Emotional experiences during breastfeeding: time of day, family support and mental health

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Abstract

This study aimed to investigate the emotional experience of breastfeeding mothers; to compare their emotions during the day and night; and to identify predictors of maternal emotional states. 107 breastfeeding women completed daytime and nighttime online surveys. Mothers reported a more positive emotional experience during the daytime breastfeeding session. During the day, positive emotional state was most strongly predicted by perceived degree of family's support, followed by mother's mental health, overall sleep quality, child's age, mother's age and the mother's immigrant status. In contrast, more positive experience during the nighttime was only associated with better subjectively rated mental health. Our results suggest that maternal emotional experience needs to be understood as an interplay between mental health and social context.

Keywords: breastfeeding; emotions; support; sleep

1.1. Sleep and Variation of Cognition in New Mothers

Mothers of new infants typically experience significant changes in their sleep schedule due to the sleep patterns and the breastfeeding demands of their newborns. Specifically, babies do not yet have mature circadian rhythms, leading them to have more frequent awakenings and nocturnal feedings, which mothers must accommodate (Spaeth et al., 2021). One of the many reasons transitioning to motherhood is a challenging time is because new mothers generally experience sleep deprivation, sleep fragmentation and a decrease in sleep efficiency (Thomas & Foreman, 2005). Such changes in sleep and rest have been found to be associated with high postpartum stress, as well as fatigue and depression (Horowitz & Damato, 1999; Righetti-Veltima et al., 2002). Due to the high prevalence of sleep disruption in new mothers, it is important to investigate the relation between sleep and emotional experiences. Overall, quality of sleep has a strong effect on our ability to regulate our affective states, with healthy sleep being associated with improved emotional well-being (Vandekerckhove & Wang, 2017). It is therefore likely that the sleep patterns of new mothers play a role in the emotions they are feeling while breastfeeding, especially at night when their sleep may be actively disrupted by scheduled or on-demand breastfeeding sessions.

Studies investigating circadian mood variations in the general population have found that positive and negative affect peak during the day and night, respectively (Dzogang et al., 2017; Emens et al., 2020). Additional studies of individuals who are generally awake during the night, including night shift workers and those suffering from insomnia, have demonstrated an increased risk of developing mood disorders due to their nocturnal wakefulness (Baron & Reid, 2014; Buysse, 2013; Emens et al., 2020). Despite the fact that breastfeeding mothers are also largely awake during periods of the night and their sleep disturbance scores are similar to individuals

working regular night shifts, they have been largely excluded from such studies (Gay et al., 2004; Lee, 1992). It is possible therefore, that many breastfeeding mothers have a different emotional experience breastfeeding during the day in comparison to the night. No study to date has investigated this possibility.

1.2. Breastfeeding and emotions

Most new mothers, certainly in Quebec (Canada), are provided with breastfeeding promotion messaging in health policy that breastfeeding is the optimal feeding method for the health of infants and babies (Bouchet-Horwitz, 2015). They are provided with recommendations from their doctors, midwives, doulas or community settings that the World Health Organization (WHO) recommends exclusive breastfeeding for the first six months of life and continuation for up to two years or longer, and they are likely to encounter models of care designed by WHO and UNICEF to promote breastfeeding (Bouchet-Horwitz, 2015; Ryan et al., 2010). Despite the ubiquity of this messaging, little is known how new mothers experience breastfeeding as an embodied process.

It is clear that breastfeeding a newborn is a complex process, and there are data demonstrating that mothers may experience a wide range of affective states, from happiness and calmness, to feeling overwhelmed, isolated, fatigued, confused, and a sense of failure (Dietrich Leurer & Misskey, 2015b; Hvatum & Glavin, 2017). In some areas of popular culture and health disclosure, breastfeeding is presented as an enjoyable experience for new mothers with positive health impacts for the baby's health and the attachment to the mother (Yate, 2017). Furthermore, research consistently shows that breastfeeding mothers have more positive moods, experience less stress and have lower anxiety than formula-feeding mothers (Groër, 2005; Heinrichs et al., 2002; Mezzacappa & Katlin, 2002). Similarly, studies have shown a reduced cortisol level, a

