

# Dream-associated Behaviors Affecting Pregnant and Postpartum Women

Tore Nielsen, PhD<sup>1,2</sup>; Tyna Paquette, MSc<sup>1</sup>

<sup>1</sup>*Dream & Nightmare Laboratory, Hôpital du Sacré-Coeur de Montréal, Montréal, Québec, Canada;* <sup>2</sup>*Department of Psychiatry, Université de Montréal, Montréal, Québec, Canada*

**Study objectives:** Evaluate the prevalence and phenomenology of dream-associated behaviors affecting pregnant and postpartum mothers. Episodes consist of anxious dreams and nightmares about the new infant that are accompanied by complex behaviors (motor activity, speaking, expressing emotion).

**Design:** Three-group design (postpartum, pregnant, null gravida), self-report, and repeated measures.

**Setting:** Pregnancy and postpartum groups: completion of questionnaires in hospital room within 48 hours of giving birth and home telephone interviews; null gravida group: completion of questionnaires and interview in person or by telephone.

**Participants:** Two hundred seventy-three women in 3 groups: postpartum:  $n = 202$  (mean age =  $29.7 \pm 4.94$  years; 95 primiparas, 107 multiparas); pregnant:  $n = 50$  (mean age =  $31.1 \pm 5.44$  years); null gravida:  $n = 21$  (mean age =  $28.5 \pm 6.34$  years).

**Interventions:** Subjects completed questionnaires about pregnancy and birth factors, personality, and sleep and participated in interviews concerning the prevalence of recent infant dreams and nightmares, associated behaviors, anxiety, depression, and other psychopathologic factors.

**Measurements and Results:** Most women in all groups recalled dreams (88%-91%). Postpartum and pregnant women recalled infant dreams and nightmares with equal prevalence, but more postpartum women reported

they contained anxiety (75%) and the infant in peril (73%) than did pregnant women (59%,  $P < 0.05$  and 42%,  $P < 0.0001$ ). More postpartum (63%) than pregnant (40%) women reported dream-associated behaviors ( $P < 0.01$ ), but neither group differed from null gravida women (56%). This was due to different distributions over groups of the behavior subtypes. Motor activity was present in twice as many postpartum (57%) as pregnant (24%) or null gravida (25%) women (all  $P < 0.0001$ ). Expressing emotion was more prevalent among null gravida (56%) than postpartum women (27%) ( $P < 0.05$ ) but was not different from pregnant women (37%). Speaking was equally prevalent among the 3 groups (12%-19%). Behaviors were associated with nightmares, dream anxiety and, among postpartum women, post-awakening anxiety (41%), confusion (51%), and a need to check on the infant (60%). Primiparas and multiparas differed in dream and nightmare recall but not in prevalence of dream-associated behaviors.

**Conclusion:** The prevalent occurrence of pregnancy and postpartum infant dreams and associated behaviors may reflect the pervasive emotional influence of maternal concerns or changes instigated by severe sleep disruption, rapid eye movement sleep deprivation, and altered hormone levels.

**Keywords:** sleep disorders, parasomnias, sleep behaviors, postpartum, parity, dreaming, nightmares, pregnancy

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ALTHOUGH CHANGES IN DREAMING DURING PREGNANCY ARE RELATIVELY WELL STUDIED,<sup>1-4</sup> THOSE ASSOCIATED WITH THE POSTPARTUM STATE ARE NOT. We have observed informally that many new mothers describe acting out vivid disturbing nightmares about their new infants. A typical episode, which we dubbed the baby-in-bed (BIB) nightmare pattern, involves a dream that the infant has been lost in the mother's bed and during which the mother searches through the covers, weeps openly, or speaks out loud. At times she may even touch or take hold of her bedpartner while attempting to find the lost infant. When fully awake, she realizes that her infant is not in the bed but she may nevertheless feel compelled to arise and confirm that the infant is indeed sleeping safely. Such behaviors may reflect a mother's state of maternal vigilance; they may even serve a functional role in her infant caregiving. Or, they may be symptomatic of a disruptive sleep disturbance that interferes with maternal duties. In any case, the prevalence, phenomenologic

characteristics, and psychopathologic correlates of these unusual dreams are unknown.

There are superficial resemblances between such episodes and other parasomnias with complex behaviors such as rapid eye movement (REM) sleep behavior disorder,<sup>5</sup> parasomnia overlap disorder,<sup>6</sup> posttraumatic nightmares,<sup>7</sup> somnambulism and confusional arousal.<sup>7</sup> However, recent evidence<sup>8</sup> suggests that most parasomnias—including nightmares—decrease in prevalence immediately after pregnancy. It is therefore possible that postpartum episodes represent an unrecognized parasomnia that arises in specific situations of sleep disruption and/or stress. We used unobtrusive interview methods to evaluate this possibility. We asked women within 12 weeks of giving birth to report dreams and nightmares about their infants and to indicate whether these were accompanied by any of 3 types of dream-associated behaviors: motor activity, speech, and expressed emotion. We also studied smaller groups of pregnant and non-child-bearing women using similar questions to determine the specificity of these episodes to the postpartum state. Based on our informal observations, we expected to observe a markedly increased prevalence of both infant dreams and dream-related behaviors selectively among postpartum women.

