ELSEVIER

Journal of Affective Disorders 63 (2001) 201–207

JOURNAL OF AFFECTIVE DISORDERS

www.elsevier.com/locate/jad

Research report

Infant massage improves mother–infant interaction for mothers with postnatal depression

Katsuno Onozawa[a,b], Vivette Glover[b,*], Diana Adams[b], Neena Modi[b], R. Channi Kumar[a,†]

[a]*Section of Perinatal Psychiatry, Institute of Psychiatry, De Crespigny Park, London SE5 8AF, UK*
[b]*Division of Paediatrics, Obstetrics and Gynaecology, Imperial College School of Medicine, Queen Charlotte's and Chelsea Hospital, Goldhawk Road, London W6 0XG, UK*

Received 22 November 1999; accepted 3 March 2000

Abstract

Background: Postnatal depression can have long term adverse consequences for the mother–infant relationship and the infant's development. Improving a mother's depression per se has been found to have little impact on mother–infant interaction. The aims of this study were to determine whether attending regular massage classes could reduce maternal depression and also improve the quality of mother–infant interaction. *Method:* Thirty-four primiparous depressed mothers, median 9 weeks postpartum, identified as being depressed following completion of the Edinburgh Postnatal Depression Scale (EPDS) at 4 weeks postpartum, were randomly allocated either to an infant massage class and a support group (massage group) or to a support group (control group). Each group attended for five weekly sessions. Changes in maternal depression and mother–infant interaction were assessed at the beginning and the end of the study by comparing EPDS scores and ratings of videotaped mother–infant interaction. *Results:* The EPDS scores fell in both groups. Significant improvement of mother–infant interaction was seen only in the massage group. *Limitation:* The sample size was small and had relatively high dropout. It was not possible to distinguish which aspects of the infant massage class contributed to the benefit. *Conclusion:* This study suggests that learning the practice of infant massage by mothers is an effective treatment for facilitating mother–infant interaction in mothers with postnatal depression.

Keywords: Postnatal depression; Infant massage; Mother–infant interaction; EPDS

1. Introduction

Postnatal depression affects 10–15% of mothers (O'Hara and Swain, 1996) and there is evidence that it is linked with impaired mother–infant interaction and with adverse psychological developmental out-

*Corresponding author. Tel.: +44-208-383-3524; fax: +44-208-741-1948.
E-mail address: v.glover@ic.ac.uk (V. Glover).
†Dr. Kumar sadly died last September.

0165-0327/01/$ – see front matter
PII: S0165-0327(00)00198-1

come for the child (Cogill et al., 1986; Murray, 1992; Sharp et al., 1995; Murray and Cooper, 1997). The early postpartum months may be especially important for the establishment of a satisfactory relationship between mother and infant and also for infant development (Hay and Kumar, 1995). It is clearly of potential clinical benefit if the interaction in depressed mothers can be enhanced by a positive intervention in the early postpartum period.

Improving maternal depression does not, in itself, necessarily improve mother–infant interaction (Cooper and Murray, 1997). Direct attempts to improve the quality of mother–infant interactions, independently of improving their depression, have been reported to have had more success. 'Brief mother–baby psychotherapy' has been proposed by Cramer et al. (1990). A second therapeutic approach is that of McDonnough (1993) which uses cognitive-behavioural strategies to improve the mother's parenting capacities. Field (1977) has recommended teaching mothers both about infants' cues and also about massage. In one study with the infants of depressed adolescent mothers, she showed that massage of the infants by a trained nurse had several beneficial effects such as improved growth, as well as improved interaction between the mother and her infant (Field et al., 1996b). In another study she coached overintrusive mothers to imitate their infants and withdrawn mothers to keep their infants' attention (Malphurs et al., 1996).

One possible strategy for improving mother–infant interaction when mothers are depressed is for them to learn to massage their infants. The aim of the present study was to determine whether attending an infant massage class, which also emphasized understanding the infant's behavioural cues, could help mother–infant interaction in mothers with postnatal depression. The effects on maternal depression were also monitored.

2. Methods

2.1. Subjects

Primiparous mothers who delivered at Queen Charlotte's and Chelsea Hospital who were aged 18 to 45 years with a singleton born from 37 to 42 weeks gestation, with no gross congenital abnormality and not requiring admission to a special care baby unit, were eligible for the study. Eight hundred and thirty such women were sent the Edinburgh Postnatal Depression Scale (EPDS) (Cox et al., 1987) at 4 weeks postpartum and 581 (70.0%) completed it. Ninety one (15.7%) scored ≥ 13 (the screening cut-off for major depression) and of these 59 agreed to participate in the study.