stress-related hormone, in breastfeeding mothers, and that breastfeeding mothers have a calmer physiological state than formula feeders (Hahn-Holbrook et al., 2011; Heinrichs et al., 2002). These studies not only present breastfeeding as a moral imperative but also represent breastfeeding as a period of positivity and calm. However, not all mothers may in fact experience breastfeeding in this way. Indeed, breastfeeding may involve a wide range of emotions for many mothers, whose bodies are undergoing lactation and endocrine processes, and are often up alone at night (Yate, 2017). Previous studies exploring the negative emotions triggered by breastfeeding are limited, with only few exploring phenomena such as the dysphoric milk-ejection reflex, characterized by a feeling of discontent during milk release, or the phenomenon of Breastfeeding Aversion and Agitation (BAA) (Heise & Wiessinger, 2011; Yate, 2017). BAA is characterized by negative emotions triggered while breastfeeding, including sensations of discomfort, anger, agitation, guilt and violent thoughts (Yate, 2017). To date, other than studies about postpartum depression and the mother-infant relationship, there has been very little research addressing the cognitive states of mothers while breastfeeding, or changes in mothers' affect during the day compared to the night.

1.3. Breastfeeding and Support

The social systems of support for breastfeeding mothers have been extensively studied. However, the primary focus of these studies has typically been on the impact of breastfeeding support on sustained breastfeeding or the early cessation of breastfeeding (Gianni et al., 2019; van Dellen et al., 2019). Overall, breastfeeding support is associated with increased breastfeeding confidence, knowledge and general attitude towards breastfeeding practice (Wilson, 2020). Social support may be received from family members, friends, peers, online support groups and others (Wilson, 2020). Surprisingly, few studies have explored the effects of perceived social

support on the emotional well-being and the affective states of new mothers, other than in extreme cases such as post-partum depression. Breastfeeding recommendations emphasize that in order to promote a healthy mother and child, social support must be continuous and in-person throughout the breastfeeding period. Unfortunately, many women do not experience sufficient social support (McFadden et al., 2017). Because isolation is a recurrent negative feeling experienced by breastfeeding mothers, the COVID-19 pandemic has further increased distress in new mothers (Snyder & Worlton, 2021; Wilson, 2020). Therefore, there is an urgent need to better understand the effects of breastfeeding support on the emotional states of new mothers.

1.4. Objectives and hypotheses

While a few studies have investigated the emotional experiences of breastfeeding mothers, no study has examined the variations in these emotions during the day compared to the night. We therefore conducted an exploratory repeated-measures study of breastfeeding mothers' experiences' during the day and at night. Our purpose was to characterize the range of maternal experiences during breastfeeding and to investigate the effect of prior sleep duration and perceived social support on emotional states.

Our specific hypotheses were that:

- 1- There would be differences in emotional experience and thoughts between the daytime and nighttime breastfeeding sessions in the same mothers, with nighttime sessions being characterized by a more negative emotional tone and less positive thoughts than the daytime breastfeeding sessions due to time of day and sleep deprivation effects; and
- 2- Longer sleep duration before nighttime breastfeeding sessions, better overall sleep quality, better child's sleep quality, better overall mental health status, and higher degrees

of perceived social support would be associated with a more positive daytime and nighttime emotional experience during breastfeeding

2. Participants and Methods

2.1. Data collection

This research study was approved by the McGill Research Ethics Board (REB# 20-01-044). The inclusion criteria were currently breastfeeding or pumping mothers, and ability to read and write in English. Data was collected from breastfeeding mothers between August 2020 and July 2021. Participants for the survey were recruited through posts on various international Internet platforms, such as Reddit, Facebook pages and Facebook messenger group chats. Some of these included the “Breastfeeding Moms GTA Support Group,” the “Working and Breastfeeding Moms” page, and the following Reddit pages: r/newborns, r/sleeptrain, r/sciencebasedparenting, and r/humanspumpingmilk. Participants were not compensated for completing the survey.

