RESEARCH
Research Paper

Navigating Infant Feeding in the Context of Household Food Insecurity: A Qualitative Study of New Zealand Mothers

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ABSTRACT

Background Household food insecurity is a major public health concern that disproportionately burdens mothers. Infants may be especially vulnerable to its negative impacts, given the central role mothers play in their feeding. Mothers' insights on infant complementary feeding while experiencing household food insecurity are needed to expand on previous research focused on breastfeeding.

Objective The aim of the study was to explore the experiences of New Zealand mothers introducing complementary foods to their infants in the context of household food insecurity.

Design This qualitative study involved in-person, semi-structured interviews (conducted in 2022) with participants from the First Foods New Zealand study (conducted in 2020-2022), focusing on mothers' infant feeding experiences and particularly complementary feeding.

Participants/setting Participants were mothers (n = 15) living in Dunedin (New Zealand) who had been identified as experiencing moderate or severe household food insecurity when their infant was aged 7 to 10 months.

Analysis Thematic analysis of transcripts was performed using a reflexive thematic analysis approach.

Results Three main themes and 1 subtheme were generated: (1) Food purchasing strategies were used to stretch money; (2) the infant's nutrition was prioritized (subtheme: breast milk was perceived to support the infant's nutrition); and (3) support was appreciated, but seeking money or food often brought a sense of shame and disempowerment.

Conclusions Mothers prioritized feeding their infants by stretching limited resources, compromising their own diets, and seeking support despite considerable challenges. Their determination and skill in feeding their infants nutritiously highlight the extensive labor involved in infant feeding and food provision in the context of household food insecurity. However, these efforts also contributed to ongoing cognitive and emotional strain for the mothers themselves.
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FOOD INSECURITY EXISTS WHEN A HOUSEHOLD HAS a "limited or uncertain availability of nutritionally adequate and safe foods, or a limited or uncertain ability to acquire acceptable foods in socially acceptable ways."[1] It is a major public health concern, driven by means of persistently high inequality; inadequate access to, and affordability of, healthy diets; and an increase in unhealthy food environments.[2] Food insecurity worsened during the COVID-19 pandemic.[3] From 2020 to 2023, the prevalence of food insecurity among households with children increased in several high-income countries—from 15% to 18% in the United States,[4,5] from 9% to 15% in the United Kingdom,[6,7] and from 16% to 28% in Canada.[8] Similarly, in New Zealand, the prevalence of households with young children aged 0 to 4 years that reported running out of food (an indicator of food insecurity) increased from 14% in 2020 to 20% in 2023.[9] Food insecurity is associated with serious adverse consequences in children, including inadequate dietary intakes, anemia, chronic illness, developmental delays, and poorer academic performance.[10]

Food insecurity is a gendered phenomenon, with women more likely than men to report household food insecurity.[11] The worldwide gender gap in moderate or severe food insecurity is attributed by the Food and Agriculture Organization to prevailing gender norms and women's limited access to resources.[2] In households with children, whether single-parent, dual-parent, or shared, food insecurity disproportionately burdens mothers, who typically assume

the role of primary caregiver and bear the most responsibility for household food provision.[12,13] Breastfeeding and infant care have been described as "sexed" care work; for mothers, the introduction of an infant to the household increases the time and cognitive demands of nurturing and feeding.[14,15] Some mothers experience chronic food insecurity, while others move in and out of food insecurity as their circumstances change.[16] During infancy, a reduction in maternal employment and an increase in infant-related expenses may further strain household budgets.[17]

Qualitative studies in the United States and Canada report that mothers with infants who are experiencing food insecurity adopt coping strategies like delaying bill payments, sacrificing their own nutrition, relying on inexpensive staple foods, and using food stamps to feed their families.[17-19] However, the limited number of published studies has focused largely on the impact of food insecurity on breastfeeding.[17-19] Although breast milk is a critical first food for infants,[20] infants require a diversity of healthy foods from age 6 months to support their rapid growth and development,[21] highlighting an important gap in the literature.

Infants rely entirely on others for food, with mothers playing a central role.[22] The arrival of a baby can create additional financial stress, which may be severe in households with limited financial resources.[17] Therefore, this study aimed to explore maternal experiences of introducing complementary foods to their infants in the context of household food insecurity.

