Editor's key points

- Mothers' concerns about what to eat while breastfeeding are an emerging social determinant of breastfeeding. It remains a prevalent and powerful perception among many that maternal diet leads to infant colic, while this is not well founded in science. This study examined the beliefs of breastfeeding women about the link between maternal diet and infant behaviour.
- Many of the participants believed that their breast milk changed in response to their own diets, and that certain things they ate caused their babies pain and made their babies cry. As a result, many participants had eliminated items from their diet; they commonly viewed elimination diets as an extension of neutral or benign choices made during pregnancy, even when it led to hardship.
- Women expressed confusion around conflicting sources of reliable information on breastfeeding. Participants' sources of information included various health care professionals, books, the Internet, and friends and family members with breastfeeding experience. When choosing which source of advice to believe, women often preferred information from more proximal sources (ie, those known to them and trusted generally) and from those with personal breastfeeding experience.

"Something is wrong with your milk"

Qualitative study of maternal dietary restriction and beliefs about infant colic

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Abstract

Objective To investigate new mothers' perceptions about the role of maternal diet in infant fuss-cry behaviour, and to explore patterns of food restriction in breastfeeding women.

Design Qualitative study.

Setting Calgary, Alta.

Participants Twenty-one mothers of healthy singleton infants aged 6 months and younger.

Methods Focus groups and one-on-one interviews with a semistructured interview guide, followed by content analysis.

Main findings Most respondents believed that infant cry-fuss behaviour was related to abdominal pain linked to feeding and had eliminated items from their diet in an attempt to change infant behaviour. Typical targets of elimination were caffeine, cruciferous vegetables (eg, broccoli and cabbage), garlic and onions, spicy foods, gluten, and beans. Women commonly viewed elimination diets as an extension of neutral or benign choices made during pregnancy, even when it led to extreme diet restrictions. Participants reported feeling appraised by society for their infant-feeding choices, and often harshly judged. Many women reported feeling confused by conflicting sources of reliable information on breastfeeding and preferred advice from trusted friends and family to that from health care providers or the Internet.

Conclusion The breastfeeding women in this study believed that maternal diet influenced infant cry-fuss behaviour, in spite of scientific evidence demonstrating the contrary. An understandable desire for a calm baby, as well as to be favourably judged by friends and family, can drive breastfeeding women to restrict their diet, often to the point of hardship.

« Un problème à propos de votre lait? »

Une mère allaitante devrait-elle éviter certains aliments par crainte de déclencher des coliques chez le nouveau-né?

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Résumé

Objectif Étudier ce que les nouvelles mères pensent du rôle des aliments qu'elles consomment sur le comportement maussade ou les pleurs de leur nouveau-né ainsi que les modèles de restrictions alimentaires chez les mères allaitantes.

Type d'étude Une étude qualitative.

Contexte Calgary, en Alberta.

Participantes Vingt et une femmes ayant accouché d'un bébé unique et en santé depuis 6 mois et moins.

Méthodes Des groupes de discussion et des entrevues individuelles à l'aide d'un guide d'entretien semi-structuré, suivis d'une analyse de contenu.

Principales observations La plupart des femmes croyaient que les comportements maussades et les pleurs de leur bébé pouvaient être provoqués par des douleurs abdominales liées à leur lait, si bien qu'elles avaient cessé de consommer certains aliments pour tenter de corriger cette situation. Les principales restrictions concernaient la caféine, les crucifères (p. ex. le brocoli et le chou), l'ail et les oignons, les aliments épicés, le gluten et les fèves. En général, les femmes considéraient que ce genre de privation était une prolongation des restrictions plus ou moins importantes qu'elles s'étaient imposées durant la grossesse, même si cela entraînait de très sévères restrictions alimentaires. Les participantes mentionnaient se sentir socialement appréciées pour leurs choix en matière d'allaitement, et souvent aussi sévèrement jugées. Beaucoup disaient être embrouillées devant des sources d'information contradictoires sur l'allaitement et préférer les conseils d'amis et de parents fiables plutôt que ceux de professionnels de la santé ou d'Internet.

