

ORIGINAL PAPER

Abraham W. Wolf · Isadora De Andraca · Betsy Lozoff

Maternal depression in three Latin American samples

Accepted: 17 December 2001

■ **Abstract** *Background* The purposes of the present study were: 1) to assess the prevalence of depressive symptoms in mothers of young children in two Latin American countries (Costa Rica and Chile), and 2) to identify and compare socio-demographic correlates of depressive symptoms among those women. *Methods* Information on maternal depression and socio-demographic factors was available for three samples of women (total n = 1256). The samples were drawn from periurban communities that were relatively homogeneous with respect to lower-middle-class status and ethnic origin. Point prevalence of depressive symptomatology was assessed using the Center for Epidemiological Studies – Depression scale in all three samples. Lifetime prevalence of major depressive episodes was assessed in two Costa Rican samples by the Diagnostic Interview Schedule. Finally, episodes of dysphoric mood following childbirth were assessed by interview in the Costa Rican samples. *Results* Although the three samples differed on nearly all socio-demographic measures, rates of depression were comparable – 35% to 50% of the mothers had experienced at least one episode of major depression or were experiencing severe dysphoric mood at the time of the evaluation. In addition, one-third of the Costa Rican mothers had experienced dysphoric mood following delivery of a child. *Conclusions* The present study indicates that the high prevalence of depression in the mothers of young children is present in developing as well as indus-

trialized countries and represents a major public health hazard. Future cross-cultural studies of maternal depression will require methodologies that are sensitive both to contextual factors in which depressive affect is expressed and individual histories that follow the course and etiology of depressive disorders as a chronic, recurrent illness in women during the childbearing and child-rearing years.

■ **Key words** depression – maternal – Latin America – Center for Epidemiological Studies – Depression Scale – Diagnostic Interview Schedule

Introduction

Major depression has been identified as the fourth-ranked cause of disability and premature death worldwide (Murray et al. 1996). Starting in adolescence and continuing through the life-span, women have prevalence rates of depressive illness nearly twice those of men (Nolen-Hoeksma 1990; Paykel 1991). A recent community-based study (Kessler et al. 1994) reported that 12.9% of women experienced an episode of major depression during the 12-month period prior to evaluation, and 21.3% experienced an episode sometime during their life, while the rates for men were 7.7% and 12.7%, respectively. Mothers of young children constitute a group at particularly high risk for depressive symptoms (Kahn et al. 1999; Heneghan et al. 1998). Utilizing various measures of depression, studies in the United States and the United Kingdom have reported prevalence rates of 12%–50% among women with young children. Maternal depression is of increasing concern for health care professionals (Zuckerman and Beardslee 1987), not only as a health problem for women but also as a developmental risk factor for their children (Tronick and Gianino Jr. 1986; Tronick 1989).

With the exception of research on postpartum depression, the existing studies of depression in mothers of young children have focused almost exclusively on

A. W. Wolf, Ph. D. (✉)
Department of Psychiatry
MetroHealth Medical Center
2500 Metro Health Drive
Cleveland, OH 44109, USA

I. De Andraca, Ph. D.
Institute of Nutrition and Food Technology
University of Chile, Santiago

B. Lozoff, M. D.
Department of Pediatrics and Communicable Diseases
Center for Human Growth and Development
University of Michigan, Ann Arbor

English-speaking, industrialized countries. It is important that the prevalence and correlates of depressive symptoms in mothers of young children be investigated in different populations and cultures to determine if this problem is specific to particular cultural contexts. The purposes of the present study were: 1) to assess the point prevalence of current depressive symptomatology, lifetime prevalence of major depressive episodes, and the prevalence of dysphoria in the postpartum period in mothers of young children in two Latin American countries, and 2) to identify and compare socio-demographic correlates of depression at these time points among these women.

Subjects and methods

Subjects

The subjects were drawn from three samples of Central and South American mothers whose infants participated in separate community-based studies on iron deficiency anemia and infant behavior. The first two samples of mothers are from Costa Rica and the third is from Chile. Both countries are democracies with highly literate populations and comprehensive health care systems. All three communities are relatively homogeneous with respect to lower-middle-class status. In neither country did the sample include indigenous populations. All mothers and their infants were healthy. The background and demographic characteristics of mothers and their families are presented in Table 1.

Study designs, methods of recruitment, inclusion and exclusion criteria, sample characteristics, and data collection methods were determined by the infant iron deficiency studies. They are summarized here and described more fully in the articles referenced below.

