the head down to the diaper, over the clothing and blanket.