## Disclosure Statement

This was not an industry supported study. Dr. Nielsen and Ms. Paquette have indicated no financial conflicts of interest.

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Address correspondence to: Tore Nielsen, Ph.D., Sleep Research Centre, Hôpital du Sacré-Coeur de Montréal, 5400 boul. Gouin Ouest, Montréal, Québec, Canada, H4J 1C5; Tel: (514) 338-2222, Ext: 3350; E-mail: tore.nielsen@umontreal.ca

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## PROCEDURES

### Postpartum Group

Within 48 hours of giving birth, new mothers ( $n = 493$ ) were approached by a unit nurse who obtained written consent and

**Table 1**—Sample Sizes, Ages<sup>a</sup> and Interviews Conducted for Each Group

Group	Total		Primi		Multi		Interviews conducted for prior time periods					
	n	Age	n	Age	n	Age	0-3 wk <sup>b</sup>	4-6 wk <sup>b</sup>	7-12 wk <sup>b</sup>	last 3 mo	last 9 mo	lifetime
Postpartum	202	29.7 (4.94)	95	28.2 (4.43)	107	31.2 (5.03)	X	X	X			
Pregnancy	50	31.1 (5.44)	28	29.4 (5.71)	22	33.1 (4.37)					X	X
Null gravida	21	28.5 (6.34)								X	X	X
Totals	273		123		129							

<sup>a</sup>Age results are presented as mean (SD).

<sup>b</sup>Prevalence estimates for the postpartum sample are based upon postpartum weeks 0-12 combined.

administered questionnaires. Eighty mothers (16.2%) declined to participate, and 193 (39.1%) were excluded for the following reasons: (1) unable to understand French or English (34.5%), (2) presented an active neurologic, psychiatric, or major sleep disorder such as narcolepsy or sleep apnea syndrome (3.2%), (3) took medications known to influence sleep (1.2%), and (4) gave evidence of substance abuse during pregnancy (0.2%). Of the remaining 220 women, 18 (8.2%) completed the in-hospital questionnaires but declined all later telephone interviews and were excluded. Thus, responses from 202 new mothers were retained initially; of these, 172 were based upon 3 telephone interviews, 26 upon 2 interviews, and 4 upon 1 interview. These subjects were 18 to 45 years old (mean = 29.7 ± 4.94 years) and were admitted to the Montreal Sacré-Coeur Hospital Mother-Infant Unit within a 9-month period (see Table 1). Ninety-five were primiparas (mean age = 28.2 ± 4.43 years) and 107 were multiparas (mean age = 31.2 ± 5.03 years). They differed in age ( $t_{190} = 4.55$ ,  $P < 0.0001$ ) but not in family income or education levels. During interviews, a subsample of these mothers was able to recall an infant dream ( $n = 154$ ); 142 of these responded to probe questions about dream content and behaviors. They consisted of 80 primiparas (mean age = 28.2 ± 4.51 years) and 62 multiparas (mean age = 31.8 ± 4.71 years;  $P < 0.0001$ ).

### Pregnant Group

To permit comparisons with pregnancy experiences, 50 additional women were recruited with the same inclusion and exclusion criteria as for postpartum subjects and were assessed for sleep and dream experiences that had occurred during their recently completed pregnancies. A total of 181 women were approached; 33 (18.2%) declined to participate. Another 98 (54.1%) were excluded for (1) inability to understand English or French (52.5%) or (2) medical complications and other reasons (1.7%). The final sample consisted of 28 primiparas (mean age = 29.4 ± 5.71 years) and 22 multiparas (mean age = 33.1 ± 4.37 years;  $t_{47} = 2.544$ ,  $P = 0.014$ ) that, like the postpartum group, were recruited within 48 hours of giving birth at the same Mother-Infant Unit. Neither the primiparous ( $t_{118} = 1.203$ ,  $P = 0.231$ ) nor the multiparous ( $t_{126} = 1.639$ ,  $P = 0.104$ ) pregnant subjects differed in age from their postpartum counterparts. Similarly, for the subgroup of 42 women in the pregnancy group who were able to recall a dream, neither the primiparas ( $n = 26$ ;  $t_{112} = 1.039$ ,  $P =$