2.2. Surveys

The study consisted of three separate surveys which contained closed and open questions. Participants completed each questionnaire on LimeSurvey. First, a general survey included seventy-two questions and could be taken at any time during the day. The general questionnaire included questions about demographics, such as their age, the age of their newborn (in months), the number of children they had, their marital status, education level, where they lived, their ethnicity and immigration status. Participants were asked to report their overall sleep quality on a scale of 1 (very bad) to 4 (very good), typical number of consecutive hours of their infants’ sleep, and number of hours they slept prior to the nighttime breastfeeding session. Mothers were also asked about social conditions including the number of people living in their household, and

the level of support they felt they received from their family, on scale of 0 (completely unsupportive) to 9 (extremely supportive). Mothers also answered questions related to how high a priority breastfeeding was to them, on a scale of 1 (not at all) to 5 (a lot) and their overall mental health, on a scale of 1 (extremely unhealthy) to 5 (extremely healthy).

Following completion of the general survey, mothers were sent a follow-up e-mail with two surveys: one to be completed during the day between noon and 3 pm, and the other to be completed at night between midnight and 3 am either during a breastfeeding session or immediately after. In both the daytime and nighttime questionnaires, participants were given the space to write about any thoughts, imagery, emotions, or sensations that were going through their mind during that breastfeeding session. Mothers were also asked to mark their overall emotional state during the session, on a scale from 1 (negative) to 9 (positive), and their overall physical state from 1 (very unpleasant/in a lot of pain) to 9 (very pleasant/euphoric). Mothers were asked to rate various emotions they may have been feeling on a numerical scale of 1 (not at all) to 7 (an extreme amount), based on the Discrete Emotions Questionnaire (Harmon-Jones et al., 2016). In total, mothers rated the following 32 emotions: anger, wanting, dread, sad, easygoing, grossed out, happy, terror, rage, grief, nausea, anxiety, chilled out, desire, nervous, lonely, scared, mad, satisfaction, sickened, empty, craving, panic, longing, calm, fear, relaxation, revulsion, worry, enjoyment, pissed off and liking. Lastly, participants were asked to estimate their sleep duration (in hours) prior to awakening for a nighttime breastfeeding session.

In total, 422 breastfeeding women completed the general survey, of which 155 completed the daytime survey (36.7%) and 139 completed the nighttime survey (32.9%). 107 participants completed both the daytime and the nighttime surveys (25.4%).

2.3 Statistical Analyses

Paired-sample t-tests were run to examine whether there was a difference in overall emotional tone and specific emotions experienced while breastfeeding during the daytime session as compared to the nighttime. Further, two stepwise linear regressions were conducted to separately assess predictors of emotional state during the day and during the night. Sleep duration prior to nighttime awakening, overall reported sleep quality, perceived family support, age, child's age, immigration status, priority of breastfeeding and self-reported mental health quality were used as predictors. Next, a series of exploratory paired-samples t-tests were performed to further investigate which emotions specifically were different between daytime and nighttime breastfeeding sessions. A Bonferroni correction was done to account for the multiple paired sample t-tests run. Spearman's correlations were also done to explore associations between sleep duration and emotions during nighttime breastfeeding sessions. Finally, participants' written comments were used to provide examples and to contrast daytime with nighttime emotional states and thoughts.

3. Results

3.1. Demographics

107 breastfeeding mothers completed both the daytime and nighttime surveys. Mean age was 32.71 ± 4.37 years, and the mean age of the children was 6.71 ± 5.66 months. 58.9% were breastfeeding their first child; 85% had a bachelor's degree or higher, and 79.4% were married (Table 1). The racial distribution of the mothers was: 84.1% white, 6.5% Asian, 3.7% Hispanic, Latino or Spanish Origin, 1.9% Black and 1% Indigenous or Native American. (Table 1). Overall, mothers ranked breastfeeding as a high priority for them, with a mean of 4.75 ± 0.51

(Scale: 1-not at all, 5- a lot). Additionally, the mean overall mental health of mothers was 3.44 $\pm$ 0.91 (Scale: 1-extremely unhealthy, 5-extremely healthy).