Table 1 Background characteristics of the two Costa Rican and Chilean samples

Background variables	Costa Rica		Chile
	Sample 1	Sample 2	
n	151	80	1025
Mother's age (years) ^{a, b}	31.7 (5.7)	27.9 (5.8)	26.6 (6.3)
Number of children ^{a, b, c}	3.1 (1.5)	3.6 (2.1)	2.1 (1.1)
Primiporous ^{b, c}	10%	10%	35%
Breast-fed \geq 1 year	19%	19%	25%
Husband/partner present	21%	22%	15%
Multigenerational household ^{*b, c}	23%	30%	50%
Mother's education (years) ^{b, c}	9.7 (3.3)	80.7 (3.4)	9.4 (2.7)
Father's education (years) ^{a, b}	10.6 (3.4)	80.6 (3.5)	80.6 (3.3)
Number of people in household ^{a, b, c}	5.6 (1.9)	6.3 (2.5)	5.4 (2.1)
Number of rooms in house ^{a, b, c}	5.8 (1.5)	5.1 (1.5)	3.5 (1.7)
Crowding (people per room) ^{a, b, c}	1.0 (0.4)	1.4 (0.9)	1.9 (1.2)

Values are means and standard deviations (in parentheses) and percentages for categorical variables

* Costa Rican mothers were questioned specifically about the presence of grandparents in the home. Chilean mothers were asked about living arrangements and coded *allegados* to reflect a multigenerational household. In Chile the term *allegados* is used to describe the arrangement of parent(s) and child(ren) living in the household of a relative (almost always a grandparent)

^a Sample 1 differs from sample 2

^b Sample 1 differs from Chilean sample

^c Sample 2 differs from Chilean sample

All differences are $p < 0.05$

Sample 1

This longitudinal study (Lozoff et al. 1987) was conducted between 1983 and 1985 in the periurban community of Hatillo, located at an elevation of 1100 m near the capital city of San Jose, inhabited by primarily lower-middle-class residents, generally homogeneous in their European descent. Every family with infants 12–23 months of age was contacted in a house-to-house survey for preliminary hematologic screening, which no family refused. Infants were included only if they met criteria for normal delivery, absence of perinatal complications, no hospitalizations in the preceding 6 months for other than acute uncomplicated problems, no iron therapy after 6 months of age, and no known developmental delay or major acute or chronic illness. The final sample was selected on the basis of a more detailed hematologic examination and consisted of 191 infants who varied in iron status from normal to iron deficient to anemic. To aid in the interpretation of the developmental and behavioral results, information on a number of socioeconomic and family demographic factors was obtained. For the 5-year follow-up study (Lozoff et al. 1991), 163 of the original families were located and agreed to participate. The follow-up hematologic, cognitive, and psychosocial assessments were completed in two 1½ to 2 h sessions. Evaluations of maternal depression were obtained for 151 mothers at the 5-year follow-up assessment.

Sample 2

This study was conducted between 1986 and 1990 (Lozoff et al. 1996) and the sample drawn from the periurban, lower-middle-class community of Desamparados, located at an elevation of 1185 m near San Jose, Costa Rica. The entrance criteria and family evaluations were the same as in sample 1. This sample differed from the first since only infants with or without iron deficiency anemia were selected in contrast to sample 1 that sampled variation in iron status. Maternal depression was assessed during the infancy evaluation and was available for 80 of the 86 mothers.

Iron deficiency anemia was common in the Costa Rican infants: 27% of the infants in sample 1 and 37% in sample 2. Nevertheless, their mothers had good iron status and no cases of maternal iron deficiency anemia were detected.

Sample 3

This study was conducted between 1991 and 1996 in four contiguous urban communities on the southeast outskirts of Santiago, the capital of Chile (Walters et al. 1998). These working-class communities had running water, sewage and electricity, were located at an elevation of 600 m and inhabited primarily by lower-middle-class residents, generally homogeneous in ethnic origin. The inclusion criteria were similar to those used in the Costa Rican samples and were applied to infants receiving routine pediatric care at the 4-month visit. Additional entrance criteria specific to successful completion of the study included a stable, literate caregiver who was able to accompany the study child to appointments, no other infants less than 12 months of age in the household, and the infant not attending day care. Since the study design called for a preventative trial of oral iron, a final criterion was the absence of iron deficiency anemia. Of the 2099 infants enrolled in the supplementation trial study, 1657 completed participation at 12 months of age. During the first years of the study, basic socioeconomic data and more detailed psychological information were collected. However, lack of funds in the final 2 years limited collection of this information to only a randomly selected 10%. Maternal depression was assessed during the infancy evaluation and obtained for 1025 mothers.

Measures of Maternal Depression

The Center for Epidemiologic Studies-Depression (CES-D) scale (Radloff 1977) was administered to mothers in all three samples. The Spanish version of the CES-D, like the original English version, is a 20-item scale designed to measure current symptoms of depression in community samples. The CES-D does not result in a diagnosis of depression, although its items represent the major symptoms of the clinical syndrome of depression, including depressed mood, feelings of

guilt and loneliness, hopelessness, loss of appetite, sleep disturbance, and psychomotor retardation. Respondents rate the frequency of 20 symptoms over the past week by choosing one of four response categories ranging from 0, "rarely, or none of the time", to 3, "most or all of the time." Total scores, which are calculated by summing responses to the 20 items, can range from 0 to 60 with high scores representing the presence and persistence of symptoms. The items of the CES-D questions were presented by showing the mother a card with the alternative answers. The mother indicated her response which was then recorded by the test administrators. A cut-off of 16 or greater is used to distinguish depressed from non-depressed individuals (Comstock and Helsing 1976; Weissman and Lucke 1995). In their review of health-related quality of life measures, Naughton and Wiklund (1993) found that the CES-D was one of the few instruments to have undergone reliability and validity testing in ethnic groups within the USA and internationally. The available studies demonstrated high internal consistency (0.83–0.91), acceptable test-retest reliability and good construct validity. One study of Anglo and Mexican patients indicated that CES-D scores did not vary as a function of language or ethnic status (Roberts et al. 1989). A cut-off of 16 was used in the present study to facilitate comparability to other reports using this convention.

