Does Maternal Role Functioning Improve with Antidepressant Treatment in Women with Postpartum Depression?

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Abstract

Aims: The ability to mother her infant is reduced in a woman with postpartum depression (PPD). Although antidepressant treatment effectively improves depressive symptoms, various domains of functioning, for example, work and relationships, do not universally improve with treatment. In this pilot study, we investigated whether maternal role functioning improved with antidepressant treatment in women with PPD.

Methods: The pilot study was an exploratory analysis of a larger study. A subset of women ($n = 27$) from a randomized clinical trial (double-blind, 8-week trial of nortriptyline compared with sertraline) completed three outcome measures of maternal role functioning: gratification in the maternal role, the Infant Care Survey (ICS), and videotapes of maternal-infant interaction. The tapes were analyzed using the Child and Caregiver Mutual Regulation Coding Scale and Noldus Behavioral Coding Software.

Results: The two antidepressants were equally efficacious in decreasing depressive symptoms and improving overall functioning and gratification in the maternal role. Differences between times 1 and 2 in the mother-infant interactions were related to time (increasing age of the infant) and not assignment of antidepressant or remission of depression.

Conclusions: Effective treatment with two antidepressants improves gratification in the maternal role but not self-efficacy or maternal-infant interaction in women with PPD. Results of the study can help women and their healthcare providers to weigh the benefits of short-term antidepressant treatment in the postpartum period. Future studies should consider outcomes related to a longer duration of treatment.

Introduction

DEPRESSION OCCURS IN 14.5% of mothers in the early postpartum period.¹ The most significant factor in the duration of the depressive episode is delay in identification and treatment.² Antidepressants are effective in treating depressive symptoms in postpartum women,³ but many mothers, particularly those who follow the American Academy of Pediatrics (AAP) guideline to breastfeed their infants for the first 6 months of life,⁴ are reluctant to take antidepressants because of concern about adverse effects on their infants.⁵⁻⁷ Multiple studies have indicated that there is minimal risk to the infant, but no studies have focused on the benefit to the infant when the mother's depression is successfully treated with antidepressants.⁸ Postpartum women and their healthcare providers need comprehensive information in order to

weigh the benefits and risks of antidepressant treatment. Therefore, the purpose of this study was to investigate whether maternal role functioning improved with antidepressant treatment in women with postpartum depression (PPD). The study was a supplement to a randomized clinical trial⁹ that compared the efficacy of antidepressant agents from two classes, a tricyclic (TCA, nortriptyline) and a serotonin selective reuptake inhibitor (SSRI, sertraline) in treating women with PPD.

A plethora of international research studies have demonstrated that mothering is adversely impacted in women with PPD,^{10,11} including impaired maternal-infant interaction,¹²⁻¹⁴ diminished gratification in the maternal role,¹⁵⁻¹⁷ and lower feelings of self-efficacy.^{18,19} In each aspect of communication, whether by facial expression, voice, or touch, the social and affective behavior of women with PPD is dis-

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torted in ways that compromise infant development.²⁰ The Mutual Regulation Model (MRM)²¹ states that socioemotional expressivity in mothers and babies is determined by the ability of each to regulate his or her emotional states, express communicative messages, and respond to each other's communication and regulatory needs. Women with PPD have difficulties with reading and responding to infant signals and with facilitating interactions with their infants.²² Compared with women without depressive symptoms, depressed mothers engage in less play, use less motherese, show less positive affect, and are more disengaged, intrusive, and negative during social interactions with their infant.^{22,23} Infants of depressed mothers have difficulties in regulating affecting states and concentrating. Field et al.²⁴ determined that depressed mothers and their 3-month-old infants shared negative behavior states more often and positive behavior states less often than did nondepressed mothers and their infants. Less attention has been given, however, to how and under what circumstances mothering improves with depression treatment. In two studies, O'Hara et al.^{25,26} were unable to demonstrate an improved relationship between the mother and infant after 12 weeks of interpersonal psychotherapy, although depression symptoms were reduced and social adjustment improved. Likewise, antidepressants are effective in decreasing depressive symptoms, but recovery of various aspects of functioning is variable. For example, in our earlier work, marital satisfaction did not improve with antidepressant treatment in women with PPD.²⁷ The aim of this study was to determine if antidepressants lead to improvement in overall maternal role functioning in women suffering from PPD.