Table 1

Demographics of Participants who Completed Daytime and Nighttime Surveys (n=107)

Age of mother (years)	<i>n</i>	Child age (months)	<i>n</i>
22-25	7	0-4	47
26-30	23	5-8	29
31-35	50	9-12	23
36-40	22	13-23	6
41-44	5	>23	2
Ethnicity	Number of children		
White	90	1	63
Asian	7	2	32
Hispanic, Latino or Spanish	4	3	7
Black or African American	2	4	2
Indigenous or Native American	1	5	2
Other	3	Skipped	1
Highest Level of Education	Marital Status		
Below bachelor level	11	Married	85
Bachelor's degree	42	Common Law	10
Master's degree	32	Divorced	0
Professional degree	7	Not Partnered	6
Doctorate degree	10	Other	3
Other	3	Skipped	3
Skipped	2		

3.2. Emotions during the day vs. during the night

A paired-samples t-test was run for the overall emotional experiences to determine whether there was a statistically significant mean difference between the overall emotional score of mothers during the day compared to the night. Overall, participants experienced a more positive emotional experience during the daytime breastfeeding session ($M=6.495\pm1.997$), as opposed to the nighttime breastfeeding session ($M=5.340\pm1.815$, Mean Difference = 1.160, $SE = 0.229$, 95% CI [.706 ,1.615], $t(105) = 5.065$, $p<.001$, $d= 0.492$). (See Figure 1) Further, as seen by visual inspection of the distribution plots of daytime and nighttime emotional experiences, daytime emotional state trended in a positive direction compared to nighttime emotional state which was more negative. (Figure 2)

Figure 1

Emotional experience during the day and night

*Note: ** indicates a significance of $p<0.001$*

Figure 2*Distribution Plot of Daytime and Nighttime Emotional Experience*

**Note: Emotional state was ranked a scale from 1 (negative) to 9 (positive)*

3.3. Specific Emotions during the day vs. during the night

Further, a series of exploratory paired-sample t-tests for all thirty-two emotions were used to determine whether there were significant differences in specific emotions between the two points of the time of day (see Table 2). A Bonferroni correction was conducted to correct for an inflation of type 1 error; therefore, the adjusted alpha level was .00156 (0.05/32).

Table 2*Paired Samples T-Tests of Different Emotions during the day and night*

Emotion	Day Mean ±SD	Night Mean ±SD	t	df	p	Mean differ	Lower 95% CI	Upper 95% CI	Cohen's d
Anger	1.32±0.89	1.64 ±1.18	-2.284	106	0.024*	-0.30	-0.576	-0.041	-0.221

Wanting	2.02 ±1.48	2.27 ±1.50	-0.984	96	0.328	-0.20	-0.591	0.199	-0.100
Dread	1.62 ±1.18	1.74 ±1.22	-0.892	106	0.375	-0.13	-0.422	0.160	-0.086
Sad	1.62 ±1.01	1.57 ±1.02	0.358	106	0.721	0.04	-0.170	0.245	0.035
Easygoing	4.53 ±1.69	3.57±1.78	4.808	105	< .001**	0.96	0.565	1.359	0.467
Grossed Out	1.05 ±0.25	1.13 ±0.65	-1.290	106	0.200	-0.08	-0.213	0.045	-0.125
Happy	4.47 ±1.57	3.13 ±1.65	7.292	105	< .001**	1.32	0.962	1.680	0.708
Terror	1.09 ±0.32	1.10 ±0.55	-0.148	105	0.882	-0.01	-0.135	0.117	-0.014
Rage	1.12 ±0.45	1.25 ±0.80	-1.537	106	0.127	-0.13	-0.300	0.038	-0.149
Grief	1.23 ±0.78	1.32 ±0.78	-0.238	105	0.812	-0.02	-0.176	0.138	-0.023
Nausea	1.17 ±0.74	1.10 ±0.41	1.000	104	0.320	0.07	-0.066	0.199	0.098
Anxiety	2.11 ±1.40	2.04 ±1.33	0.523	105	0.602	0.08	-0.210	0.361	0.051
Chilled Out	3.93 ±1.84	3.54 ±1.75	2.055	105	0.042*	0.41	0.014	0.797	0.200
Desire	1.67 ±1.27	1.61 ±1.17	0.728	101	0.469	0.09	-0.169	0.365	0.072
Nervous	1.63 ±1.11	1.45 ±1.00	1.603	105	0.112	0.19	-0.045	0.422	0.156
Lonely	1.86 ±1.40	1.96 ±1.33	-0.690	106	0.492	-0.10	-0.398	0.193	-0.067
Scared	1.32 ±0.88	1.26 ±0.93	0.496	104	0.621	0.05	-0.143	0.238	0.048
Mad	1.31 ±0.82	1.59 ±1.10	-2.061	104	0.042*	-0.26	-0.505	-0.010	-0.201
Satisfaction	3.71 ±1.87	2.92 ±1.80	3.638	103	< .001**	0.76	0.346	1.174	0.357
Sickened	1.08 ±0.53	1.09 ±0.49	-0.294	103	0.770	-0.02	-0.149	0.111	-0.029
Empty	1.43 ±1.03	1.51 ±1.14	-0.723	106	0.471	-0.08	-0.280	0.130	-0.070
Craving	1.51 ±0.91	1.40 ±0.87	0.883	104	0.379	0.11	-0.131	0.340	0.086
Panic	1.21 ±0.64	1.18 ±0.73	0.313	104	0.755	0.03	-0.152	0.210	0.031
Longing	1.60 ±0.97	1.78 ±1.17	-1.475	102	0.143	-0.19	-0.455	0.067	-0.145
Calm	4.48 ±1.64	4.24 ±1.79	1.302	103	0.196	0.26	-0.136	0.655	0.128
Fear	1.23 ±0.77	1.22 ±0.85	0.109	103	0.913	0.01	-0.165	0.184	0.011
Relaxation	3.81 ±1.74	3.47 ±1.69	1.866	104	0.065	0.37	-0.023	0.766	0.182
Revulsion	1.06 ±0.36	1.06 ±0.27	0.000	105	1.000	0.00	-0.053	0.053	0.000
Worry	2.13 ±1.40	2.12 ±1.35	0.062	104	0.950	0.01	-0.294	0.313	0.006