METHODS

Qualitative Approach

The current study is located in an interpretive paradigm, which holds that rather than there being a single objective "truth," realities are multiple, subjective, and context-dependent.[23] Research findings are therefore viewed as a product of the relationship between the researcher and the study participant,[23] with the researcher's own experiences, values, and motivations integral to the research process.[24]

The research team comprised 5 female-identifying academic nutrition researchers, 4 of whom are mothers. Four team members identified as being of New Zealand and other European ethnicities, and 1 identified as Māori (Indigenous New Zealander). The first author (I.K.) conceptualized the study and conducted all data collection, analysis, and interpretation, and was a doctoral candidate trained in qualitative methodologies at the time of the study. Although not a mother, she had previous research experience with mothers of infants and was raised in a household with traditional family-oriented values. As a university-educated, middle-class female of European ethnicity pursuing a PhD during New Zealand's cost-of-living crisis, she recognized that participants may have perceived her to be in a privileged position. This author's motivation for the research was to document mothers' lived experiences and challenge societal blame narratives that food insecurity is experienced due to poor decision-making. The remaining team members hold expertise in relevant areas, specifically, qualitative research (S.E.S., L.A.T.M.), food insecurity (C.S.), infant nutrition (A.L.M.H.), and Māori health (L.A.T.M.).

The reporting of this research was guided by the Consolidated Criteria for Reporting Qualitative research.[25]

RESEARCH SNAPSHOT

Research Question: How do New Zealand mothers manage feeding their infants during the complementary feeding period while experiencing household food insecurity?

Key Findings: Mothers participating in semi-structured interviews recalled their experiences of food insecurity when their infants were aged 7 to 10 months, and showed strong determination and resilience in providing their infants with nutritious diets. Mothers stretched limited financial resources, sacrificed the quality of their own diets, and sought support to provide their infants with food, despite the shame and embarrassment it caused them. The extensive effort that mothers devoted to feeding infants nutritiously so their infants could thrive created considerable challenges that negatively affected maternal well-being.

Setting

Participants in our study had participated in the First Foods New Zealand (FFNZ) study. FFNZ is a cross-sectional, dual-centered (Dunedin and Auckland) study investigating nutrition and health in New Zealand infants.[26] Primary caregivers (such as mothers, fathers, grandparents, and other guardians) were required to be at least 16 years of age and able to communicate in English.

Ethical Approval

Only participants who had consented to being contacted for future studies and for their data collected in FFNZ to be used in related projects were approached to take part in our study. Ethical approval for FFNZ was obtained from the Health and Disability Ethics Committees New Zealand (19/STH/151). Our study was approved by the University of Otago Human Ethics Committee (approval 22/084). This study was conducted according to the guidelines laid down in the Declaration of Helsinki. Written informed consent was obtained from participants before data collection.

Recruitment

Infant and primary caregiver pairs were recruited into FFNZ between 2020 and 2022, when their infant was 7.0 to 9.9 months of age. For the current qualitative study, only primary caregivers who identified as "mothers" in the FFNZ study were eligible to participate. Mothers were required to live in Dunedin and be classified as living in a moderately or severely food-insecure household in FFNZ. A total of 63 mothers met these eligibility criteria for the qualitative study. The current qualitative study focused on maternal experiences, given the greater infant feeding and care demands placed on mothers.[14] The food security status of their household was measured using a validated questionnaire, the "food security measurement tool for New Zealand households" (comprising 8 New Zealand food insecurity indicator statements reflecting experiences of household financial constraint over the past 12 months),[27] which classified households into 1 of 3 categories of food insecurity (severely food insecure, moderately food insecure, and food secure).[28] Purposeful sampling was used to recruit a diverse group of participants with lived experience of feeding

infants in the context of food insecurity, and varying in age, ethnicity, and number of adults in the household.[28] Priority was given to those who were severely food insecure, Māori or Pacific, younger than age 25 years, or living in a single-adult household. This approach aimed to ensure inclusion of perspectives from New Zealand population groups more likely to experience food insecurity: those of Māori or Pacific ethnicity, younger age groups, and single-adult households.[28,29] Eligible participants received an invitation e-mail with a participant information sheet detailing the purpose of the study and the researcher's intentions. The researcher (I.K.) telephoned those who expressed interest to explain the study and arrange an interview. In line with interpretive research values,[30] the final number of participants was not determined before data collection. Fifteen interviews were conducted (Figure 1, available at www.jandonline.org).