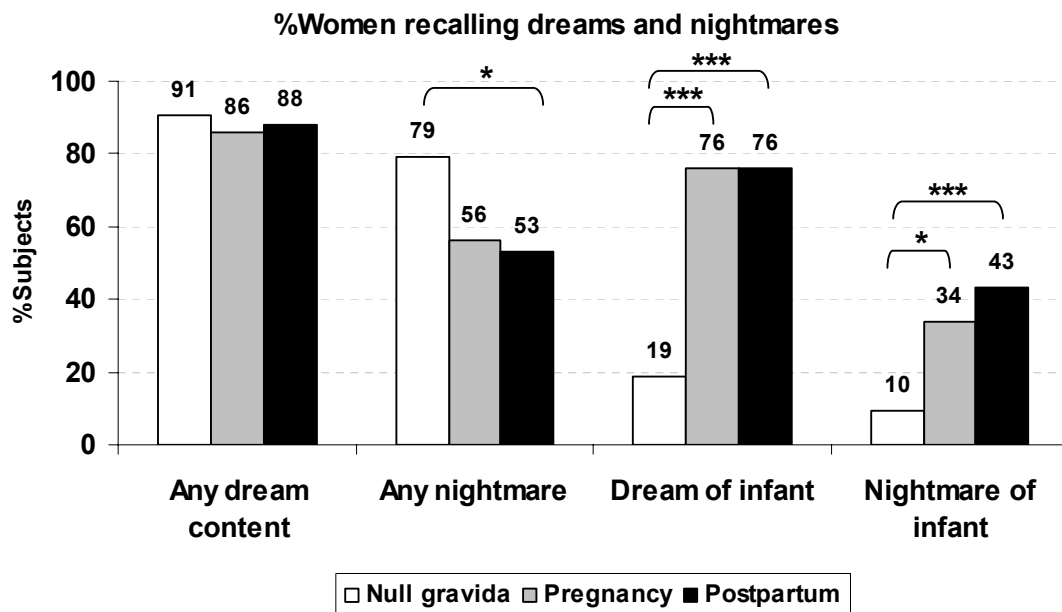
0.301) nor the multiparas ( $n = 16$ ;  $t_{101} = 0.375$ ,  $P = 0.708$ ) differed in age from their postpartum counterparts.

### Null Gravida Group

To permit comparisons with a nonpregnant group, 21 women who had never borne children and who were not currently pregnant were recruited with the same inclusion and exclusion criteria as above and assessed for sleep and dream experiences occurring during the last 9 months. Their mean age (28.48 ± 6.34 years) did not differ from that of either primiparous group (both  $P > 0.60$ ) but was younger than that of both the postpartum ( $t_{125} = 2.222$ ,  $P = 0.028$ ) and pregnancy ( $t_{41} = 2.819$ ,  $P = 0.007$ ) multiparous groups.

### Interviews

Subjects in the postpartum group were contacted by telephone at home at 3, 6, and 12 weeks postpartum and administered structured interviews covering the period since their last contact with a research assistant (see Table 1). Responses to all questions were tape recorded and typed into a database by 1 of 3 interviewers. Mothers were asked if they had dreams or nightmares (defined as bad dreams that woke them up) during this period and to describe their most intense and realistic dream about their infant since last contact. Dream content in transcribed reports was defined as any description of sensory imagery; statements such as "I dreamed about my baby" without further elaboration were not considered to be dream content. If a dream about the infant was recalled, a checklist was administered that coded for content attributes (e.g., Dream anxiety); 3 types of dream-associated behaviors, i.e., Motor activity ("Did you actually move in your bed?"), Speaking ("Did you actually speak out loud?"), and Expressing emotion ("Did you actually express any emotions, such as laughing or crying?"); and mothers' reactions to the episode (Lingering anxiety, Confusion on awakening, Checking on infant). Interviewers verified with subjects the precise nature of the behaviors before coding them. Overlaps were permitted if, for example, an expressed emotion also involved limb or trunk movements or speech. A binary dream-associated behaviors score was coded as 1 if any of the 3 types of behavior was reported in any interview. A binary Peril dreams score was coded as 1 if either of 2 types of dreamed threat to the infant was reported: Infant lost (yes/no) or Infant hurt or in



**Figure 1**—Prevalence of women in the null gravida (white bars), pregnancy (grey bars), and postpartum (black bars) groups who recalled dreams, nightmares, infant dreams, and infant nightmares during the interview. Dream recall was equivalent for the 3 groups, and more null gravida women recalled at least 1 nightmare than did the women in either other group. Significantly more pregnant and postpartum mothers recalled dreams and nightmares about the infant than did null gravida women. \* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$

danger (yes/no). Nightmares were assessed with a general item, any nightmares present (yes/no), as well as a variable specific to infants, Nightmares about the infant present (yes/no). Additional measures of obstetric complications, sleep and sleep disorders, spousal and familial support, breast-feeding practices, and psychopathology were taken but are not considered further here.

Subjects in the pregnancy group were administered the same questionnaires and the same interview as subjects in the postpartum group, except that the interview was conducted only once, in the woman's hospital room immediately after birth, and items were changed to refer to the 9-month pregnancy, rather than the postpartum, period (Table 1). In particular, they were asked first, whether in that time period they had experienced dreams accompanied by each of the 3 behaviors and, second, whether they had recalled a dream about their future children, babies, or pregnancies or, if they had not, whether they recalled any dream. They were then asked to indicate whether they experienced behaviors during that dream and to complete other items on the questionnaire. If spouses were present in the room, they were asked to verify any occurrences of dream-associated behaviors. They were in agreement with 100% of their wives' reports and occasionally reported instances that their wives had overlooked. Finally, subjects were asked whether they had experienced dream-associated behaviors at any time in their lives prior to pregnancy. To ensure conservative statistical comparisons with the postpartum group, mothers recalling any dream content from the 9-month pregnancy period were included in the analyses.