Conclusion Dans cette étude, les femmes qui allaitaient croyaient que les aliments qu'elles consommaient pouvaient être responsables de pleurs chez le nouveau-né, et ce, même si des données scientifiques démontrent le contraire. Le désir bien compréhensible de calmer le bébé et le fait de vouloir être jugées favorablement par leurs amis et leurs parents peuvent amener les mères allaitantes à adopter des restrictions alimentaires, au risque d'en souffrir.

Points de repère du rédacteur

- Un facteur de plus en plus important dans la décision d'allaiter est le fait que la mère s'inquiète de l'effet sur le bébé des aliments qu'elle consomme. Beaucoup croient encore fermement que certains aliments consommés par la mère provoqueraient des coliques chez le nouveau-né, bien que cela ne soit pas bien fondé scientifiquement. Cette étude portait sur ce que croient certaines femmes allaitantes concernant le lien entre les aliments consommés par la mère et le comportement du nouveau-né.

- Plusieurs participantes croyaient que les aliments qu'elles consommaient entraînaient des changements dans leur lait et que certains de ces aliments déclenchaient des douleurs et des pleurs chez leur bébé. En conséquence, plusieurs d'entre elles avaient éliminé certains aliments de leur alimentation; pour elles, cette décision représentait une prolongation des choix plus ou moins faciles qu'elles s'étaient imposés durant la grossesse, même si cela constituait une privation additionnelle.

- Les participantes ont mentionné que les sources d'informations à ce sujet étaient souvent contradictoires. Parmi les sources qu'elles consultaient, mentionnons des professionnels de la santé, des livres, Internet ainsi que les membres de leur famille qui avaient déjà allaité. En général, elles préféraient l'information provenant de proches (c.-à-d. les personnes qu'elles connaissaient et en qui elles avaient confiance) et de femmes qui avaient déjà allaité.

In spite of overwhelming evidence of the benefits of breastfeeding,[1-6] only 37% of the world's children are exclusively breastfed until the age of 6 months.[2] Reasons for this include operative delivery, difficulties with lactation, maternal illness, oral contraceptive use, and return to work outside the home.[7-11] Less well studied are the private reasons some women have for choosing to stop breastfeeding early, for example negative body image,[11] the tension of difficult work versus ambiguous infant cues,[12] and lack of perceived support from family and friends.[13] Mothers' concerns about what to eat while breastfeeding are an emerging social determinant of breastfeeding.[14] Numerous surveys conducted in non-Western cultures have shown that women often restrict their diet during breastfeeding,[15-19] even when it entails nutritional cost and affects perinatal outcomes.[20,21] Reasons for this include food insecurity and "taboos" founded in beliefs about the roles of various foods in maternal recovery and health. In North America, food restriction by breastfeeding mothers might have more to do with notions about the effect of maternal diet on infant behaviour.[22,23]

Infantile colic has traditionally been understood to be a functional gastrointestinal disorder of infancy and is currently defined as an otherwise healthy infant younger than 5 months old with prolonged and recurrent periods of crying, fussing, or irritability reported by caregivers that occur without obvious cause and cannot be prevented or resolved.[24-26] Colic, or fuss-cry behaviour, is thought to be multifactorial and self-limited.[22-28] However, it is also correlated with family distress (including risk of child abuse) and an increased risk of maternal depression,[29-32] so an intervention is highly sought after.

Various authors have attempted to argue that low-allergen diets (ie, diets low in nuts, gluten, and eggs) in breastfeeding women can reduce infant crying.[25,27,33,34] Each of the trials had methodologic problems,[35,36] and with the exception of maternal avoidance of cow's milk in the setting of a cow's milk allergy in the infant,[37] little evidence exists that any other maternal dietary intervention reduces colic. A 2012 systematic review[26] of 6 available studies identified only 1 randomized controlled trial by Hill et al in 2005[34] with 107 infants that showed a low-allergen diet for 1 week reduced infant crying by 60 minutes over 48 hours, but even then mothers reported no subjective overall improvement in crying. Furthermore, only 60% of mothers in this study were able to be completely compliant with the elimination diet, underlining the difficulty of such an intervention. Yet breastfeeding mothers of fussy infants are often advised by friends, family, and health care providers to try severe elimination diets. The 2016 Canadian consensus guideline on female nutrition through the lifespan[38] graded the recommendation to eliminate, one by one, dairy, eggs, peanuts, tree nuts, wheat, soy, fish, cruciferous vegetables, cow's milk, onion, and chocolate from a breastfeeding mother's diet in the setting of infant colic with a 1B level of evidence, based largely on the Hill et al[34] study described above. As a result of similar advice they have received, women in our clinical practice adopt extremely limited diets, or stop breastfeeding entirely, out of concern that what they eat makes their baby cry. Such an intervention should not be considered benign.