Enjoyment	3.76 ±1.80	2.76 ±1.57	5.597	104	< .001**	1.02	0.658	1.380	0.546
Pissed Off	1.31 ±0.75	1.58 ±1.20	-1.987	103	0.050	-0.28	-0.557	-5.563e-4	-0.195
Liking	3.58 ±1.79	2.67 ±1.65	5.011	102	< .001**	0.89	0.540	1.247	0.494

Note: * indicates a significance of $p < 0.05$

Note: ** indicates a significance of $p < 0.001$

Several emotions were significantly different during the daytime breastfeeding session compared to the nighttime (see Figure 3). Mothers reported feeling significantly more easygoing (Day $M=4.528 \pm 1.686$, Night $M=3.566 \pm 1.778$, $p < 0.001$), happy (Day $M=4.467 \pm 1.568$, Night $M=3.132 \pm 1.645$, $p < 0.001$), satisfied (Day $M=3.705 \pm 1.865$, Night $M=2.924 \pm 1.801$, $p < 0.001$), enjoyment (Day $M=3.757 \pm 1.795$, Night $M=2.762 \pm 1.566$, $p < 0.001$), and liking (Day $M=3.583 \pm 1.785$, Night $M=2.667 \pm 1.645$, $p < 0.001$) during the daytime compared to the nighttime. There were no statistically significant differences in any of the other emotions across the two breastfeeding sessions.

Figure 3

Emotional experiences showing significant differences across the daytime and nighttime period

Note: ** indicates a significance of $p < 0.001$

3.4. Linear regressions: predictors of daytime and nighttime emotional state

A stepwise linear regression with daytime emotional state as an outcome variable and with the following predictor variables: age, child's age, perceived degree of family's support, number of people living in the same household, immigration status, education level, mental health quality, priority attributed to breastfeeding, overall average sleep quality and average child's consecutive number of hours of sleep. The resulting model ($F(6)=7.113$, $p<.001$, $R^2_{adj}=.264$) had six predictors: with family support as the strongest predictor (standardized $\beta=.337$, $p<.001$), followed by mental health (standardized $\beta=0.281$, $p=0.003$), overall sleep quality (standardized $\beta= -0.187$, $p=0.042$), child's age (standardized $\beta=0.221$, $p=0.014$), mother's age (standardized $\beta= -0.205$, $p=0.025$) and immigration status (standardized $\beta=0.185$, $p=0.036$).