Women in the null gravida group were administered the same questionnaires and the same interview as subjects in the pregnancy group, except that the interview was conducted either in person or by telephone at the women's convenience, and items were changed to refer to both the last 3 months and the last 9 months of the woman's experience (Table 1). They were also asked whether they had experienced dream-associated behaviors at any time in their lives prior to the preceding 9 months. Again,

to ensure conservative statistical comparisons, mothers recalling any dream content from the prior 9-month period were used in the analyses.

### Statistical Analyses

For the postpartum group, dependent measures were calculated for the entire 12-week postpartum period by combining scores for each subject's telephone interviews into dichotomous variables where 0 was equal to *no* on all interviews and 1 was equal to *yes* on at least 1 interview. For the pregnancy and null gravida groups, dependent measures were calculated from the dichotomous variables of the single hospital, telephone, or in-person interview that was conducted. Relationships between variables were assessed with  $\chi^2$  tests and, if any cell counts were below 5, with Fisher exact tests.

## RESULTS

### Prevalence of Dreams and Nightmares

As shown in Figure 1, recall of specific dream content was equally prevalent for subjects in the postpartum (88.1% or 178/202), pregnancy (88.4% or 43/50), and null gravida (90.5% or 19/21) groups. The presence of any nightmares was more prevalent for the null gravida group (79%) than for either the postpartum (53%;  $\chi^2_{(197)} = 4.554$ ,  $P = 0.050$ , Fisher exact test) or pregnant (56%;  $\chi^2_{(62)} = 3.022$ ,  $P = 0.082$ , Fisher exact test) groups, which did not differ. In contrast, the proportion of women recalling dreams that concerned the new (or future) infant was high for the postpartum group (86.0% or 154/178) and not different from the pregnancy group (88.4% or 38/43;  $\chi^2_{(221)} = 0.10$ ,  $P = 0.746$ ); both were higher than the null gravida group (21.1% or 4/19;  $\chi^2_{(197)} = 46.34$ ,  $P < 0.00001$  and  $\chi^2_{(62)} = 27.33$ ,  $P < 0.00001$ , Fisher exact tests). Similarly, the proportion of women who had 1 or more

**Table 2**—Emotions Expressed During Dreams Reported by Women in Each Group

	Postpartum n	Pregnancy n	Null gravida n	Total n	Postpartum %	Pregnancy %	Null gravida %	Total %
Anxiety	11	6	3	20	25.6	40.0	30.0	29.4
Fear/terror	11	5	2	18	25.6	33.3	20.0	26.5
Sadness/grief	15	1	2	18	34.9	6.7	20.0	26.5
Happiness/relief	4	2	1	7	9.3	13.3	10.0	10.3
Disgust	1	0	0	1	2.3	0.0	0.0	1.5
Other	1	1	2	4	2.3	6.7	20.0	5.9
	43	15	10	68	100.0	100.0	100.0	100.0

Results are expressed as numbers and percentages of emotions expressed during dreams reported by women in each group. Physical signs of expressed emotions identified by the women included crying, tearing, laughing, startling, heavy breathing, hyperventilating, facial grimaces and expressions, trembling, sweating, pounding heart and other autonomic changes.

nightmares of the infant was equally high for the postpartum (48.3% or 86/178) and pregnancy (39.5% or 17/43) groups ( $\chi^2_{(221)} = 0.10$ ,  $P = 0.300$ ); both were higher than the null gravida group (10.5% or 2/19;  $\chi^2_{(197)} = 9.92$ ,  $P = 0.001$  and  $\chi^2_{(62)} = 5.22$ ,  $P = 0.035$ , Fisher exact tests).

For the postpartum women who responded to questions about a particular infant dream ( $n = 142$ ), 74.8% indicated that their dream contained anxiety and 73.4% indicated that the infant was depicted as in peril (lost, injured, or in danger). The equivalent scores were significantly lower for the pregnancy group (58.5%;  $\chi^2_{(180)} = 4.09$ ,  $P = 0.043$  and 41.5%;  $\chi^2_{(180)} = 14.40$ ,  $P = 0.0001$ ) and the null gravida group (50.0%;  $\chi^2_{(155)} = 4.410$ ,  $P = 0.072$ , Fisher exact test and 18.7%;  $\chi^2_{(155)} = 19.60$ ,  $P < 0.00001$ ).

Closer examination of the postpartum group revealed that more primiparas (94.7%) than multiparas (82.2%) were able to recall a dream ( $\chi^2_{(202)} = 7.503$ ,  $P = 0.006$ ), an infant dream (87.4% vs 66.4%;  $\chi^2_{(202)} = 12.27$ ,  $P = 0.0005$ ), and an infant nightmare (52.6% vs 34.6%;  $\chi^2_{(202)} = 6.69$ ,  $P = 0.010$ ). After controlling a possible age-related difference in dream recall<sup>9</sup> by comparing only dream recallers, the difference for recall of infant dreams was still obtained (primiparas: 92.2% vs multiparas: 80.7%;  $\chi^2_{(178)} = 5.08$ ,  $P = 0.024$ ) as was the difference for recall of infant nightmares (54.4% vs 39.8%;  $\chi^2_{(178)} = 3.84$ ,  $P = 0.050$ ). For the pregnancy group, a similar difference was found for dream recall (primiparas: 61.9%; multiparas: 38.1%;  $\chi^2_{(50)} = 3.714$ ,  $P = 0.054$ ) but not for recall of infant dreams or nightmares. Further limiting the postpartum sample to recallers of infant dreams eliminated the nightmare effect (primiparas: 59.0%; multiparas: 49.3%;  $\chi^2_{(154)} = 1.46$ ,  $P = 0.226$ ).