The subjects, median 9 weeks postpartum, were randomly allocated either to an infant massage class and a support group (massage group) or to a support group (control group). Thirty-four (19 in the massage group, 15 in the control group) started the study; the others did not take part primarily because the timings of the study were not convenient. Seven from the massage group and 2 from the control group did not complete. Again the main reason for dropout was the inconvenient time of the sessions. Thus 12 in the massage group and 13 controls completed all the sessions. Two mothers in the massage group and 1 in the control group could not complete the video recordings because their infants were not settled.

The study was approved by the Ethics Committee of the Imperial College Medical School (No. 97/5261). Consent was obtained from all the mothers.

2.2. Treatment procedures

2.2.1. Massage class

The mothers and their infants attended the weekly infant massage class at Queen Charlotte's and Chelsea Hospital; the class was for 1 h from 10 am and the course lasted 5 weeks. These classes are available for all parents who have recently given birth at the Queen Charlotte's and Chelsea Hospital and are not restricted to depressed mothers. Instructors are trained according to procedures approved by the International Association of Infant Massage. They teach the techniques of infant massage by encouraging parents to observe and respond to their infants' body language and cues and adjust their touch accordingly.

Cues: Massage is best when the baby is in a quiet alert state. Engagement cues include bright-eyed focused expression, still/calm attentiveness, relaxed arms, shoulders and palms. Disengagement cues include gaze aversion, yawning, arching, grimacing,

anxious tongue poking and legs/arms held stiffly. Parents are encouraged to respond to such cues as quickly as possible to promote longer periods of quiet alertness and also to avoid emotional extremes. Recognition of self-regulation cues such as hand to mouth, hand to foot clasping and leg bracing help parents to find tactics which prevent negative reactions. These are achieved by positioning and containment strategies such as covering with a blanket or cuddling rather than silencing strategies such as dummies or instant food gratification. By watching for and understanding these cues, parents learn to relate to their infants in a more sensitive way.

Massage: The instructor demonstrates the massage strokes on a doll, while the mother works with her own infant. The class begins with a short period of relaxation which allows the parents to unwind. Then they place a resting hand on the infant, and for some very young or sensitive infants this will be as far as they go. If infants indicate that they are not in the right mood, the massage is not begun. The massage begins with slow rhythmic strokes, the mother's speed and timing being guided by the infant's body signals. Each part of the body is treated in a different way, e.g. legs: milking strokes from hip to foot, gentle squeezes and twists in a wringing motion; foot: gentle pressing on a sole of foot, stroking from toes to ankle on the top of the foot; abdomen: hand over hand strokes in a paddle wheel fashion, circular clockwise direction strokes avoiding the ribs.

2.2.2. Support group

All mothers in the study attended a support group led by DA, the control and massage groups attending separately. The sessions, for 5 weeks, consisted of half an hour of informal group discussion in which practical problems and coping strategies were discussed.

2.3. Assessments

The mother and infant pairs were assessed at the hospital on two occasions, once on the day of the first massage class or support group, and once on the day of the last. At both assessments, prior to the treatment session, the mothers filled in the EPDS.

In addition, the mothers were asked to engage in face-to-face play interaction with their infants for a 5-min period as described by Murray et al. (1996a). This was video-recorded for later assessment. At a time when the mother felt that the infant was alert and contented, the infant was placed in a reclining seat opposite the mother, who was then asked to play with the infant without the use of toys. The video camera was positioned to obtain a near full-face view of the infant, and of the mother in profile, so that eye-to-eye contact could be scored. A mirror was placed adjacent to the infant's seat so that full-face reflection of the mother appeared alongside that of the infant in the same camera frame. If the infant became distressed and was not readily consoled, the session was stopped.

2.3.1. Assessment of video recording

The observation measures, the global ratings for mother–infant interactions at 2 months by Fiori-Cowley and Murray, fall into: (1) maternal contribution to the interaction; (2) infant's contribution; and (3) the interaction itself. There are several dimensions within each category rated from good to poor (5 to 1) and the results are averaged. All tapes were assessed by KO. A random selection of 10 dyads were rated by an experienced independent rater (M. Gunning) who was totally blind to this study. Overall, KO's ratings met the required reliability criteria of 90% for infant scores and mother–infant interaction scores. However, there were two groups of dimensions of maternal scores which did not and these were eliminated. Thus the final dimensions used were; Maternal: (a) warm to cold, (b) non-intrusive to intrusive; Infant: (a) attentive to non-attentive, (b) lively to inert, (c) happy to distressed; Interaction: smooth/difficult; fun/serious; mutually satisfying/unsatisfying; much engagement/no engagement; excited engagement/quiet engagement.