Interview Guide

Individual in-depth interviews were carried out using a semi-structured interview guide.[31] The guide was pretested with 2 mothers who were professional contacts of the research team. One mother had experienced food insecurity as a parent, and the other provided feedback from the perspective of a mother of non-European ethnicity. After pretesting, the question order was modified to improve the flow between topics, and additional probes were included to elicit more comprehensive responses. The final interview guide contained open-ended questions about strategies used to navigate food insecurity, sources of support, perceived impacts of food insecurity on the infant, and aspirations for infant feeding (Figure 2, available at www.jandonline.org). The analysis in this study focused on navigating food insecurity and sources of support. Participants were asked to recall their experiences when they had participated in FFNZ (6 months to 2 years before the interview, depending on the participant).

Data Collection

Participants provided written informed consent to participate in the study and were offered the opportunity to bring a support person to the interview. One father, who was the partner of the participant and father of the infant, accompanied the participant and took part in the interview. Only the data provided by the participant, and not their support person, were included in the analysis. Audio-recorded interviews were conducted between October and December 2022. The median interview length was 67 minutes (range, 36-104 minutes). Fourteen interviews took place in the participants' homes, and 1 took place in a university meeting room.

The following demographic data collected in FFNZ, with response options shown in parentheses, were used to describe participants in the current study: household food security status (moderately food insecure, severely food insecure), participant age (in years), infant age (in months), employment status (not employed, employed part-time, employed full-time, paid parental leave, unpaid parental leave), ethnicity (Māori, Pacific, Asian, New Zealand and other European, other),[32] highest level of education (primary or secondary school, polytechnic or similar tertiary institution, university), number of adults (1, 2, 3, 4 or more) and number of children (1, 2, 3, 4 or more) "usually" (at least half the time) living in the household. Additional demographic data relating to when the infant was aged 7 to 10 months were collected verbally during the interview: main source of household income (employment income, government benefit), infant breastfeeding status (breastfeeding, not breastfeeding), and household composition (the relationships between household members). Household composition was classified into 1 of 6 categories: single parent with 1 child, single parent with multiple children, partnered with 1 child, partnered with multiple children, intergenerational household, and shared household (ie, 2 or more unrelated families living in the same household).

After the interview, participants received a NZ$75 (US$40) supermarket grocery voucher and fresh fruit in a reusable storage container. A list of support services (eg, financial support, food relief) was also offered. The researcher (I.K.) took reflective field notes after each interview.

The final number of participants was determined by the depth of the interview data and the likelihood of being able to identify distinctive patterns across the data set that could be constructed into themes.[33]

Data Analysis

Interview audio recordings were transcribed verbatim using *Otter.ai* automated transcription software.[34] Transcripts were checked by the first author (I.K.) for accuracy, anonymized, and then analyzed thematically with *NVivo 13* software,[35] applying the "reflexive thematic analysis" approach developed by Braun and Clarke.[24] Reflexive thematic analysis consists of 6 iterative phases and emphasizes the researcher's reflexivity and engagement with the data.[33] Consistent with the reflexive thematic analysis approach, transcripts were not returned to participants for checking.[24]

The first author (I.K.) familiarized herself with the data by reading and reflecting on the transcripts. Transcripts were coded inductively using "in vivo" coding[36] to reflect the explicit content of the data.[24] Multiple rounds of coding were undertaken, with segments of text assigned to existing codes.[33] Codes were organized into clusters around potential themes interpreted by the researcher as capturing a meaningful idea (Figure 3, available at www.jandonline.org). Constructing initial themes was an iterative process[33] of reviewing coded text segments and rereading transcripts, modifying codes, referring to field notes, and reflecting on patterns in the data. The central organizing concepts of the initial themes were then discussed with another author (S.E.S.), after which the first author (I.K.) further developed and refined the themes.[24] Finally, the themes were named and defined, and participant quotes were selected to illustrate each theme within the narrative.