Materials and Methods

A pretest, posttest design was used. The study was a supplement to a double-blind, acute-phase, 8-week randomized

clinical trial. This study compared maternal role functioning in women before and after 8 weeks of antidepressant treatment. Data were collected in Pittsburgh, Pennsylvania. IRB approval was received from the University of Pittsburgh and the University of Louisville Institutional Review Boards, and all women provided written informed consent.

Instruments

Depressive symptoms were assessed with the Structured Interview Guide for the Hamilton Depression Rating Scale (SIGH-ADS).²⁸ This measure includes the 17-item Hamilton Rating Scale for Depression (HRSD).²⁹ Overall functioning was determined by the clinician-rated Global Assessment Scale (GAS).³⁰ Self-report instruments included the Infant Care Survey (ICS)¹⁸ to measure self-efficacy and the Gratification in the Maternal Role Scale (GRAT).³¹ The ICS measures self-efficacy that is specific to feeding, burping, diapering, bathing, and holding one's baby.¹⁸ For this study, the Cronbach alpha score was 0.85. GRAT is a 14-item checklist in which postpartum women rate the extent that each item is true for them on a 5-point scale from 1 = not at all to 5 = very much, with 3 representing somewhat. For this study, the Cronbach alpha score was 0.86 (Table 1).

Maternal-infant interactions were videotaped. Child affect, child behavior, maternal affect, and maternal behavior were separately coded from 3-minute videotapes using the Child and Caregiver Mutual Regulation System (CCMR),³³ which is based on the MRM²¹ and work by Tronick et al.^{20–22} and was revised for use in infants by the first author and study consultants. This system has been effective in picking up subtle changes in infant and maternal behavior compared with global scoring systems or rating changes.³⁴ Our recent paper describing results of a pilot study using CCMR to code videotapes of maternal infant interaction.³⁵ Interrater reliability was established between coders and our study con-

TABLE 1. DESCRIPTION OF STUDY INSTRUMENTS

<i>Measure</i>	<i>Constructs</i>	<i>No. of items</i>	<i>Reliability and validity</i>	<i>Time to complete</i>
Infant Care Survey ¹⁸	Beliefs about knowledge and skill in the following areas: Infant health Infant diet Infant safety	52	Internal consistency 0.95–0.98 Construct validity demonstrated ¹⁸ For this study, the Cronbach alpha was 0.85.	10–15 minutes
Gratification in the Maternal Role Scale ³¹	Feeling enjoyment in new parent role	14	Internal consistency 0.85 ¹¹ For this study, the Cronbach alpha was 0.86	5 minutes or less
Hamilton Depression Rating Scale ²⁹	Mood, anhedonia social withdrawal, guilt, sleep, energy, anxiety, somatic symptoms, agitation, insight, psychomotor retardation, suicidality	17	Multiple studies have demonstrated internal consistency >0.70, convergent and discriminant validity ³² Used in studies with diverse groups of childbearing women	15–20 minutes administered by clinically trained interviewer
Global Assessment of Functioning ³⁰	Numeric scale from 1–100 used to assess adult functioning in occupational, social, and psychological areas	1		1 minute at end of clinical assessment

sultants for the pilot study. Coding was accomplished using The Observer software by Noldus (www.Noldus.com), which provided on-line, continuous, computer-assisted behavioral coding of variables. Two coders separately viewed the videotapes in real time but were able to stop and replay segments as well as edit coding.³⁵

In separate passes, child affect was coded, then child actions, maternal actions, and maternal affect. Every change in behavior or affect was coded. The mean percent time in each affect was calculated. The mean rate per minute was calculated on codes that were scored on a frequency basis. Twenty percent of tapes were coded by two research assistants. Interrater reliability was 0.95.³⁵

Procedure

Women 15–45 years of age with major depressive disorder (MDD) with postpartum onset were eligible for the study; Table 2 shows the demographics of the study sample. A SIGH-ADS score of ≥ 18 was required for inclusion. Subjects were randomly assigned to treatment with either nortriptyline or sertraline for 8 weeks. Clinician assessments, self-report questionnaires, and videotapes of maternal-infant interaction were completed at baseline and after 8 weeks of treatment. The procedures for the larger study are described elsewhere.⁹

Data analysis

Differences at baseline between the nortriptyline and sertraline groups and between the remitters and nonremitters were compared for demographic variables, including infant age, depression symptoms, overall functioning, and mater-

nal role functioning. Pearson's chi-square or Fisher's exact statistics were used for analysis of categorical variables, and analyses of variance (ANOVA) were used for analysis of continuous variables (ANOVA). Comparison of data between baseline and week 8 used random effects regression. Main effects included time of data collection (baseline vs. week 8), remission status at week 8, and assigned drug treatment. The interaction of time in the trial by remission status served as fixed factors. The baby's age was treated as a time-dependent covariate. For analysis of maternal-infant interaction, nonparametric exact tests were used to account for the small number of observations.