In this qualitative study, we sought to investigate mothers' perceptions about the role of maternal diet in infant fuss-cry behaviour, and to explore patterns of food restriction in breastfeeding women.

Methods

Participants

Women were recruited between October 2014 and January 2016 through posters placed at 3 maternity and breastfeeding clinics in Calgary, Alta, a city of approximately 1.2 million; the 3 clinics were Riley Park Low-Risk Maternity Clinic, which serves many professional women; the Alex Breastfeeding Clinic, which serves many young and low-income women, as well as women from the ethnically diverse northeast communities; and South Calgary Primary Care Network Low-risk Maternity Clinic, which serves a largely suburban population. After approximately 6 months of slow recruitment, posters were also distributed through La Leche League coordinators and placed at Circle Medical, a clinic in southeast Calgary that includes lactation consultation among its offered services. Women were asked to contact the research team for inclusion or exclusion decisions. They were included in the study if they had healthy singleton infants aged 6 months and younger, were currently breastfeeding or had started breastfeeding but had switched partly or wholly to formula, and were comfortable with spoken and written English. They were excluded from the study if they had had multiple gestations or a preterm baby, were admitted to the neonatal intensive care unit, were rehospitalized after giving birth, or had never breastfed their babies or had started them on solid foods. We aimed to recruit a convenience sample of 10 to 12 English-speaking women from each of the 3 clinics; no specific efforts were made to have our sample reflect the cultural diversity of the larger Calgary population.

Data collection

All participants provided informed consent. We assigned each woman an identification number to replace her name in the transcripts to ensure anonymity. We collected demographic information from all the study participants, and conducted semistructured, one-on-one interviews using an interview guide derived from the research questions and relevant literature on the topic. We conducted 2 focus groups with the first 8 women (5 women in the first and 3 in the second), but because group meetings were difficult to arrange for participants with newborns, we modified our strategy and conducted one-on-one

telephone interviews with the remaining participants. All interviews were audiorecorded and transcribed verbatim.

Data analysis

Data analysis commenced with the transcripts of the first focus group and occurred continuously throughout the study. We used responses from the first focus group to review and modify the interview guide to ensure we obtained high-quality data. Because little research has been published in this field and no established theory existed to direct the inquiry, we used conventional content analysis and generated codes from the transcripts in a naturalistic fashion.[39] The principal investigator (M.K.) identified 8 codes plus subcodes from the first focus group, and a co-investigator (M.H.) reviewed the codes to ensure credibility (**Table 1**). This process was repeated after the second focus group, and the number of codes was reduced to 6. A third co-investigator (J.B.) conducted the remaining interviews over the telephone but was not involved in the coding. Investigators (M.K., M.H.) coded the transcripts independently and subsequently discussed their findings until they achieved consensus. Throughout the analysis, both investigators purposefully searched for contrasting views from participants to ensure all perspectives were represented in the findings. We continued recruiting women until we reached saturation of the data (in other words, no new themes emerged from the interviews), which occurred after interviewing 22 participants. We later determined that 1 participant did not meet the inclusion criteria, and excluded her responses from the analysis.

After the first round of analysis was complete, a second-order analysis of the codes was carried out using theoretically informed perspectives to draw out themes from the responses.[40] The theory of planned behaviour[41] holds that a person's intention to perform a behaviour is influenced by attitude, perceived norm, and perceived behavioural control. We also relied on Bernice Hausman's analysis of the discursive construction of the mother-infant dyad; she presents a rhetoric of breast milk as both medicine and toxin, and argues that breastfeeding mothers are appraised and doctored according to a doctrine of maternal purity[42]: women assert their fitness as mothers by making the "rational" choice for purity over personal needs and desires. Finally, our work was informed by research on "orthorexia nervosa," a newly defined lifestyle syndrome of obsession with healthy eating that has arisen from an emphasis on health through individual discipline and moral conduct.[43]

Ethics approval for the study was obtained from the University of Calgary Conjoint Health Research Ethics Board.