Thus, to control this dream recall factor in subsequent analyses of dream-associated behaviors, comparisons were conducted only for the subset of women who recalled an infant dream and responded to questions about that dream in the postpartum ( $n = 142$ ) and pregnancy ( $n = 43$ ) groups. For the null gravida group, recallers of any dream content were included ( $n = 20$ ). Because some women failed to respond to select probe questions, numbers for statistical tests varied from 124 to 142 for the postpartum group and from 41 to 43 for the pregnancy group.

### Prevalence of Dream-associated Behaviors

A total of 90 of 142 (63.4%) postpartum women queried reported at least 1 of the 3 types of behaviors (Figure 2). This number was significantly greater than that for the pregnancy group

(39.5%;  $\chi^2_{(185)} = 7.70$ ,  $P = 0.006$ ) but not for the null gravida group (56.3%;  $\chi^2_{(158)} = 0.31$ ,  $P = 0.576$ ). The latter 2 groups did not differ ( $\chi^2_{(59)} = 1.32$ ,  $P = 0.250$ ).

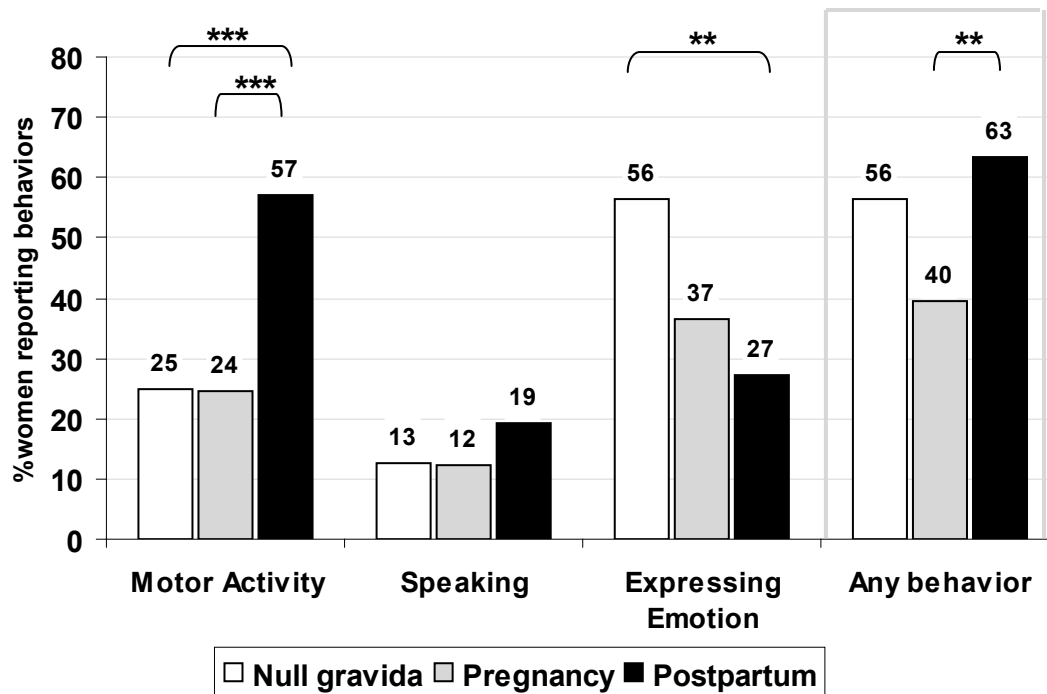
Assessment of behavior subtypes revealed that the latter findings were due to different distributions over groups of Motor activity and Expressing emotion subtypes. Motor activity was the most prevalent behavior, reported by 71 of 124 (57.3%) postpartum mothers queried, and was markedly more prevalent than for either the null gravida (4/16 or 25.0%;  $\chi^2_{(140)} = 14.54$ ,  $P = 0.0001$ ) or pregnancy (10/41 or 24.4%;  $\chi^2_{(165)} = 29.97$ ,  $P < 0.00001$ ) groups. In contrast, Expressing emotion was more prevalent for the null gravida group (9/16 or 56.3%) than for the postpartum group (38/140 or 27.1%;  $\chi^2_{(156)} = 5.78$ ,  $P = 0.016$ ) and, marginally, for the pregnancy group (15/41 or 36.6%;  $\chi^2_{(57)} = 1.83$ ,  $P = 0.177$ ). Speaking was slightly, but not significantly, more prevalent for the postpartum group (26/135 or 19.3%) than for the null gravida (2/16 or 12.5%) or pregnancy (5/41 or 12.2%) groups (all  $P > 0.30$ ). The prevalence of dream-associated behaviors did not differ between primiparas and multiparas for either the postpartum (primiparas: 67.5%; multiparas: 58.1%) or pregnancy (42.3%; 35.3%) groups, nor did primiparas and multiparas differ on any of the 3 behavior subtypes.