RESULTS

Demographic Characteristics

Interviews were conducted with 15 mothers (Table 1), of whom the majority were "moderately food insecure," and the remainder were "severely food insecure." Mothers ranged in age from 23 to 40 years. Nine mothers identified as being of New Zealand or other European ethnicity, and 4 identified as Māori. Most mothers had a polytechnic or similar tertiary institution level of education and lived in partnered households with 1 or more children. Two-thirds

Table 1. Demographic characteristics of food insecure mothers in Dunedin, New Zealand, who participated in interviews about their experiences of infant feeding when their infant was aged 7-10 months (n = 15)

Characteristic	Data
Household food security status,[a] n	
Moderately food insecure	10
Severely food insecure	5
Mother age, y, median (range)	31 (23-40)
Mother age group, n	
<25 y	3
25 to <35 y	7
≥35 y	5
Ethnicity,[b] n	
Māori	4
Pacific	1
Other (South American)[c]	1
New Zealand and other European	9
Highest level of education, n	
School (primary or secondary)	4
Polytechnic[d] or similar tertiary institution	9
University	2
Employment status, n	
Not employed[e]	8
Employed part-time	3
Employed full-time	4
No. of children in household,[f] n	
1	3
2	5
3	4
4 or more	3
No. of adults in household,[g] n	
1	2
2	10
3	1
4 or more	2
Main source of household income, n	
Employment income[h]	10
Government benefit	5
Household composition, n	
Single parent with 1 child	2
Single parent with multiple children	2
Partnered with 1 child	1
Partnered with multiple children	8
Intergenerational household	1
Shared household[i]	1
Current infant age,[j] mo, median (range)	24 (18-33)
Infant breastfeeding status,[k] n	
Breastfeeding	7
Not breastfeeding	8

[a]Measured using the "food insecurity measurement tool for New Zealand households."[27]
[b]Participants identifying themselves as having 2 or more ethnicities were assigned into 1 ethnic group using the following order aligned with New Zealand Census categories: Māori, Pacific, Asian, New Zealand and other European, other.[32]
[c]The specific ethnicity of the participant assigned to "other" has been included in parentheses.
[d]May include bachelor's degrees.
[e]Not employed or on parental leave from work.
[f]Number of children who "usually" (at least half the time) live in the household. Age of "child" is not defined; therefore, it may include adult children.
[g]Number of adults who "usually live" in the household. Age of "adult" is not defined; therefore, it may include adult children.
[h]Includes income received due to an inability to work (eg, COVID-19 support payments).
[i]Refers to 2 or more unrelated families living in the same household.
[j]Refers to the infant's age at the time of the interview.
[k]Refers to when the infant was aged 7-10 months.

lived in households where the main source of income was from the employment of another household member. Almost one-half of the mothers were breastfeeding when their infant was aged 7 to 10 months.

Themes

Mothers shared experiences, perceptions, priorities, and tradeoffs they faced in feeding their infants. Three themes and 1 subtheme were generated (Table 2).

Theme 1: Food Purchasing Strategies Were Used to Stretch Money. Price comparisons guided food purchasing decisions. Mothers went to great efforts to feed their families on limited budgets. Strategies included shopping around for discounted foods, such as those "on special," markdowns, or multi-buy deals. The cost of food outweighed brand loyalty or perceived indicators of quality:

> Sometimes he [the infant] didn't get [popular brand of commercial baby food pouches], he'd get the off-budget brand because they would be the one on special. Sometimes he'd get organic, sometimes it wouldn't be organic. It just depends what they had on their deal, and I'd just buy those. (participant [P] 8, mother of 4, single-adult household)

Another strategy was to go supermarket shopping early in the day to buy perishable foods that had not sold the previous day and had marked-down prices. Some mothers used

Table 2. Themes, brief theme definitions, and illustrative quotes from interviews (n = 15) with mothers in Dunedin, New Zealand, on introducing complementary foods to their infants in the context of household food insecurity