To evaluate a lifetime diagnosis of major depression, the two Costa Rican samples were administered the Spanish version of the depressive disorders section of the Diagnostic Interview Schedule (DIS) (Karno et al. 1983; Robins et al. 1981) at the same time as the CES-D. The DIS is a structured interview developed as a research instrument for psychiatric epidemiology. It has been used extensively in cross-cultural research and results in the formulation of diagnoses according to DSM-III clinical criteria (Weissman et al. 1995). Criteria for a lifetime prevalence of depression require that a respondent admits to depressed mood over a 2-week period at some point during her life accompanied by four of the following eight symptoms: weight loss or gain, sleep disturbance, fatigue, psychomotor retardation, loss of interest in usual activities, feelings of worthlessness, problems with concentration, and recurrent thoughts of death. The reliability and validity of the Spanish version of the DIS diagnosis (Burnam et al. 1997) is equivalent to the English version.

Following administration of the CES-D and the DIS-Depression section, Costa Rican mothers were interviewed about episodes of depressed mood following childbirth. The interview consisted of ten questions regarding the onset and duration of mood changes following the birth of the study child and children delivered before and after the study child. Episodes of postpartum depression have been accurately recalled by mothers several years following delivery (Cox et al. 1987). The interview did not distinguish between the common and brief dysphoric reactions that occur following delivery, "baby blues," and the more serious postpartum mood disorders. If a mother admitted to depression or sadness following delivery, she was coded as having experienced an episode of postpartum dysphoria. Cases of chronic depression that continued before and after the postpartum period ($n = 3$) and/or depression associated with the death of a newborn ($n = 3$) were excluded. Responses to depression following childbirth were available for 148 mothers in sample 1 and 78 mothers in sample 2.

The evaluation of depression was limited to mothers' responses to the depression section of the DIS, the CES-D and the interview regarding episodes of depression following childbirth. The interviewer did not obtain more detailed responses regarding the mothers' unique experiences of depression. Mothers were not queried about their individual interpretations of test items to assess personal or cultural associations. The failure to obtain more specific information risks continuing a misconception that clinical depression and dysphoria are entities that exist outside of a specific cultural context (Good and Kleinman, 1985).

Data Analysis

Statistical analyses followed the general linear model for continuous variables, using t-tests and analysis of variance; post-hoc pairwise comparisons were evaluated by the least significant difference test. Categorical variables were compared using the chi-square test. All analyses were carried out with standard computational packages (SAS 1988). An alpha level of 0.05 was defined for tests of statistical

significance. However, because the size of the three samples varied substantially, we also planned to consider the magnitude and clinical significance of differences as well as consistency and coherence in the pattern of results.

Results

Table 1 indicates that the three samples differed on most of the background measures. As expected, mothers in the first Costa Rican study were older because the depression evaluation occurred during a follow-up when the target child was 5 years old. The two Costa Rican samples differed from the Chilean sample in that mothers in Costa Rica had more children, were more likely to live without a husband/partner, and less likely to live in multi-generational households. Chilean homes were smaller and more crowded. Differences among groups on parental education did not show any consistent pattern.

Table 2 compares the three samples on the depression measures. The samples did not differ on mean CES-D scores [$F = 0.83$ (2/1253)]. Differences were observed when the samples were compared on the proportion of mothers who scored 16 or greater on the CES-D (chi-square = 8.1, $p < 0.05$); 34% of Costa Rican mothers in sample 1 had CES-D scores above the cut-off compared to 46% and 47% in the other samples.

There were no differences in the proportion of mothers who reported at least one lifetime episode of depression as assessed by the DIS (chi-square = 0.3, ns). In sample 1, 40% (61/151) reported having had a depressive episode, with an average age of onset of 27.5 years (range 7–50 years) and a median duration of 16 weeks (range 2 weeks–7 years); 16% of these mothers reported multiple depressive episodes. In sample 2, 48% (38/80) reported a depressive episode, with an average age of onset of 24.1 years (range 11–31 years) and a median duration of 8 weeks (range 2 weeks–2 years); 18% reported multiple depressive episodes. In both Costa Rican samples, mothers who met criteria for depression on the DIS had higher average CES-D scores (sample 1: $20.2 \pm 14.2SD$ vs $10.7 \pm 10.2SD$, $t = 4.5$, $p < 0.001$; sample 2: $21.9 \pm 12.3SD$