Emotions expressed by women are displayed in Table 2 and consisted primarily of sadness, fear/terror, and anxiety. Only 7% of the instances were of a positive tone (happiness/relief).

For the postpartum group, more mothers with behaviors reported Dream anxiety in at least 1 infant dream (81.8%) than did mothers without behaviors (62.7%;  $\chi^2_{(137)} = 6.24$ ,  $P = 0.013$ ). More mothers with behaviors also reported Nightmare presence (67.8%) than did mothers without (38.4%;  $\chi^2_{(140)} = 11.56$ ,  $P = 0.001$ ). The same relationships were found for the pregnancy group: Dream anxiety (76.5% vs 45.8%;  $\chi^2_{(41)} = 3.85$ ,  $P = 0.050$ ); Nightmare presence (82.4% vs 42.3%;  $\chi^2_{(43)} = 6.77$ ,  $P = 0.009$ ). No differences on these variables were found comparing the postpartum and pregnancy groups however.

The postawakening reactions rated by postpartum mothers reflect the disturbing nature of their episodes. Many mothers reported Lingering anxiety (57/138 or 41.6%) and even more Confusion on awakening (72/139 or 51.8%) and Checking on the infant (82/137 or 59.9%). The presence of dream-associated behaviors was associated with all 3 of these measures ( $\chi^2_{(137)} = 6.700$ ,  $P = 0.010$ ;  $\chi^2_{(138)} = 13.054$ ,  $P = 0.0003$ ;  $\chi^2_{(136)} = 4.3864$ ,  $P = 0.036$  respectively).

## Dream-associated behaviors reported by groups



**Figure 2**—Prevalence of dream-associated sleep behaviors reported by women in the null gravida (white bars), pregnancy (grey bars), and postpartum (black bars) groups who were able to recall a dream during the interview. Comparisons with the postpartum group are conservative because prevalence estimates are from the 3 prior months, whereas those for the pregnancy and null gravida groups are from the 9 prior months. Postpartum women nonetheless reported the highest prevalence of any behavior (63%; framed bars at right), which was significantly more than the pregnancy group (40%) but not different from the null gravida group (56%). This is because different distributions characterized the 3 behavior subtypes. An unexpectedly high prevalence of Expressing emotion characterized the null gravida group (56%), whereas a markedly higher prevalence of Motor activity (57%) characterized the postpartum group. Speaking was only slightly higher for the postpartum group. Expressing emotion followed a pattern observed for most other parasomnias previously studied, decreasing from pregnancy to postpartum (see text), whereas Motor activity was atypically elevated postpartum. Due to the conservative nature of the comparisons, the true differences for Expressing emotion may be smaller, and those for Motor activity and Speaking larger, than shown in the figure. \* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$

### BIB Nightmare Pattern and Dream-associated Behaviors

The observed associations between behaviors and disturbing dreams of the infant confirm our informal observations of a prevalent and stereotypic BIB nightmare pattern among postpartum women. Many postpartum mothers in the present sample reported disturbing dreams in which they believed their new infants to be present, albeit lost or suffocating, somewhere in the bed and during which, both fictively and in reality, they searched for the infant, often in a state of great fear or distress. Our prevalence analyses reveal that Motor activity is the most common accompaniment to these dreams. Several examples appear in Table 3. However, our comparisons go further to demonstrate that similar types of anxious dreams are prevalent among pregnant women, for whom their focus is the unborn child and the possibility of birth complications. Some of these dreams, such as the 1 reported by subject 222 in Table 3, even include the intense hallucinated presence of the unborn infant. Motor activity is a less common and Expressing emotion a more common attribute of these pregnancy dreams. Our comparisons also confirm that, although nightmares are prevalent among null gravida women, only rarely do they concern infants in this manner. To our great surprise, however, we did obtain 1 nightmare containing all of the attributes

of the stereotypical BIB pattern reported by postpartum women. This dream occurred after the woman's very emotional encounter with her newborn nephew and is described in Table 3 (see subject 1017). Equally surprising was the finding that, unlike postpartum women, a high proportion of null gravida women (56%) overtly express emotions such as sadness and anxiety during their nightmares. Finally, we were surprised to learn that 10 of 119 (7.6%) women queried about their spouses' experiences reported that the latter had experienced 1 or more dream-associated behaviors concerning the infant. One additional spouse reported having had such experiences after the birth of a previous child. These episodes ranged from simple instances of sleep-talking about the infant to more elaborate episodes of searching for the infant in bed or walking while carrying a pillow believed to be the infant. No instances of expressing emotion by spouses were reported.