Findings

Demographic characteristics

Twenty-two women contacted the research team to express their willingness to participate in the study; of these, 21 met the inclusion criteria and provided informed consent. Relevant demographic variables of the participants are shown in **Table 2**. In spite of our efforts to recruit an ethnically and socioeconomically diverse sample of women, our participants were, for the

Table 1. Codes and subcodes that were identified following the first focus group, by category

CATEGORY	CODE	SUBCODE
Baby's behaviour	Baby is unsettled	Crying/pain
		Doesn't sleep
	Ideas about why baby is unsettled	"Bad" foods
		Other (eg, low milk supply)
Maternal reaction	Eliminating foods from diet—impact on baby	Helped my baby
		Did not help my baby
	Eliminating foods from diet—impact on mother	Difficult
		Easy
Sources of support	Breastfeeding advice received	Sufficient
		Conflicting
	Impact of friends/family/caregivers	Felt judged
		Felt supported
	Internal*	Breastfeeding confidence
		Body image
	Calgary as a place to breastfeed*	

*The "Internal" and "Calgary as a place to breastfeed" codes were eliminated after the second focus group, and the number of codes was reduced to 6.

most part, highly educated, white, and living in food-secure households well above the poverty line.

Content analysis

Our interviews with participants revealed the following 6 themes.

Theme 1. "Just after eating, she was super gassy": abdominal pain and its relationship to fuss-cry behaviour. Most of our participants believed fuss-cry behaviour was related to abdominal pain linked to feeding. Respondents interpreted hip and knee flexion as abdominal pain, and descriptions such as the following were typical:

> Just after her eating, she was super gassy. She was trying to get out a fart and stuff like that and you could just tell by her cry, it was more of a painful cry, and her stomach was a little bit harder than normal. (T1)*

Theme 2. "I decided to eliminate all the good things": diet restriction as intervention. While some women did not believe their diet influenced their breast milk in ways that would cause their baby abdominal pain, and subsequently only changed their diet to increase daily calories or add more of certain types of food, such as milk (for calcium) or avocados and salmon (for healthy fats), most respondents reported that they had restricted their diets to reduce fuss-cry behaviour. Typical targets of elimination were caffeine, cruciferous vegetables (broccoli and cabbage were common "culprits"), garlic and onions, spicy foods, gluten, and beans. Women often described undergoing trial-and-error processes in order to ferret out offending foods:

> I stopped taking my shake because I thought it was giving her gas. Protein powder, orange juice, I was kind of worried about those 2 things ... I have reduced the amount of cheese that I was eating just out of concern if she maybe had a concern with dairy .... Oh, I did take out broccoli and I continue to keep it out because people said broccoli could be gassy and so I just choose to eat other things. (T13)

Some women went to extreme lengths to remove perceived sources of gas in the baby.

> I was already gluten-free and I have cut out dairy. I have cut out all gassy vegetables and gassy fruits (cauliflower, broccoli, beans, carrots, corn, apples, oranges, soy), caffeine, and carbonated beverages. Eggs, and, of course, no butter. Everything is very plain because everything seems to affect him. (SHC7)

When we asked respondent SHC7 what was left for her to eat, she said she was eating little more than chicken breast and baked potatoes.

Theme 3. "When it's for your kid, it's easy to do": the effect of diet restriction on breastfeeding women.

Table 2. Demographic characteristics of study participants

CHARACTERISTICS	NO. OF PARTICIPANTS (N = 21)
Maternal age at birth of baby, y	
• 25-29	6
• 30-34	13
• 35-39	1
• ≥ 40	1
Para	
• 1	14
• 2	6
• 3	0
• 4	1
How often I can buy the food I want	
• Always	18
• Usually	3
• Never	0
How much money my household spends on food per week, $	
• 100-149	6
• 150-199	6
• 200-249	4
• ≥ 250	3
• Not reported	2
Highest level of education	
• High school	0
• Postsecondary diploma	5
• College or university degree	16
Total household income last year, $	
• 75 001-100 000	2
• > 100 000	18
• Not reported	1
Country of origin	
• Canada	20
• United States	1
Ethnicity	
• White	18
• Filipina	1
• Indonesian-white	1
• Chinese-white	1

*Interviewee pseudonyms indicate the following: telephone interview (T) and South Health Campus focus group (SHC), as well as an interview number.