Table 2 Depression scores for the two Costa Rican and Chilean samples

Depression variables	Costa Rica		Chile
	Sample 1	Sample 2	
n	151	80	1025
CES-D	14.5 (12.8)	16.7 (11.6)	16.6 (12.2)
CES-D $\geq 16^a$, b	34.0% (52/151)	46.0% (37/80)	47.0% (47/1025)
DIS-Depression	40.0% (61/151)	48.0% (38/80)	–
Postpartum dysphoria	38.0% (56/148)	35.0% (27/78)	–

Values are means and standard deviations (in parentheses) and percentages for categorical variables

^a Sample 1 differs from sample 2

^b Sample 1 differs from Chilean sample

^c Sample 2 differs from Chilean sample

All differences are at least $p < 0.05$

vs $11.9 \pm 8.6SD$, $t=4.2$, $p < 0.001$). These depressed mothers also had a greater proportion of CES-D scores greater than 16 (sample 1: 67% vs 26%, chi-square = 23.9, $p < 0.001$; sample 2: 65% vs 33%, chi-square = 8.3, $p < 0.01$).

Table 2 indicates that mothers in the two Costa Rican samples did not differ with respect to the frequency of dysphoric episodes following the birth of a child (38% and 34%, chi-square = 0.63, ns). In sample 1, the median duration of dysphoric symptoms following the birth of the target study child was 18 days (range 1 day–16 weeks), with a median onset 2 days postpartum (range 1–30 days). Of these, 20% (11/56) reported dysphoria following other births. In sample 2, the median duration of the postpartum dysphoric symptoms was 7 days (range 1 day–52 weeks), and a median onset 3 days post-

partum (range 1–84 days). Dysphoria following other births was reported by 15% (4/27) of these mothers.

Table 3 compares background measures between depressed and non-depressed mothers, classified by either DIS or CES-D, in the three samples. Depressed and non-depressed mothers did not differ on either the DIS or the CES-D in their ages at the time of evaluation, number of rooms in the house, primiparous vs multiparous status, or how long they breast-fed the target child. All other background factors varied by sample and measure of depression. In sample 1, mothers with CES-D scores of 16 or greater had more children, fewer years of schooling (as did the father of the study child), a greater number of people living in their households, and more people per room, were less likely to have a husband or partner present, and more likely to live in multi-genera-

Table 3 Association of measures of depression with background factors

Background variables	Costa Rica								Chile	
	Sample 1				Sample 2				CES-D	
	CES-D		DIS-Depression		CES-D		DIS-Depression		< 16	≥ 16
n	< 16	≥ 16	Absent	Present	< 16	≥ 16	Absent	Present	< 16	≥ 16
	99	52	90	61	43	37	42	38	546	479
Mother's age (years)	31.9 (5.1)	31.3 (6.6) ¹	31.6 (5.6)	31.9 (5.9)	28.9 (6.4)	26.8 (4.8)	28.3 (5.9)	27.5 (5.7)	26.7 (6.3)	26.3 (6.2)
Number of children	2.8 (1.3)	3.4 (1.7) ¹	3.1 (1.5)	3.0 (1.5)	3.8 (2.4)	3.4 (1.9)	3.6 (1.8)	3.5 (2.4)	2.1 (1.1)	2.1 (2.1)
Mother's education (years)	10.1 (3.5)	8.9 (3.0) ¹	9.9 (3.4)	9.3 (3.3)	8.5 (3.6)	8.8 (3.2)	8.7 (3.4)	8.7 (3.4)	9.7 (2.7)	9.0 (2.7) ³
Father's education (years)	11.0 (3.2)	9.7 (3.8) ¹	11.0 (3.5)	9.9 (3.2) ¹	8.6 (3.5)	8.7 (3.5)	8.9 (2.8)	8.3 (4.0)	8.8 (3.3)	8.3 (3.2) ¹
Number of people in household	5.3 (1.5)	6.3 (2.3) ²	5.7 (1.9)	5.6 (1.9)	6.4 (2.4)	6.2 (2.5)	6.4 (2.2)	6.2 (2.6)	5.2 (1.9)	5.7 (2.2) ¹
Number of rooms in house	5.6 (1.3)	5.9 (1.9)	5.8 (1.5)	5.7 (1.6)	5.1 (1.2)	5.0 (1.8)	4.9 (1.1)	5.1 (1.8)	3.6 (1.6)	3.4 (1.7)
Crowding (people per room)	0.9 (0.4)	1.1 (0.4) ¹	1.0 (0.4)	5.1 (1.6)	1.3 (0.6)	1.5 (1.2)	1.4 (0.6)	1.5 (1.2)	1.8 (1.1)	2.0 (1.3) ²