### DISCUSSION

The conception and birth of a child are emotionally salient events that influence the dreams of most new mothers. In a surprisingly high number of cases, this influence reflects negative aspects of maternal responsibility, depicting the new infant in dreamed situations of peril and provoking anxiety in the mother

**Table 3**—Examples of Infant-related Dreams with Associated Sleep Behaviors Among Mothers in the Postpartum, Pregnancy and Null Gravida Groups

S-ID*	Age	Parity	Interview	Dream content	Associated behaviors
<b>Postpartum group</b>					
30	26	M	3 weeks postpartum	The baby is sleeping with me in my bed. I turn on my side to pick him up but cannot find him. I look under the sheets, begin to wake up and start to realize that it is a dream.	I turned on my side and I felt around in the sheets.
118	36	P	3 weeks postpartum	I think that the baby is in my arms or look for the baby in bed. I think that I forgot to return the baby to her crib.	I sit up in bed and say “careful, the baby.”
184	27	P	3 weeks postpartum	The baby was in my bed and I was looking for him everywhere but couldn’t find him. I thought he was in my husband’s arms and woke up touching my husband, looking for the baby. That has happened a dozen times in the last 20 days.	I was looking for my baby in the bed; I touched my husband.
210	30	P	3 weeks postpartum	I dream...I look for the baby and that wakes me up...I realize that he is in his room. I have the pillows in my arms thinking it’s him.	I’m feeling around the sheets.
<b>Pregnancy group</b>					
222 <sup>a</sup>	37	M	1 month predelivery	I was having contractions and suddenly a foot came out of my belly. I tried to get it back inside when the other one came out and then the head too, but on the top of the belly. I knew that it was upside down. My belly was like a baby carrier, and I was hurriedly trying to put all the limbs back inside. I told my husband that we had to hurry to the hospital because the baby wasn’t ready to come out yet and, if it did, it would die.	On waking up, I was moving my arms and legs; I was pushing on my belly. I felt fear, powerlessness, horror.
272	48	M	1 week pre-delivery	My mother was driving a friend and me (on passenger side) by a beach. Suddenly the sky became dark and the road windy and dangerous with ravines. We go too fast and the car flies off the road, crashes in a field and starts turning over onto my side. I hold my stomach and pull back in my seat to protect the baby.	I woke up holding my belly and backing up in my bed. I’m very afraid and hyperventilating.
241	30	P	2 weeks predelivery	I was giving birth and there were complications. I was very afraid of the Caesarian but had to have it and something went wrong. The baby was stillborn with the cord wrapped around his neck. I was very afraid and in shock.	I woke up with my eyes full of tears, crying.
233	23	P	1 month predelivery	I was arguing with my future baby’s godmother (also my aunt) and we are very close. I said hurtful things having to do with the baby.	I woke up crying with big tears rolling down my face.
<b>Null gravida group</b>					
1017 <sup>b</sup>	28	N	n/a	I felt anguish. It was like we had brought my nephew home and he was lost in the bed and I was afraid of crushing him. I see the bedroom, my spouse and the blankets, but not my nephew. I ask “Where is J__ ; I can’t find J__?” I looked through the covers and realized he is not there. I was confused for 5-10 seconds after waking up.	I was sitting up and feeling around the bed for my nephew; I touched my husband and said “Where is J____?: I can’t find J_____.”
1010	26	N	n/a	I was holding a friend’s baby. It transformed into a larva. I stepped on it and crushed it. I felt terrible.	I woke up crying. I had moved so that I was diagonal in the bed; I usually never move at all.

\*S-ID refers to subject identification number; M, multipara; P, primipara; N, null gravida.

<sup>a</sup>Subject had contractions and sore belly prior to sleep.

<sup>b</sup>Subject had held her newborn nephew for the first time earlier that day, had been extremely moved and had imagined having a child of her own.

that often spills over into wakefulness. These threatening dreams are associated with behaviors in over half (63.4%) of postpartum mothers who can recall their dreams and are expressed primarily motorically. Similar dreams occur in pregnant mothers, but with a much lower prevalence.

Such a high prevalence of dream-associated behaviors is surprising in light of the fact that in a recent study of 325 mothers<sup>8</sup> only a 9.2% prevalence of postpartum somniloquy or somnambulism was reported. This estimate is much lower than the Motor activity estimates we obtained for our samples of dream recallers, which ranged from a low of 24.4% for the pregnancy group to a high of 57.3% for the postpartum group. The discrepancy remains even if our estimates are recalculated more conservatively on the total sample sizes of 50 for the pregnancy group (20.0%) and 202 (35.1%) for the postpartum group. It is therefore likely that the discrepancy reflects our use of targeted probe questions that focused specifically on sleep behaviors, infant nightmares, and related factors. A similar conclusion regarding the need to use targeted probes to identify sleep behaviors was drawn by the authors of a study examining sexual sleep behaviors.<sup>10</sup> Our probe questions also revealed an unexpectedly high prevalence of the Expressing emotion variable among null gravida subjects and evidence that this phenomenon may decrease in prevalence during pregnancy and even further postpartum. This pattern over time resembles that seen for most other parasomnias<sup>8</sup> and suggests that it may represent a qualitatively distinct parasomnia from that of dream-associated motor activity. However, the small size of our null gravida sample suggests caution in interpreting these findings. The emotions expressed by women in the 3 groups also differed qualitatively; postpartum women reported a majority of sadness/grief emotions (35%) that were most often in response to the dreamed death or loss of the infant. Pregnant women reported a preponderance of anxiety and fear (73%) but also positive emotions (13%). Null gravida women reported a more uniform distribution of emotion types. In view of the relatively small sample of null gravida women studied, the fact that we employed a conservative baseline estimate (9 months) for the null gravida and pregnancy groups and the fact that no other literature exists on the expression of emotions during adult sleep, further research on this measure in various populations is clearly called for.