The second stepwise linear regression with nighttime emotional state as an outcome variables and same predictors plus hours of sleep prior to the nighttime awakening revealed a solution ($F(1)=8.221$, $p<.005$, $R^2_{adj}=.091$) with only one significant predictor: mental health (standardized $\beta=.302$, $p=.005$). Results of these two regression analyses are presented in Table 3.

Table 3

Linear regression results with a model for predicting daytime and nighttime emotional state

Variables	Unstandardized β	Std. Error	Standardized β	t	p	Lower 95% CI	Upper 95% CI
Predictors of daytime emotional state							
Family Support	0.296	0.078	0.337	3.817	< .001	0.142	0.45
Mental Health	0.612	0.197	0.281	3.1	0.003	0.22	1.003
Sleep Quality Overall	-0.536	0.26	-0.187	-2.059	0.042	-1.053	-0.019
Child's age	0.077	0.031	0.221	2.491	0.014	0.016	0.138
Age	-0.094	0.041	-0.205	-2.282	0.025	-0.175	-0.012
Immigrant status	1.012	0.475	0.185	2.131	0.036	0.069	1.954

Predictors of nighttime emotional state							
Mental Health	0.545	0.190	0.302	2.867	0.005	0.167	0.922

3.5. Sleep duration and emotions during nighttime breastfeeding sessions

In total, 88 mothers provided an estimate of sleep duration prior to the nighttime breastfeeding session ($M=2.77$ hours ± 1.19 , range=0.5-6). Sleep duration positively correlated with overall emotional state ($r_s(87)=0.247$, $p=0.021$), and with feelings of calm ($r_s(87)=0.225$, $p=0.036$) and relaxation ($r_s(86)=0.309$, $p=0.004$). On the other hand, sleep duration negatively correlated with the following emotional states: anger ($r_s(88)= -0.239$, $p=0.025$), rage ($r_s(88)= -0.288$, $p=0.007$), being lonely ($r_s(88)= -0.216$, $p=0.043$), and being mad ($r_s(88)= -0.303$, $p=0.004$).

4. Discussion

4.1 Variation in emotional experience during the day vs. night

Our study explored women's emotional experiences while breastfeeding. It is the first such study to date, to assess the variations in affective states of new mothers during breastfeeding at different time points during day and night. Consistent with our hypothesis, we found that mothers had a more positive emotional experience during the daytime breastfeeding session compared to the nighttime. Our findings are in accordance with circadian mood patterns in the general population, which show that mood is most positive in the morning and deteriorates through the day, with negative emotions peaking at night. (Dzogang et al., 2017; Golder & Macy, 2011)

We explored thirty-two emotions, both positive and negative and found that mothers felt more easygoing, happy, satisfied, enjoyment and liking during the daytime compared to the nighttime. Surprisingly, there were no statistically significant differences between feelings of

loneliness during the day compared to the night, despite the fact that mothers are likely awake alone and social isolation is a common feeling of breastfeeding mothers. (Hegney et al., 2008)

Overall, mothers reported very low scores of extreme negative emotions such as sickening, terror, rage, revulsion, emptiness, and panic during both the daytime and nighttime. These findings may be due to the fact that the mothers in this study were generally well off in terms of socioeconomic status, were very dedicated to breastfeeding and had generally good mental health. In addition, many mothers may be protected from intense negative emotions in virtue of the release of oxytocin during lactation which has been associated with increased positive affective states and a buffer against negative emotions (Cox et al., 2015; Dawood et al., 1981; Niwayama et al., 2017).

Previous research has shown that mothers report having increased self-confidence breastfeeding and a more positive affective state when reassured their breastfeeding experience was normal (Bäckström et al., 2010; Dietrich Leurer & Misskey, 2015a, 2015b). Our findings are the first to support the view that a variation in emotional state at different times is common for breastfeeding mothers. Selected responses illustrating this pattern can be found in Table 5. Mother 6 (see Table 4 for the excerpt), for example, reflects on the same aspects of her life (school, house work, relationship to breastfeeding), both during the day and during the night. While her daytime experience is joyful and she reports being content and competent, these same aspects of her life are all seen in a negative light during the night. Similarly, during the day Mother 11 expresses her confidence and happiness breastfeeding, “I love feeding him,” and laments that her daytime feeds are limited. On the contrary, at nighttime she expresses a lack of control, as well as feelings of frustration and jealousy. Many mothers also experienced both positive and negative emotions during a single breastfeeding session. Some mothers were also

happy during both sessions, while others were frustrated, sad or upset during both sessions.