Background variables	Costa Rica				Chile
	Sample 1		Sample 2		CES-D
	CES-D		DIS-Depression		CES-D
n with depression	≥ 16	Present	≥ 16	Present	≥ 16
n with depression	52	61	37	38	479
n total sample	151	151	80	80	1025
Number of children					
Primiparous	33% (5/15)	47% (7/15)	63% (5/8)	63% (5/8)	43% (143/329)
Multiparous	35% (47/136)	40% (54/136)	45% (31/69)	48% (33/69)	50% (302/605)
Breast-feeding of study child					
< 1 year	36% (44/122)	41% (50/122)	51% (33/65)	43% (28/65)	47% (361/764)
≥ 1 year	28% (2/29)	38% (11/29)	27% (4/15)	67% (10/15)	45% (118/261)
Husband/partner					
Present	31% (37/120) ¹	38% (46/120)	47% (28/60)	48% (29/60)	47% (374/800)
Absent	48% (15/31)	48% (15/31)	47% (8/17)	53% (9/17)	53% (72/136)
Multigenerational household					
Yes	50% (17/34) ¹	41% (14/34)	48% (11/23)	61% (14/23)	52% (256/496) ₂
No	30% (35/115)	41% (47/115)	46% (25/54)	44% (24/54)	42% (209/502)

The percentages represent the proportion of depressed cases in a particular category. For example, 5 of the 15 (33%) women who had only one child had a CES-D score greater than or equal to 16, compared to 47 of 136 (35%) women who had more than one child

¹ $p < 0.05$; ² $p < 0.01$

tional households. For mothers with a DIS diagnosis of depression, the father of the target child had fewer average years of schooling. A very similar pattern was observed in the Chilean sample. Mothers with CES-D scores of 16 or greater had fewer years of schooling (as did the father of the target child), a greater number of people living in their households, more people per room, and were more likely to live in multi-generational households.

Table 4 indicates that an episode of dysphoria following childbirth was associated with higher CES-D scores but only weakly and inconsistently associated with a DIS diagnosis of depression. In sample 1, mothers who had a history of postpartum depression were more likely to have higher CES-D scores, and there was a trend for these mothers to have a DIS diagnosis of depression. There were no associations between an episode of postpartum dysphoria and any of the background variables in sample 1. In sample 2, postpartum dysphoria was associated with higher CES-D scores, although there was no association with a DIS diagnosis of depression. In sample 2, mothers who reported postpartum dysphoria had more years of schooling compared to those with no such history ($9.6 \pm 3.3SD$ versus $7.9 \pm 3.2SD$, $t = 2.1$, $p = 0.04$), and there was a trend for their husbands/partners to be more educated as well ($9.6 \pm 3.2SD$ years versus $8.1 \pm 3.5SD$ years, $t = 1.8$, $p = 0.08$). They also lived in homes with fewer occupants per room ($1.1 \pm 0.4SD$ vs $1.6 \pm 1.1SD$, $t = 2.5$, $p = 0.02$).

Discussion

This study found that a high prevalence of depression among the mothers of young children in Costa Rica and Chile: 34%–47% reported dysphoric mood at the time of the evaluation as indicated by elevated scores on the CES-D; 40%–48% reported an episode of major depression sometime during their life as indicated by a diagnosis on the DIS; and one-third of the Costa Rican mothers admitted to dysphoric mood following the birth of a child. In spite of substantial differences on nearly all socio-demographic background factors, the rates of de-

pression and disturbed mood were comparable in all three samples. These point and lifetime prevalence rates are within the range of high rates reported in other studies of women of childbearing age, although we could not identify any other study that assessed prevalence rates of maternal depression in a developing country.

■ Point prevalence of depressive symptoms

One-third to one-half of mothers in the three Latin American samples had CES-D scores above the conventional cut-off of 16 used to identify cases with severe dysphoric mood. A search of the major indexing systems failed to reveal any community-based or treatment studies of non-postpartum maternal depression outside the UK or the US. In the UK, prevalence rates ranging from 25% to 50% have been reported (Ghodsian et al. 1984; Moss and Lewis 1977; Richman 1977). Studies of US samples report rates ranging from 12%–40% (Bromet et al. 1982; Bromet and Cornely 1984; Garrison and Earls 1983; Heneghan et al. 1998; Kahn et al. 1999). Kahn et al. (1999) found that two-thirds of young mothers who brought their children for pediatric care reported health problems and 40% screened positive for depression; rates for depression varied by site from 33% at an academic hospital outpatient program to 59% at a community health center. This is consistent with other reports (Orr and James 1984) of low-income single mothers or black heads of households where 80% of mothers were depressed. Only one report suggests that mothers of young children are not at increased risk for depression (Earls et al. 1986 as cited in Tronick et al. 1986).

Although average CES-D scores for the three samples did not differ, a lower proportion of Costa Rican mothers in Sample 1 had CES-D scores greater than or equal to 16 than the other two samples – 34% vs 46% and 47%, respectively. The mothers in sample 1 are also older which may indicate that they are more mature and do not have to deal with the stresses of raising young children and are, therefore, less vulnerable to dysphoric mood.

■ Lifetime rates of major depression

In the two Costa Rican samples, 40% and 48% of mothers had at least one prior episode of major depression as assessed by the DIS. While higher than the 21% lifetime rate found by Kessler, et al. (1994), this is comparable to other community-based studies that reported rates of 43% (Hankin et al. 1998) and other studies assessing lifetime rates of depression in childbearing women, e. g., 37% (O'Hara et al. 1990) and 46% (Areias et al. 1996).