2.4. Statistical analysis

All data were analyzed by non-parametric methods because of the small size of samples and the fact that scores were not always normally distributed. All comparisons were carried out using the Mann–Whitney U-test (two-tailed) or Fisher's exact probability test, as appropriate.

3. Results

Table 1 shows the characteristics of the two groups that completed the study together with the dropouts. There was no difference in baseline depression score or other demographic variables in the two groups, or in those that started but did not complete the study. One mother in the massage group was taking anti-depressants and one in the control group had been depressed during pregnancy.

Table 2 shows the results for the EPDS scores. There was an improvement in mood in both groups over the few weeks interval between recruitment and starting the study. There was also an improvement in both groups over the whole course of the study but this was more marked in the massage group. The

Table 1
Characteristics of subjects

[95% confidence intervals]	Massage $n = 12$	Control $n = 13$	Non-completers $n = 9$
Median age of mothers (years)	32.0 [29.6–34.5]	33.0 [31.2–35.9]	31.0 [28.3–32.1]
Median age of infants (weeks)	9.0 [8.0–9.8]	8.9 [7.6–10.0]	8.6 [7.4–10.5]
Median birth weight (g)	3546 [3269–3672]	3390 [3241–3532]	3392 [3278–3744]
Sex of infant (Male:Female)	6:6	11:2	6:3
Mode of delivery: SVD	4	3	5
Assisted	6	4	1
Elective CS	1	2	2
Emergency CS	1	4	1
Marital status: Married/cohabiting	12	10	9
Single	0	3	0
Obstetric complications:			
Yes	5	7	3
No	7	6	6
Ethnicity: White	11	12	7
Other	1	1	2
Country of birth:			
Britain	8	11	5
Other English speaking	1	0	0
Other non-English speaking	3	2	4
Median EPDS at recruitment	15.0 [14.0–18.1]	16.0 [14.7–18.7]	17.0 [12.9–21.9]

Table 2
Median scores on EPDS [95% confidence intervals]

Treatment	n	Assessment time			Median[a] delta	Z[b]	P
		Baseline	First session	Final session			
Message	12	15.0 [14.0–18.1]	9.5 [6.1–13.2]	5.0 [2.2–7.8]	12.0 [8.0–14.2]	−2.2	0.03
Control	13	16.0 [14.7–18.7]	13.0 [10.3–14.0]	10.0 [7.7–11.8]	6.0 [4.6–9.0]		

[a] Median delta from baseline to final session.
[b] Compared with control group.

Table 3
Median maternal, infant and interaction scores [95% confidence intervals]

Treatment			n	Assessment time		Median delta	Z^a	P
				First session	Final session			
Massage	Mother	(a) Warm to cold		3.2 [2.9–3.6]	3.6 [3.6–4.0]	0.8 [0.1–1.2]	−2.6	0.01
		(b) Non-intrusive to intrusive		3.5 [3.1–4.2]	4.5 [3.2–4.4]	0.8 [0.1–1.0]	−2.0	0.05
	Infant	(a) Attentive to non-attentive	10	1.3 [1.1–2.1]	3.0 [2.4–3.5]	1.2 [0.7–2.0]	−3.3	0.001
		(b) Lively to inert		2.0 [1.7–2.7]	4.0 [3.2–4.4]	1.5 [1.0–2.2]	−2.7	0.006
		(c) Happy to distressed		2.0 [1.3–2.8]	4.5 [3.6–4.6]	2.0 [1.5–2.8]	−3.6	0.0003
	Interaction			1.1 [1.1–2.1]	3.2 [2.7–4.1]	1.5 [1.1–2.4]	−3.5	0.0004
Control	Mother	(a) Warm to cold		3.2 [2.8–3.4]	3.2 [2.9–3.3]	0.0 [−0.2–0.2]		
		(b) Non-intrusive to intrusive		4.0 [3.3–4.2]	4.0 [3.4–4.1]	0.0 [−0.2–0.2]		
	Infant	(a) Attentive to non-attentive	12	2.0 [1.4–2.6]	2.2 [1.5–2.5]	0.0 [−0.4–0.4]		
		(b) Lively to inert		2.7 [1.9–3.1]	2.7 [2.4–3.2]	0.3 [−0.3–0.9]		
		(c) Happy to distressed		3.0 [2.7–3.7]	3.5 [2.5–3.9]	0.5 [−0.6–0.7]		
	Interaction			2.1 [1.4–2.6]	2.0 [1.6–2.7]	0.3 [−0.3–0.6]		

[a] Compared with equivalent control group.

reduction in the EPDS score from recruitment to the final session for the massage group was significantly greater than for the control group.