We did not replicate the finding that nightmares decrease from prepregnancy through pregnancy to the postpartum period.<sup>8</sup> In fact, our prevalence estimates for nightmares occurring during pregnancy (56%) and postpartum (53%) were similar and only somewhat higher than a published estimate for pregnancy nightmares (37.3%).<sup>3</sup> This finding, together with the finding that dream-associated motor activity increases postpartum, leads us to conclude that the propensity to enact nightmares, possibly due to an increase in their emotional intensity, rather than their prevalence per se, is changed in the postpartum state.

Health practitioners dealing with new mothers should be aware of postpartum dreams and sleep behaviors so they may avoid unnecessary sleep laboratory testing and the possible misdiagnosis of REM sleep behavior disorder, somnambulism, or psychiatric pathologies involving hallucinoid symptoms, e.g., schizophreniform disorder. Such knowledge may also provide a context within which practitioners may explain to new parents the advantages of optimizing sleep hygiene during the often tumultuous postpartum period. Similarly, new mothers may benefit from education on the nature and prevalence of postpartum dreams and

sleep behaviors if it alleviates unnecessary worries about their infant's safety and unfounded concerns about their own mental health. It may also prevent mothers from unnecessarily rising at night to check on their infants, thereby decreasing the amount of sleep fragmentation and deprivation that they undergo. Women with a strong tendency to express dream-related behaviors may pursue strategies for diminishing the intensity of nightmares (e.g., cognitive-behavioral therapy) or undertake preventative sleeping measures to avoid injuring themselves, their spouses, or their infants.

We were surprised to see a stereotypical BIB nightmare reported by a woman in the null gravida group (see Table 3). That this subject had seen and held her newborn nephew earlier that day, had been emotionally moved by the experience, and had imagined herself soon to be in the motherhood role are factors that may well have enabled this episode. This example, together with our observation that BIB nightmares are also reported by a small number of fathers, attests to the stereotyped nature of the phenomenon and supports the possibility that psychological or socioemotional factors may in some cases be sufficient to trigger the pattern. However, it is likely that the triggering of most episodes requires socioemotional influences in addition to other, more obvious, contributing factors.

One such factor is the severe sleep disruption that new mothers undergo in the postpartum period. High levels of sleep interruption, due primarily to the demands of infant care, are the most characteristic feature of postpartum sleep,<sup>11</sup> especially up to 12 weeks.<sup>12</sup> There is also evidence of postpartum REM sleep deprivation,<sup>13-15</sup> which likely produces large REM rebounds with intensified dreaming when recovery sleep occurs.

Another likely contributing factor is the fluctuation in hormones such as oxytocin, prolactin, and vasopressin. A mother's oxytocin levels play a pivotal role in birth and breast-feeding<sup>16</sup> and are likely influenced by the infant's cries and social signals.<sup>17</sup> Its expression in REM sleep may also play a role in mother-infant attachment.<sup>18</sup> Since most dream-associated behaviors occur during awakenings from sleep and, indeed, many women have reported anecdotally that they occur at times of breast engorgement, it may be that these hormones—or their influence on other processes such as breast sensation during sleep—affect the form, intensity, or content of dreams.

Finally, the occurrence of dream-associated behaviors is likely affected by various psychopathologic influences. We have reported elsewhere<sup>19</sup> that among postpartum mothers dream-associated behaviors, motor activity and emotions, in particular, are correlated with measures of insecure attachment (Parental Bonding Instrument) and global symptom severity (Symptom Checklist-90-R).

Further clinical study of dream-associated behaviors and the factors that precipitate them may prompt more careful investigations of their range in the general population and their variations among clinical samples. The objective recording of sleep with laboratory or ambulatory polysomnography methods is needed to clarify whether the phenomena arise primarily in REM sleep (like REM sleep behavior disorder or nightmares) or primarily in non-REM sleep (like somnambulism or confusional arousals). Polysomnography recordings that include facial and limb electromyogram leads may also help clarify whether the expression of emotions during dreaming is a parasomnia that is distinct from motor activity. Closer study of fathers and of

parents who adopt infants may help clarify whether hormonal or socioemotional factors are more critical in producing the phenomena. Such research may help shed light upon the significance of disturbed dreaming in a variety of medical conditions characterized by both intense emotional stress and severe sleep disruption. With such developments, the dreams of new mothers may help to spawn a novel model for explaining atypical, dreaming-related parasomnias.

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