Table 4 Association of lifetime history of postpartum dysphoria to DIS-Depression and CES-D

	Sample 1		Sample 2	
	History of postpartum dysphoria		History of postpartum dysphoria	
	Absent	Present	Absent	Present
n	92	56	51	27
DIS-Depression	35%	50% ^a	43%	52%
CES-D	13.2 (11.7)	17.3 (14.2)	14.7 (10.8)	20.4 (12.7) ^b
CES-D ≥ 16	28%	46% ^b	41%	56%

Values are means and standard deviations (in parentheses) and percentages for categorical variables

^a $p < 0.10$; ^b $p < 0.05$

■ Postpartum depressive symptoms

In the two Costa Rican samples more than a third of mothers reported depressed mood following the birth of at least one child. While this study did not attempt to distinguish postpartum depression from “baby blues,” the results add to the growing cross-cultural literature on postpartum dysphoria. In a review of 13 cross-cultural studies on “baby blues,” Kumar (1994) found that rates of depressed mood following delivery varied from 13% to 76%. The issue of postpartum depression continues to be controversial in cross-cultural perspective. In the same review, Kumar cites 23 cross-cultural studies that support the claim that about 10% of women have a major depression following delivery. This rate is similar to that of non-childbearing women during a comparable 3-month time period (O’Hara et al. 1990). However, when the time frame is shortened to 1 month, the risk of depression in childbearing women is three times greater than in non-childbearing women (Cox et al. 1993). The association between Costa Rican mothers’ reports of postpartum dysphoria and the DIS diagnosis of depression and elevated CES-D scores is also consistent with the findings of other cross-cultural studies, suggesting that postpartum dysphoria may be a risk factor for later episodes of depression.

■ Recurrent episodes

The disproportionate rate of depression among women is one of the most robust findings in psychiatric epidemiology and identifies a major public health problem. Community-based studies of depression routinely report high lifetime prevalence rates among women. One longitudinal study (Hankin et al. 1998) reported that, by as early as age 21, 43% of women had experienced an episode of major depression compared to 21% of men. Studies of lifetime prevalence rates are limited to reporting only one episode of depression and do not assess the prevalence of recurrent lifetime episodes of depression. In the Costa Rican samples the relationship between DIS and CES-D scores suggests that even one episode of major depression represents a risk for repeated episodes. This is consistent with current thinking on depressive illness. Judd (1997) summarized that “it has been established that unipolar major depressive disorder is a chronic, lifelong illness, the risk for repeated episodes exceeds 80%, (and) patients will experience an average of four lifetime major depressive episodes of 20 weeks duration each.” Since depression is a chronic illness, future epidemiological studies could shed light on the course of this illness by collecting data on the onset, frequency, and duration of previous episodes, instead of only the presence or absence of a single previous episode.

■ Risk factors

The results of this study are consistent with previous reports of risk factors for depression in mothers of young children (Hall 1990). Costa Rican sample 1 and the Chile samples both found that higher CES-D scores were associated with fewer years of schooling among parents and greater household crowding. Also, in the Costa Rican sample 1, the absence of the study child’s father was associated with higher CES-D scores. Previous studies of maternal depression in the UK and US have consistently reported associations with marital conflict and fewer years of schooling; less consistent associations were found with factors such as younger age, lower socioeconomic status, unemployment, lower income, single parenthood, lack of social support, and stressful life events. A similar set of associations has been reported for postpartum depression (Kumar 1994). Finally, the finding that mothers in the Costa Rican sample 1 with higher CES-D scores had more children is consistent with the findings of the WHO Collaborative Study on Psychological Problems in General Health Care (Gater et al. 1998) of 27000 primary care patients from 15 centers on four continents which found that women with two or more children were more likely to be depressed than women with no children or only one child.

Although more than twice as many Chilean mothers lived in multi-generational households than Costa Rican mothers in sample 1, mothers in both groups living in such households were more likely to have higher CES-D scores. The Costa Rican mothers were questioned only about the presence of grandparents in the home. Chilean mothers were asked about household composition to determine their status as *allegados*, that is, living in a room in the household of another family, usually but not exclusively a parent, because of economic necessity. In both samples, the greater crowding of the households and the presence of other family members was associated with dysphoric mood, a result which suggests that merely the presence of others is not necessarily a social support.

The public health problem of depression in women of childbearing age extends to their children. Children of depressed mothers are at increased risk for clinical depression in addition to a full range of adjustment problems (Hammer 1991). Models for the transmission of psychopathology from mother to infant have focused on a lack of maternal monitoring and responsiveness, resulting in the infant experiencing disorganization and dysregulation (Fields 1995; Weinberg and Tronick 1996). An alternative view (Downey and Coyne 1990) notes the “mother-bashing” quality implicit in these models and points to other contextual factors, notably marital distress, which could account for both maternal depression and infant psychopathology. That is, maternal depression per se may not be a risk factor for child development. Rather, depression in mothers of young children may be a reaction to, and a marker for, a larger constellation of factors (and, more likely, their interactions)

that directly or indirectly affect their children. In any case, the high prevalence of depression in mothers of young children represents a double public health hazard.