Table 3 shows the maternal, infant and interaction scores from the videotaped interaction test. It can be seen that in every dimension measured the massage group showed an improvement whereas the control group remained the same. Thus the mother's attitude towards the infant, the infant's responses and the overall mother–infant interaction was significantly improved by attending the massage class compared with the control group.

4. Discussion

This study has found a clear benefit for mothers with postnatal depression from attending 5 weeks of a massage class.

First, there was a greater improvement in depression scores in the massage group than in the control group. It must be noted that much of the effect was before the class started and may reflect expectation (Appleby et al., 1997). However, the benefit was maintained. Several previous studies have shown improvements in depression following non-directive counselling (Holden et al., 1989), cognitive-behavioural counselling or treatment with fluoxetine (Appleby et al., 1997), or with transdermal oestrogen (Gregoire et al., 1996). However not all mothers respond and most prefer non-pharmacological treatment (Appleby et al., 1997). These results complement those of Field et al. (1996a) who showed that massage and relaxation therapy reduced depression in adolescent mothers.

Secondly, in all dimensions studied by the video assessment, of mothers' mood and behaviour, the infants' mood and behaviour and in their interaction, there was a consistent and marked improvement in the massage group compared with the controls. If only the mother–infant pairs with boys were compared, the results remained significant, e.g. for interaction (median delta 2.0 [95%CI 1.0–3.2] in the massage group, $n = 6$ versus 0.2 [−0.4–0.6] in the control group, $n = 12$, $Z = -2.9$, $P = 0.003$).

The major problems with the study were the small size and high dropout, especially in the massage group. A larger study may clarify the nature of the benefit for depression. The major reason for the dropout appeared to be the time of the class. It is of note that even though the sample size was small, the results for the video assessments were highly significant. It is not possible to distinguish which aspects of the massage class produced the benefit, as the mothers were taught to observe and understand their infants' "cues", as well as how to massage them. It

is quite probable that all are important, and that improved maternal understanding and confidence contribute to a happier infant, and that a more settled infant also helps the mother's mood.

Mothers with postnatal depression are known to have impaired interactions with their infants (Murray, 1992; Murray et al., 1996a). Tronick and Weinberg (1997) have described two distinct patterns, overintrusive mothers whose infants tend to withdraw, and withdrawn mothers whose infants tend to protest and usually to be distressed. Cooper and Murray (1997) have discussed how remarkably sensitive infants are to the quality of their human environment from the first day of life, and how this may well help to explain associations between early parenting behaviour and eventual child outcome. It is now well established by several independent investigations that children of mothers who are depressed in their early months have more behavioural and cognitive problems later (Cogill et al., 1986; Murray, 1992; Sharp et al., 1995; Murray et al., 1996a). However it is not yet clear what the links are, either in the association between depression and impaired mother–infant interaction, or long term effects. It is possible that in some cases the infants themselves make a contribution: that is difficult infants can cause their mothers to become depressed (Murray et al., 1996b).

It is of interest that Cooper and Murray (1997) have found that while several different types of non-pharmacological treatment, cognitive-behavioural, counselling and psychodynamic were effective in improving the mothers' depression as assessed by changes in the EPDS scores, they had little effect on improving the mother–infant interaction. Thus improving depression, per se, was not enough.

In conclusion, although this is a study with a small sample size and relatively high dropout, it is the first controlled investigation of the effect of infant massage by mothers with postnatal depression on mother–infant interaction. It suggests that attending an infant massage class substantially improved the relationship between mother and infant and may also have contributed to improvements in maternal mood. Further research is needed to confirm these findings in a larger group and to investigate the longer term effects of massage therapy on maternal depression, mother–infant interaction and child development.

Acknowledgements

We thank all the mothers and infants who participated in this study; our thanks also to Cherry Bond, Alison Hodgkinson and Lowell Herbert for the massage class, Melanie Gunning for videotape rating, to Professor Lynne Murray for helpful comments, and Caroline Doré for statistical advice.