Results

For this pilot study, there were 27 women providing data at baseline and 22 women with complete data after 8 weeks of treatment. At enrollment, there were no differences between the two drug treatment groups by demographic variables, age of the baby at enrollment, symptoms of depression, global functioning, or maternal role functioning (self-efficacy and gratification in the maternal role). Depression, functional status, and maternal role functioning (self-efficacy, gratification in the maternal role) all improved with antidepressant treatment both with drugs and with time. There were no significant differences in study outcomes between the groups treated with sertraline and nortriptyline.

For women who remitted by 8 weeks compared with those who did not remit, there were no baseline differences between the groups for demographic variables, symptoms of depression, global functioning, or maternal role functioning (self-efficacy and gratification in the maternal role). After 8

TABLE 2. DEMOGRAPHICS OF STUDY SAMPLE

	Nonremitters ^a (n = 15)		Remitters (n = 12)		p values for comparisons
	n	%	n	%	
Race					
White	10	66.7	9	75.0	FE, ^b $p = 0.7$
Black	5	33.3	3	25.0	
Marital status					
Single	10	66.7	5	41.7	FE, $p = 0.3$
Married	5	33.3	6	50.0	
Divorced/separated	0	0	1	8.3	
Parity					
First baby	7	46.7	8	67.7	FE, $p = 0.6$
One or more other children	8	53.3	4	33.3	
Education					
<High school	5	33.3	2	16.7	FE, $p = 0.6$
Completed high school	3	20.0	1	8.3	
Some college or trade	5	33.3	6	58.3	
Completed college	2	13.3	3	25.0	
Mother's age					
Mean	24.1		24.8		F(1,25) = 0.08, $p = 0.8$
SD	6.4		6.6		
Baby age at study entry (weeks)					
Mean	11.8		8.2		F(1,25) = 3.7, $p = 0.07$
SD	4.7		5.1		

^aIncludes 5 women who withdrew from the study before 8 weeks. All 5 had an HRSD score >7 at withdrawal.

^bFE, Fisher's exact test, F, F-test for analysis of variance results.

weeks of treatment, there was more improvement in depression symptoms and in overall functioning in women who remitted. Gratification in the maternal role was greater in the women who remitted at 8 weeks, but the difference between remitters and nonremitters was not significant ($p = 0.18$; $p = 0.70$). Self-efficacy was stable over time for the remitters and was worse over time for the nonremitters (Table 3).

Data from videotapes of maternal-infant interaction were available for 20 women at baseline and 12 women after 8 weeks of treatment. The percentage of positive infant affect improved with time (Wilcoxon signed rank test = 2.43, exact $p = 0.01$), and neutral infant affect decreased with time (Wilcoxon signed rank test = 1.36, $p = 0.19$). There were no differences between the drug groups or remission groups for maternal-infant interaction. At baseline, gratification in the maternal role was related to the percent of time in positive affect for the mother ($r = 0.46$, $p = 0.04$). Self-efficacy was increased in women when the infant demonstrated a higher percentage of positive affect, but the correlation was not significant ($r = 0.54$, $p = 0.21$).

Discussion and Conclusions

Previous international research studies have described effective treatment of depressive symptoms in women with PPD with interpersonal therapy but not overall improvement of the maternal-child relationship.^{25,26,32} This pilot

study of short-term antidepressant treatment in women with PPD demonstrated improvements in depressive symptoms, overall functioning, and gratification in the maternal role. Self-efficacy scores were stable in women who remitted and worsened in nonremitters.

Two antidepressants (nortriptyline and sertraline) were equally effective. Microanalytical coding of videotapes (observation measures) as well as self-report measures added richness to the data reported in the study. In addition, both overall functional status and functioning specific to the maternal role were measured. A similar comprehensive definition of functioning is recommended for future studies in this area.

Most studies of maternal role functioning in women with PPD have not examined the impact of depression treatment. Thus, our research, along with that of our national and international colleagues,^{25,26,32} adds to the science in the area.