Some women described feeling discouraged because after 9 months of avoiding caffeine and alcohol, they still felt as if in the postpartum period they could not have some of their favourite foods. For one woman, it meant having a smaller breakfast than she would have liked and then having to play caloric catch-up throughout the day:

> I am a pretty big breakfast girl. I missed that I eliminated egg at breakfast time, and I don't know if it affected her or if it didn't. I just stopped making it because I had heard the eggs could potentially do that. I just eat less in the morning and then had to snack more throughout the day. (T13)

However, most women, such as respondent T14, seemed to regard diet restriction as an extension of neutral or benign choices they had made during pregnancy. "Because it is not about me, it was easy to do. When it is about your kids [you] have more willpower." (T14)

Theme 4. "Some people can stand on their high horse": external messages on breastfeeding. Participants reported feeling supported in their infant-feeding practices, but they also felt judged. Women felt they were supported by family, friends, and health care providers. There were those who were surrounded by a breastfeeding-friendly social network, as was the case for T1 who said:

> I mean my father-in-law and stuff like that, I have sat in front of him and they are all supportive. I have 2 sister-in-laws [*sic*] and they have got 3 babies, so it is nothing new, like all under the age of 5. All the people I have been around are completely fine with it. Same with my friends and my family here. (T1)

Unfortunately, more common than stories of feeling supported while breastfeeding were stories of feeling judged. Some women felt pressured by health care providers to breastfeed when they did not want to.

> The nurses and the doctors really kind of put that pressure on moms. I have talked to other moms who feel the same way. Even when I saw my doctor recently and I told him I had quit breastfeeding, he really wanted me to try again and he gave me a prescription to get my milk production back up. But, I am just not going to do it because we already have a routine. Everyone is happy and so that is it. (T6)

For some women the perceived social pressure to increase (or to stop) breastfeeding became painful, as respondent SHC1 explained:

> It can be really frustrating when you are that mom who is doing everything she can and still has to get formula. But I have no choice but to give her that. Some people can stand on their high horse and it is discouraging. People are like, "Oh really, formula?" I am like, "OK, I will let my baby starve." (SHC1)

One woman described having to defend her choices to her husband.

> Even my husband was like, "Seriously now, when are we going to have that conversation about you not breastfeeding anymore?" And I said, "We are not going to have that conversation. I am determined to work through this." He was like, "OK, I guess if you want to keep going, but I am serious. When are we going to stop hearing a screaming baby? When are we going to get him on formula?" (SHC7)

Theme 5. "Something is wrong with your milk": the perceived hidden dangers of breast milk. Women felt least supported in breastfeeding when they heard negative comments about the quality of their milk. There were women who were told their babies were crying because their milk was inadequate, as one respondent explained:

> My mom keeps pushing me to feed him solids because he is not sleeping through the night …. He's 4 and a half months old. She's like, "He is 13 pounds and over 3 months, he should be sleeping. Maybe you don't have enough fat in your breast milk anymore and you are not keeping him full." (SHC5)

Two respondents had people very close to them suggest their milk was tainted.

> When we [came home after leaving our baby with some friends for the first time], his eyes were swollen from crying. So that affected me, I think. He has never done that with us. And they just put the correlation, because of when they fed him … he got miserable after they [had] fed him. "I think something is wrong with your milk." That was the comment. That stuck with me. (SHC4)

> My frozen breast milk, when I am trying to give her a bottle, I always taste it to make sure it's OK. It tastes awful. So I have had my mom say, "Throw it all out. Throw it all out and start again." I am like, "I have a freezer full of milk and I have done all that pumping." That is the most negative it has gotten. (SHC3)

Theme 6. "Anybody can put stuff up on the Internet": conflicting sources of information on breastfeeding. Women cited nurses, midwives, lactation consultants, doctors, and doulas as sources of breastfeeding information from health care providers. Many participants also read books, consulted friends and family members with

breastfeeding experience, and searched the Internet for information. In many cases, having multiple sources of information allowed women to triangulate and choose what to believe.