■ Limitations and implications

The three samples were drawn from studies designed to evaluate the effect of iron therapy on the cognitive development of infants. This paper assumes that if the three samples of infants were drawn from community-based studies using comparable selection criteria and were representative of those communities, then the samples of mothers are also representative. A study designed to assess the prevalence rates of depression in the mothers of young children would have used different selection criteria. Since the present study does not compare the prevalence rates of depression in mothers to women of comparable ages, it is not possible to determine if those rates are related to the presence of children or a function of age. This paper also assumes that, since comparable selection criteria were applied, the Costa Rican and Chilean communities are homogeneous. A cross-cultural study focusing on depression would have assessed specific cultural differences and how they are related to prevalence. Nevertheless, the similarity of the prevalence rates of depression across the three samples appears to support the assumption.

In sum, this study of the mothers of young children in two Latin American countries found point and lifetime prevalence rates comparable to studies of mothers with young children in the US and UK. The association between these prevalence rates and, to a lesser degree, with episodes of postpartum dysphoria suggests that these women are experiencing multiple episodes of depression. As a chronic illness with a recurrent course, only a limited understanding of its course and etiology can be gained from cross-sectional studies like the present one. Longitudinal studies assessing the onset, duration, and risk factors associated with each episode are necessary. In the case of women during the childbearing and child-rearing years, frequent monitoring and assessment will be required to understand a lifetime course influenced by a complex set of biological, social, and psychological factors.

The cross-cultural assessment of psychopathology is complicated by the issues of biological vs cultural etiology. The authors of this paper do not imply that high prevalence in the three Latin American samples or other samples of mothers of young children implies an etiology independent of context. Indeed, a major shortcoming of this study is the failure to understand the meaning of depressive symptoms either in cultural context or independent history. Nevertheless, such methodological shortcomings should not constrain the evaluation of a global health problem affecting women and their young children.

■ **Acknowledgements** This work was supported by grants from the National Institutes of Health (HD 14122, Betsy Lozoff, Principal Investigator). We acknowledge the cooperation of the participating families and the research teams in Costa Rica and Chile.

References

1. Areias M-EG, Kumar R, Barros H, Figueiredo E (1996) Comparative incidence of depression in women and men, during pregnancy and after childbirth. Validation of the Edinburgh postnatal depression scale in Portuguese mothers. *British Journal of Psychiatry* 169: 30–35
2. Bromet E, Cornely MPH (1984) Correlates of depression in mothers of young children. *Journal of the American Academy of Child Psychiatry* 23: 335–342
3. Bromet E, Solomon Z, Dunn L, Nicklas N (1982) Affective disorders in mothers of young children. *British Journal of Psychiatry* 140: 30–36
4. Burnam MA, Karno M, Hough RL, Escobar JI, Forsythe AB (1997) The Spanish Diagnostic Interview Schedule. *Archives of General Psychiatry* 40: 1189–1196
5. Comstock G, Helsing K (1976) Symptoms of depression in two communities. *Psychological Medicine* 6: 551–563
6. Cox JL, Holden JM, Sagovsky R (1987) Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry* 150: 782–786
7. Cox JL, Murray D, Chapman G (1993) A controlled study of the onset, duration and prevalence of postnatal depression. *British Journal of Psychiatry* 163: 27–31
8. Downey G, Coyne JC (1990) Children of depressed parents: an integrative review. *Psychological Bulletin* 108: 50–76
9. Earls FJ, Sussman M, Robins L (1986) Unpublished data. Washington University School of Medicine, St. Louis, Missouri
10. Fields T (1995) Infants of depressed mothers. *Infant Behavior and Development* 18: 1–13
11. Garrison WT, Earls FJ (1983) Life-events and social supports in families with a preschool-aged child: methods and preliminary findings. *Comprehensive Psychiatry* 24: 493–452
12. Gater R, Tansella M, Korten A, Tiemens BG, Mavreas VG, Olatawura MO (1998) Sex differences in the prevalence and detection of depressive and anxiety disorders in general health care settings: report from the World Health Organization Collaborative Study on the psychological problems in general health care. *Archives of General Psychiatry* 55: 405–413
13. Ghodsian M, Zajicek E, Wolkind S (1984) A longitudinal study of maternal depression and child behavior problems. *Journal of Child Psychiatry and Psychology* 25: 91–109
14. Good B, Kleinman A (1985) Culture and Depression. In: Kleinman A, Good B (eds) *Culture and depression*. University of California Press, Berkeley, pp. 491–505
15. Hall LA (1990) Prevalence and correlates of depressive symptoms in mothers of young children. *Public Health Nursing* 7: 71–79
16. Hammer C (1991) *Depression runs in families: the social context of risks and resilience in children of depressed mothers*. Springer-Verlag, New York
17. Hankin BL, Abramson LY, Moffitt TE, Silva PA, McGee R, Angell KE (1998) Development of depression from preadolescence to young adulthood: emerging gender differences in a 10-year longitudinal study. *Journal of Abnormal Psychology* 107: 128–140
18. Heneghan AM, Silver EJ, Bauman LJ, Westbrook LE, Stein REK (1998) Depressive symptoms in inner-city mothers of young children: who is at risk? *Pediatrics* 102: 1394–1400
19. Judd LL (1997) The clinical course of unipolar major depressive disorders. *Archives of General Psychiatry* 54: 989–991
20. Kahn RS, Wise PH, Finkelstein JA, Bernstein HH, Lowe JA, Homer CJ (1999) The scope of unmet maternal health needs in pediatric settings. *Pediatrics* 103: 576–581