Normal developmental changes in the samples may have impacted both treatment and depression effects. A healthy comparison group without a diagnosis of depression would provide information as to whether improvements with treatment return mothers to nondepressed levels. Inclusion of such a control group would have strengthened findings of this study and is being used in our current longitudinal study. This pilot study is also limited by the small numbers in the sample and the short length of depression treatment. The comparison of remitters and nonremitters provides information about study outcomes under conditions of non-efficacious treatment. However, the nonremitters are not

TABLE 3. DEPRESSION SCORES, GENERAL FUNCTIONING, AND MATERNAL FUNCTIONING AT BASELINE AND WEEK 8 BY REMISSION STATUS AT WEEK 8

	<i>Women who remitted after 8 weeks of treatment</i>		<i>Women who did not remit after 8 weeks of treatment</i>		<i>Pattern of results</i>
	<i>Week 0</i>	<i>Week 8</i>	<i>Week 0</i>	<i>Week 8</i>	
Depression symptom and general functioning measures					
Depression: HRSD	18.4	2.8	17.8	10.4	Significant decrease for both groups but larger decrease for remitted group
Functional status: GAS	58.8	86.5	58.5	72.1	Significant increase for both groups but larger increase for remitted group
Maternal functioning measures					
Gratification with maternal role	50.0	61.1	49.9	53.8	Significant increase for remitters but not for nonremitters
Infant Care Survey	1.73	1.76	1.93	1.37	No change over time for remitters; worse self-efficacy for nonremitters over time
Video results ^a					
Infant % positive affect	<i>n</i> = 12 15.6%	<i>n</i> = 8 38.1%	<i>n</i> = 7 9.8%	<i>n</i> = 5 45.5%	Significant increase for both groups but increase explained better by increased age of baby, not remission status
Infant % neutral affect	58.7%	46.0%	70.7%	54.5%	No difference by time or group
Mother % positive affect	84.3%	94.7%	97.4%	100%	No difference by time or group
Mother % neutral affect	14.4%	5.3%	2.6%	0%	No difference by time or group
Mother % negative affect	0%	0%	0%	0%	No difference by time or group
Number of facilitative actions	1.5	1.4	1.4	1	Fewer facilitative actions at 8 weeks

^aThere were no hostile/intrusive or disengaged actions coded in the videotapes of maternal-infant interaction.

equivalent to mothers who are neither treated for depression nor enrolled in a clinical trial. Women in clinical trials who agree to videotaping of maternal-infant interaction may be self-selected for competent maternal-infant interactions, serving as additional limitations to the study.

In advising women with PPD about treatment options, healthcare providers should make them aware of comprehensive outcome data that empower women to weigh the costs and benefits of each treatment as they formulate a treatment decision. This pilot study demonstrates a trend for overall functioning and maternal role functioning to improve in women with PPD with short-term antidepressant treatment. Additional outcomes may be demonstrated by longer length of treatment. Thus, findings of this pilot study should be shared with women with PPD along with a listing of study limitations. Improvement of functional status and maternal role functioning in women with antidepressant treatment has the potential to improve the productivity and the national health of two generations of citizens.

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Disclosure Statement

No competing financial interests exist.