References

Appleby, L., Warner, R., Whitton, A., Faragher, B., 1997. A controlled study of fluoxetine and cognitive-behavioural counselling in the treatment of postnatal depression. Br. Med. J. 314, 932–936.

Cogill, S., Caplan, H., Alexandra, H., Robson, K.M., Kumar, R., 1986. Impact of postnatal depression on cognitive development in young children. Br. Med. J. 292, 1165–1167.

Cooper, P.J., Murray, L., 1997. The impact of psychological treatments of postpartum depression on maternal mood and development. In: Murray, L., Cooper, P.J. (Eds.), Postpartum Depression and Child Development. The Guilford Press, London, pp. 201–220.

Cox, J.L., Holden, J.M., Sagovsky, R., 1987. Detection of postnatal depression: development of the Edinburgh Postnatal Depression Scale. Br. J. Psychiatry 150, 782–786.

Cramer, B., Robert-Tissot, C., Stern, D., Serpa-Rusconi, S., De Muralt, M., Besson, G., Palacio-Esoasa, F., Bachmann, J.-P., Knauer, D., Berney, C., D' Arcis, U., 1990. Outcome evaluation in brief mother–infant psychotherapy: A preliminary report. Infant Ment. Health J. 11, 278–300.

Field, T., 1977. Effect of early separation, interactive deficits, and experimental manipulations on infant–mother interaction. Child Dev. 48, 763–771.

Field, T., Grizzle, N., Scafidi, F., Schanberg, S., 1996a. Massage and relaxation therapies' effects on depressed adolescent mothers. Adolescence 31, 903–911.

Field, T., Grizzle, N., Scafidi, F., Abrams, S., Richardson, S., Kuhn, C., Schanberg, S., 1996b. Massage therapy for infants of depressed mothers. Infant Behav. Dev. 19, 107–112.

Gregoire, A.J.P., Kumar, R., Everitt, B., Henderson, A.F., Studd, J.W.W., 1996. Transdermal oestrogen for treatment of severe postnatal depression. Lancet 347, 930–933.

Hay, D.F., Kumar, R., 1995. Interpreting the effect of mothers' postnatal depression on children's' development. Child Psychiatry Hum. Dev. 25, 165–181.

Holden, J.M., Sagovsky, R., Cox, J.L., 1989. Counselling in a general practice setting: controlled study of health visitor intervention in treatment of postnatal depression. Br. Med. J. 298, 223–226.

Malphurs, J., Larrain, C., Field, T., Pickens, J., Pelaez-Nogueras, M., Yando, R., Bendell, D., 1996. Altering withdrawn and intrusive interaction behaviors of depressed mothers. Infant Ment. Health J. 17, 152–160.

McDonnough, S.C., 1993. Interaction guidance: Understanding and treating early infant–caregiver relationship disturbances. In: Zeanah, Jr. C.H. (Ed.), Handbook of Infant Mental Health. Guilford Press, New York, pp. 414–426.

Murray, L., 1992. The impact of postnatal depression and infant development. J. Child Psychol. Psychiatry 33, 543–561.

Murray, L., Cooper, P.J., 1997. The role of infant and maternal factors in postpartum depression, mother–infant interactions, and infant outcome. In: Murray, L., Cooper, P.J. (Eds.), Postpartum Depression and Child Development. The Guilford Press, London, pp. 111–135.

Murray, L., Fiori-Cowley, A., Hooper, R., Cooper, P., 1996a. The impact of postnatal depression and associated adversity on early mother–infant interactions and later infant outcome. Child Dev. 67, 2512–2526.

Murray, L., Stanley, C., Hooper, R., King, F., Fiori-Cowley, A., 1996b. The role of infant factors in postnatal depression and mother–infant interactions. Dev. Med. Child Neurol. 38, 109–119.

O'Hara, M.W., Swain, A.M., 1996. Rates and risk of postnatal depression — a meta-analysis. Int. Rev. Psychiatry 8, 37–54.

Sharp, D., Hay, D.F., Pawlby, S., Schmucher, G., Allen, H., Kumar, R., 1995. The impact of postnatal depression and boy's intellectual development. J. Child Psychol. Psychiatry 36, 1315–1336.

Tronick, E.Z., Weinberg, M.K., 1997. Depressed mothers and infants: Failure to form dyadic states of consciousness. In: Murray, L., Cooper, P.J. (Eds.), Postpartum Depression and Child Development. The Guilford Press, London, pp. 54–81.