These findings demonstrate that maternal emotional experiences during breastfeeding are varied and certainly not always positive.

Table 4

Comments describing overall thoughts, imagery, emotions or sensations during daytime compared to nighttime

	Daytime Sample Comment – Overall Positive	Nighttime Sample Comment – Overall Negative
Mother 3	“Happy, love, looking down at her as she gets sleepy eyed and feeling grateful and also needed”	“Frustration that she woke up again and that she won’t let me put her back down. Frustration that nursing is the only thing that will get her back to sleep and she won’t fall back asleep on her own. Wondering if it’s the reason she keeps waking up (reflux) and why at 7 months it’s worse than ever.”
Mother 5	“Daytime feeding sessions are much more calmer with just my to-do list in my head. I am much more doting on my child at this time.”	“Tired mostly, hardly keeping my eyes open wishing baby would hurry up so I can go back to sleep. Sometimes I want to take him off the breast as it gets really uncomfortable but I don't because feeding on demand is important. But it gets really uncomfortable sometimes like I wish I can have just a couple of hours to myself with nothing or no one touching me. I don't usually get these feelings in day time.”
Mother 6	“Today, I have felt immense happiness and peacefulness...In awe that my body created, birthed and now nourishes my baby. In awe that my baby is mine, and that I am his safe place and he loves me unconditionally. I do not have any situations	“I was very tearful. Feeling very anxious and sad. I am feeling burnt out with school, motherhood, and covid 19. I feel like I am not myself lately. I often get very tearful at night feedings. I am not sleeping much at all. I stay up until 3,4,5, in the morning or

	occurred today that have impacted my emotions or feelings in a negative manner. I am caught up with my school work, house work and so on. I don't feel pulled or pressured to do other things. I often imagine who my baby will be and what he will do within his lifetime. I picture him across a lifespan."	later, only to have to get up with the baby around 7 or 8 in the morning. I feel like I am not being productive and my house constantly feels a mess no matter how much time I spend cleaning. I feel a lot of doubt for my future and my future dreams/endeavors..."
Mother 11	"I was hoping the baby would go back to sleep as he'd woken early so it was a sleepy, gentle feed. I was thinking about how much I love feeding him and how much longer it's going to go on as he's 9 months tomorrow. I felt happy, it was a tender moment and he was warm and sleepy. There were some feelings of slight anxiety as he's going to daycare soon but won't take a bottle, so I do feel my day time feeds are going to be limited soon."	"Frustration, exhaustion, this was my third wake up with a teething baby. My toddler had also woken up and had come into the room so I just wanted him to go back to sleep. Feeling like I had a lack of control, then fear for what the rest of the night or what tomorrow would look like with everyone so tired from multiple wake ups. Jealousy for my husband sleeping alone in our bed not having to get up."
Mother 21	"I just kept seeing how cute and peaceful my baby was"	"Felt tired waking up and felt tired while breastfeeding too"
Mother 42	"Thoughts; 'I love you' [baby] Feelings: content, relaxed, at one with my baby" "Love, his sweet cheeks, his playfulness, i love his eyes when he looks at me while nursing, its so cute	"Emotions: anger, annoyance"
Mother 104	when babies smile while nursing and you see there little tongue and they lose suction and slurp. I love his little chubby arms and dimples on his hands. Absolutely love and joy..."	"Worry if i took my medication. Why don't I have a let down reflex. So tired."

4.2 Predictors of daytime and nighttime emotional state and role of sleep duration

We also found different patterns of associations for emotional state during the day and during the night. During the day, positive emotional state was most strongly predicted by perceived degree of family's support (stronger family support = more positive emotions), followed by mother's mental health (more positive mental health = more positive emotions), her overall sleep quality (worse sleep = more positive emotions), child's age (older child = more positive emotions), and mother's age (younger mother = more positive emotions), and whether the mother was an immigrant (immigrant mothers had more positive experience). In contrast, more positive experience during the nighttime was only associated with better subjectively rated mental health. Surprisingly, the amount of sleep before nighttime breastfeeding session was not a predictor of emotional state during the night, suggesting that time of day and circadian influences may be relatively independent from effects of sleep deprivation. Additionally, we were surprised to see that worse sleep quality was associated with more positive emotions while breastfeeding; however, this may be due to our small sample size.