21. Karno MA, Burnam A, Escobar JI, Hough RL, Eaton WW (1983) Development of the Spanish-language version of the National Institute of Mental Health Diagnostic Interview Schedule. *Archives of General Psychiatry* 40: 1183–1188
22. Kessler RC, McGonagle KA, Zjao S, Nelson CB, Hughes M, Eshleman S, Wittchen H, Kendler KS (1994) Lifetime as 12-month prevalence of DSM-III-R psychiatric disorders in the United States. *Archives of General Psychiatry* 51: 8–19
23. Kumar R (1994) Postnatal mental illness: a transcultural perspective. *Social Psychiatry and Psychiatric Epidemiology* 29: 250–264
24. Lozoff B, Brittenham GE, Wolf AW, McClish DK, Kuhnert PM, Jimenez E, Jimenez R, Mora LA, Gomez I, Krauskoph D (1987) Iron deficiency anemia and iron therapy effects on infant development. *Pediatrics* 79: 981–995
25. Lozoff B, Jimenez E, Wolf AW (1991) Long-term effects of iron deficiency anemia in infancy. *New England Journal of Medicine* 325: 687–694
26. Lozoff B, Wolf AW, Jimenez E (1996) Iron-deficiency anemia and infant development: effects of extended oral iron therapy. *Journal of Pediatrics* 129: 382–389
27. Moss P, Lewis I (1977) Mental distress in mothers of preschool children in inner London. *Psychological Medicine* 7: 641–652
28. Murray CJL, Lopez AD (eds) (1996) *The global burden of disease*. The Harvard School of Public Health on behalf of The World Health Organization and The World Bank, Geneva, Switzerland
29. Naughton MJ, Wiklund J (1993) A critical review of dimension-specific measures of health-related quality of life in cross-cultural research. *Quality of Life Research* 2: 397–432
30. Nolen-Hoeksma S (1990) Sex differences in depression. Stanford University Press, Stanford, CA
31. O'Hara MW, Zekoski EM, Philipps LH, Wright EJ (1990) Controlled prospective study of postpartum mood disorders: comparison of childbearing and nonchildbearing women. *Journal of Abnormal Psychology* 99: 3–15
32. Orr ST, James S (1984) Maternal depression in an urban pediatric practice: implications for health care delivery. *American Journal of Public Health* 74: 363–365
33. Paykel ES (1991) Depression in women. *British Journal of Psychiatry* 158: 22–29
34. Radloff L (1977) The CES-D Scale: a self-report depression scale for research in the general population. *Applied Psychological Measurement* 1: 385–401
35. Richman N (1977) Short-term outcome of behavior problems in three-year-old children. In: Graham PJ (ed) *Epidemiological approaches in child psychiatry*. Academic Press, London
36. Roberts RE, Vernon SW, Rhodes HM (1989) Effects of language and ethnic status on reliability and validity of the Center of Epidemiological Studies-Depression Scale with psychiatric patients. *Journal of Nervous and Mental Disease* 177: 581–592
37. Robins LN, Helzer JE, Croughan J, Ratcliff KS (1981) National Institute of Mental Health Diagnostic Interview Schedule: its history, characteristics, and validity. *Archives of Mental Health* 38: 381–389
38. SAS (1988) *SAS Language guide for personal computers*, Release 6.03 edition. SAS Institute Inc, Cary, NC
39. Tronick E, Gianino AF Jr. (1986) The transmission of maternal depression to the infant. In: Tronick E, Field T (eds) *Maternal depression and infant disturbance*. Jossey-Bass, New York, pp. 5–11
40. Tronick EZ (1989) Emotions and emotional communication in infants. *American Psychologist* 44: 112–119
41. Walters T, Pino P, Pizarro F, Lozoff B (1998) Prevention of iron-deficiency anemia: comparison of high- and low-iron formulas in term healthy infants after six months of life. *Journal of Pediatrics* 132: 635–640
42. Weinberg MK, Tronick EZ (1996) Maternal depression and infant maladjustment: a failure of mutual regulation. In: Noshpitz J (ed) *The handbook of child and adolescent psychiatry*. Wiley and Sons, New York
43. Weissman MM, Lucke BZ (1995) Comparison of a self-report symptom rating scale (CES-D) with standardized depression rating scales in psychiatric populations. *American Journal of Epidemiology* 102: 430–431
44. Zuckerman BS, Beardslee WR (1987) Maternal depression: a concern for pediatricians. *Pediatrics* 79: 110–117