> [I chose to eliminate onions and garlic] just from reading stuff, as well and talking to other moms and what worked and didn't work for them .... [I also used] what I learned in nursing school, and a lot of my friends who are labour and delivery nurses who get some of the research. That's about it. You try to put everything together for yourself and whatever works, works. (SHC5)

But for some women, having multiple sources of conflicting information led to frustration and mistrust.

> At first the nurses told me to empty out both breasts at every feeding, or to at least finish one and then start on the other one. But then when I was researching, and the hindmilk is the most fatty and that is the milk you want to get into them. I did definitely turn a little bit from the doctors in that sense not that I don't believe them because I know they went to school for this stuff, [but] I changed from just going by what they had said to what family and friends said .... I have started to stop reading as much because anybody can put stuff up on the Internet ... you just have to watch what you believe. (T1)

In deciding whom to believe, women often preferred information from more proximal sources (ie, known to them and trusted generally) and from people with personal breastfeeding experience to that of information from health care professionals. Respondent SHC3 described feeling alone as she sifted through what to believe:

> I think because you are sleep deprived and doing everything you can, you're getting conflicting opinions. There are so many different opinions out there and you are just doing what you think is best. Then having people who are not in your situation tell you what to do and tell you what you're doing is wrong really sucks. (SHC3)

Discussion

This is the first study we are aware of that examines the beliefs of breastfeeding women in Canada about the link between maternal diet and infant behaviour. Many of our respondents believed their breast milk changed in response to their own diets, and that certain things they ate caused their babies pain and made their babies cry. As a result, many respondents had eliminated items from their diet; they commonly viewed elimination diets as an extension of neutral or benign choices made during pregnancy, even when it led to hardship. Women expressed confusion around conflicting sources of reliable information on breastfeeding, and reported feeling judged by society for their infant-feeding choices. Our findings are consistent with the only other survey study examining maternal food restrictions during breastfeeding. In a survey of 145 women in Korea, Jeong et al[14] found that most (84%) women questioned avoided foods for what the researchers considered to be a "vague" concern that it could be harmful to their infant. They also found dietary practices were not influenced by maternal education or household income.

That women would choose to restrict their diets is consistent with the theory of planned behaviour,[41] which predicts that a person will act in response to pressures of a societal norm and because it is within one's perceived power to do so. The social pressure here is toward "purity" for the infant and away from milk tainted somehow by the mother's personal desire or comfort[42]; however, this pressure to achieve wellness through diet purity is increasingly present in North American society for all adults, not only among breastfeeding mothers.[43] So while the perception that maternal diet leads to infant colic is not well founded in science, it remains prevalent and powerful.

Limitations

Our study was limited in that while we reached theme saturation, we failed to recruit a diverse population of women. Other qualitative studies with pregnant women and mothers of newborns have faced the same challenge, owing to women being disinterested or too busy.[44] Our respondents were largely Canadian-born and white women with postsecondary diplomas or degrees who lived well away from the poverty line; such women are the most likely to breastfeed and the least likely to benefit from a breastfeeding intervention.[45] We believe future research should include women from other cultural and socioeconomic backgrounds, as well as information on participants' mental health, such as previous history of disordered eating. It is also possible that in moving from focus groups to one-on-one interviews that women might have been more or less inhibited and that the data should be examined separately.

Conclusion

We believe that the maternal diet–infant colic paradigm is reductive, as it ignores breastfeeding as a complex interplay of physiologic, evolutionary, economic, familial, and social contexts.[46,47] It is also potentially harmful if it leads to early breastfeeding cessation or inadequate micronutrient content in breast milk.[48] Ample evidence exists that simply telling women "breast is best" is an insufficient intervention to increase breastfeeding rates.[45,49-52] Therefore, we agree with others that more work needs to be done on the social determinants of breastfeeding, which includes changing women's perceptions about the role of maternal diet in infant behaviour.

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Contributors
All authors contributed to the concept and design of the study; data gathering, analysis, and interpretation; and preparing the manuscript for submission.

Competing interests
None declared

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