Lastly, even though sleep duration was not identified as a predictor of nighttime emotional state in our regression analysis, we found a weak positive correlation between sleep duration and positive emotions during nighttime breastfeeding. More specifically, mothers who slept longer, felt calmer, more relaxed and less angry, lonely and mad. These results are consistent with existing literature showing the burden of insufficient sleep in new mothers (Atas & Ozerdogan, 2021), and the relationship between short sleep duration and increased negative and decreased positive affect in the general population (Sin et al., 2020). These findings underscore the importance of protecting maternal sleep and of providing breastfeeding mothers with ample opportunities for rest. These interventions must go beyond sleep hygiene education

programs, which were previously shown to be inefficient with regards to improving maternal sleep (Kempler et al., 2020).

4.3 Support and the Emotional Breastfeeding Experience

Our study found that a positive emotional state in breastfeeding mothers was most strongly predicted by perceived degree of family's support. This aligns with qualitative data collected in Quebec which suggested that social support could empower and positively alter the habitus of breastfeeding women (Groleau et al., 2017).

The positive association between social support and the emotional state of breastfeeding mothers highlights the role of social context in the mental health of new mothers. Although a causal effect of social support cannot be inferred from our study, further research into the effects of social support during breastfeeding is warranted. The effects of prolonged isolation, such as that brought about by the COVID-19 pandemic, should be a focus of particular attention (Snyder & Worlton, 2021). With the advent of new virtual technologies and social media platforms, novel avenues for access to and delivery of different forms of support to new mothers may be available (Wilson, 2020). These should also be addressed in future research.

It is noteworthy that the number of people living in the same household as the breastfeeding mother was not correlated with the amount of support they experienced. Indeed, it is possible that a higher number of individuals living under the same roof may be a source of stress, particularly during the pandemic. For instance, a recent study showed an association between increased chaos and crowding during the pandemic and decreased sleep quality in mothers (Kracht et al., 2021).

4.4 Limitations and Future Directions

The first limitation of our research study is the small sample size. Additionally, participants were predominantly white, married women, and first-time mothers over the age of 26. Therefore, our findings may not be generalizable to the entire population. Future studies are needed that include a more geographically diverse sample, with mothers from different SES backgrounds, and varied numbers of children. Another limitation of our study is that the sample was self-selective since participation was voluntary, which could lead to biased results. Lastly, we did not correct for multiple comparisons due to the exploratory and planned nature of the analyses. Our results, therefore, are of limited statistical power.

The emotions experienced by breastfeeding mothers are complex. While many factors may be contributing to the decrease in positive affect during the nighttime versus the daytime, we hypothesize that factors such as increased loneliness during the night, insomnia, exhaustion, fear of the dark and stress about the upcoming day may all play a role. Additionally, bed sharing with the infant has been shown to predict maternal depressive symptoms, and may also contribute to the affective states of breastfeeding mothers (Nulty et al., 2021). Future studies exploring such factors are necessary.

5. Conclusions

This paper describes the emotional experiences of breastfeeding mothers at different times. We report differences in overall emotional state during the daytime breastfeeding session compared to the nighttime, with mothers reporting a more positive emotional experience during the daytime. Longer sleep duration prior to the breastfeeding sessions at night was associated with more positive emotional experiences while breastfeeding. Family support, maternal mental

health, sleep quality, child's age and immigrant status were the strongest predictors for daytime emotional state.

Overall, we highlight that mothers experience a wide range of emotions while breastfeeding, which may be influenced by a multitude of factors, many of which have yet to be studied. Mothers should be made aware of the variations in emotions they may be experiencing and reassured that it is common for negative emotions to arise, especially at night. Finally, emotional support must be emphasized by health professionals, peer supporters, and family members, and adapted to the unique emotional experience of each mother.

Acknowledgments

We are grateful to all the mothers who took the time to fill out all three surveys across different time points, especially during the nighttime.

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