References

- Gaynes B, Gavin N, Meltzer-Brody S, et al. Perinatal depression: Prevalence, screening accuracy, and screening outcomes. In: 05-E006-2 APN, ed. Evidence report/technology assessment. Rockville, MD: Agency for Healthcare Research and Quality, 2005;119:1-8.
- England SJ, Ballard C, George S. Chronicity in postnatal depression. *Eur J Psychiatry* 1994;8:93-96.
- Appleby L, Warner R, Whitton A, et al. A controlled study of fluoxetine and cognitive behavioral counseling in the treatment of postnatal depression. *BMJ* 1997;314:932-936.
- American Academy of Pediatrics. Policy statement: Breastfeeding and use of human milk. *Pediatrics* 2005;115:496-506.
- Pearlstein TB, Ziotnick C, Battle CL, et al. Patient choice of treatment for postpartum depression: A pilot study. *Arch Womens Mental Health* 2006;9:303-308.
- Boath E, Bradley E, Henshaw C. Women's views of antidepressants in the treatment of postnatal depression. *J Psychosom Obstet Gynecol* 2004;25:221-233.
- Dennis CL, Chung-Lee L. Postpartum depression help seeking barriers and maternal treatment preferences: A qualitative systematic review. *Birth* 2006;33:323-331.
- Weissman A, Levy B, Hartz A, et al. Pooled analysis of antidepressant levels in lactating mothers, breast milk, and nursing infants. *Am J Psychiatry* 2004;161:1066-1078.
- Wisner KL, Hanusa BH, Perel JM, et al. Postpartum depression: A randomized trial of sertraline vs. nortriptyline. *J Clin Psychopharmacol* 2006;26:353-360.
- Logsdon MC, Wisner KL, Pinto-Foltz MD. The impact of postpartum depression on mothering. *J Obstet Gynecol Neonat Nurs* 2006;35:652-658.
- Mercer RT. Nursing care for parents at risk. *Thorofare, NJ: CB Slack, 1977.*
- Beck CT. The effects of postpartum depression on maternal infant interaction: A meta-analysis. *Nurs Res* 1995;45:298-304.
- Field T. Maternal depressive effects on infants and early interventions. *Prev Med* 1998;27:200-203.
- Tronick EZ, Weinberg MK. Depressed mothers and infants: Failure to form dyadic states of consciousness. In: Murray L, Cooper P, eds. Postpartum depression and child development. New York: Guilford Press, 1997:54-81.
- Killien, MG. Postpartum return to work: Maternal stress, anxiety, and gratification. *Can J Nurs Res* 1998;30:53-66.
- Panzarine S, Slater E, Sharps P. Coping, social support, and depressive symptoms in adolescent mothers. *J Adolesc Health* 1995;17:113-119.
- Troy MW. A comparison of fatigue and energy levels at 6 weeks and 14 to 19 months postpartum. *Clin Nurs Res* 1999;8:135-152.
- Froman RD, Owen SV. Mothers' and nurses' perceptions of infant care skills. *Res Nurs Health* 1990;13:247-253.
- Teti DM, Gelfand DM, Pompa J. Depressed mothers' behavioral competence with their infants: Demographic and psychosocial correlates. *Dev Psychopathol* 1990;2:259-270.
- Weinberg MK, Tronick EZ. Maternal depression and infant maladjustment: A failure of mutual regulation. In: Noshpitz J, ed. The handbook of child and adolescent psychiatry. New York: Wiley & Sons, 1996.
- Tronick EZ. Emotions and emotional communication in infants. *Am Psychol* 1989;44:112-119.
- Cohn JF, Tronick EZ. Specificity of infants' response to mothers' affective behavior. *J Am Acad Child Adolesc Psychiatry* 1989;28:242-248.
- Murray L, Cooper PJ, eds. Postpartum depression and child development. New York: Guilford Press, 1997.
- Field T, Healy B, Goldstein S, Guthertz M. Behavior-state matching and synchrony in mother infant interactions of non-depressed versus depressed dyads. *Dev Psychology* 1990;26:7-14.
- O'Hara MW, Stuart S, Gorman L, Wenzel A. Efficacy of interpersonal psychotherapy for postpartum depression. *Arch Gen Psychiatry* 2000;57:1039-1045.
- Forman DR, O'Hara MW, Stuart S, Gorman LL, Larsen KL, Coy KC. Effective treatment for postpartum depression is not sufficient to improve the developing mother child relationship. *Dev Psychopathol* 2007;19:585-602.
- Logsdon MC, Wisner KL, Hanusa BH, Phillips A. Role functioning and symptom remission in women with postpartum depression after treatment with antidepressants. *Arch Psychiatr Nurs* 2003;17:276-283.
- Williams JBW, Terman M. Structured Interview Guide for the Hamilton Depression Rating Scale with Atypical Depression Supplement (SIGH-ADS). New York: New York State Psychiatric Institute, 2003.
- Hamilton M. A rating scale for depression. *J Neurol Neurosurg Psychiatry* 1960;23:56-62.
- Endicott J, Spitzer RL, Fleiss JL, Cohen J. The Global Assessment Scale. A procedure for measuring overall severity of psychiatric disturbance. *Arch Gen Psychiatry* 1976;33:776-771.
- Mercer R. The process of maternal role attainment over the first year. *Nurs Res* 1985;34:198-204.
- Murray L, Cooper PJ, Wilson A, Romaniuk H. Controlled trials of the short and long term effect of psychological treatment of postpartum depression. *Br J Psychiatry* 2003;182:420-427.
- Weinberg MK, Olson KL, Beeghly M, Tronick EZ. Making up is hard to do, especially for mothers with high levels of

- depressive symptoms and their infant sons. *J Child Psychol Psychiatry* 2006;47:670–683.
34. Weinberg MK, Tronick EZ. Beyond the face: An empirical study of infant affective configurations of facial, voice, gestural, and regulatory behaviors. *Child Dev* 1994;65:1503–1515.
35. Logsdon MC. Maternal role functioning in adolescents at 12 months postpartum. *Women's Health Care: A Practical Journal for Nurse Practitioners* 2008;7:27–32.

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