Theme/definition	Illustrative quotes
Food purchasing strategies were used to stretch money	"I'd try to go first thing early in the morning to get all the markdowns if I could, if there was any there." (participant [P] 2, mother of 2, two-adult household)
Mothers made a variety of decisions to stretch the money they had to purchase food	"That would help down on costs . . . you can get a kg of chicken breast for like, $15. And then you can get a whole chicken, 1.5 kg chicken for $9.99. And then if you look even harder you can get a 2.1 kg chicken for $10.59." (P1, mother of 6, two-adult household)
	"We would limit, you know, 'This week, we're going to stick to white potatoes, carrots, and what we've got in the freezer. We're not buying, you know, kumara, a pumpkin, things like that.' We would just really stick to a very small variety of fruits or vegetables that we knew we could afford." (P5, mother of 1, two-adult household)
	"Instead of fresh fruit you buy tinned fruit, because tinned fruit was like 99 cents a can. And a bag of apples was like, six bucks. So I was like, 'I'll just buy some tinned fruit'. . . we went tinned veggies over frozen veggies for a wee bit, but then I noticed like some of them changed back to normal price. So, I was like, 'Let's go back to our frozen veggies.' But it was still buy frozen over fresh produce. Like, so you could get a whole [frozen] bag of broccoli which is like two kgs for three dollars, or you can get a head for four dollars." (P8, mother of 4, single-adult household)
	"It usually was with something that needs to be paid like, a car will [break down]. And then something else really big will [break down] right when, you know, you don't need it to happen. So having backup food stores was always good for those times." (P13, mother of 4, two-adult household)
	"The more that you put out everywhere else, the less you've got. . . food I guess, is one of those, I don't know, bottom of the cliffs that it is what you make it. If you have $50 to spend for the week for food, then that's what you've got." (P10, mother of 1, two-adult household)
The infant's nutrition was prioritized	"[Infant's name] never missed out and hers were never reduced or missed but mine were quite significantly reduced. Almost like, yeah, to the point where, like, you know, if I was to have a normal meal, it'd be like a normal dinner size. But if I was to have a short week where I wasn't earning much money, it would be on almost like a baby plate." (P7, mother of 1, single-adult household)
Mothers gave importance to their infant's nutrition by ensuring their infants had access to and consumed perceived "healthy" foods	"With having to buy Budget, you know that when you're buying something Budget that it's not too good for them so you try to add something to it that—I don't know, makes you not feel as guilty. Like you're gonna make nachos for instance, so you're gonna try grate some carrot in there or add something to make you not feel as bad for the processed [low quality food] you buy. I'd grate any veggie I

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Table 2. Themes, brief theme definitions, and illustrative quotes from interviews (n = 15) with mothers in Dunedin, New Zealand, on introducing complementary foods to their infants in the context of household food insecurity (*continued*)

Theme/definition	Illustrative quotes
	could to—to put it in that mince, especially if I had to buy like a cheaper tray of mince." (P3, mother of 3, single-adult household)
	"I wanted her to have as much sort of fruit and veg as she could, just to get that sort, goodness in, rather than, like bolognaises and sort of stuff, like I'd just focus on veggies and fruit. Wee bit of meat here and there, but pretty much fruit and veg. . . I preferred fresh for her. Definitely for her, I wanted fresh." (P9, mother of 1, shared household)
	"I just wouldn't eat. So like, if there wasn't enough, it was the kids get what they get and I just would have a sandwich and an apple. . . like, other times if it was like, chicken nuggets and chips, it was really easy to avoid because I'd just like, grab a couple of chicken nuggets, chuck it in a sandwich and be like, 'I've eaten.' They didn't realize that I hadn't actually sat down and ate with them because I was eating and I was still boppering [sic] around doing other stuff." (P8, mother of 4, single-adult household)
	"So instead of making like, enough for four people, we would just make enough for those two [her children]. . . It was when money was really low." (P2, mother of 2, two-adult household)
Subtheme: Breast milk was perceived to support the infant's nutrition	"I got in the mindset of what I'm eating, he's effectively getting so I would try and supplement myself better." (P15, mother of 3, two-adult household)
	"A lot of people say, you know, breastfeeding is cheaper but I wouldn't say it's free, because it's—it definitely comes at a cost to your physical and mental exhaustion a lot of the time, and sometimes I would have gladly swapped to formula for that reason. But I'm glad we stuck with it, because it was one less thing financially to think about. And I knew she was getting really good nutrition from that and, you know, benefits for her—with illness and stuff." (P5, mother of 1, two-adult household)
Support was appreciated, but seeking money or food often brought a sense of shame and disempowerment	"It definitely took pressure off. . . it was very helpful. It made—it meant we had choices . . . I'd go into the freezer then I'd go, 'Right, what are we going to have for tea [dinner]?' as opposed to going, 'Well, we have to have that because that's all we've got,' sort of thing." (P15, mother of 3, two-adult household)
Mothers sought or received support from various sources; seeking money or food impacted mothers' sense of independence	"So I guess, maybe it's like a pride thing as well and it's hard to always tell people when you don't have things. You don't want to be like the burden friend that's always like, 'Oh, you guys got some food today for my children?' or something . . . they're always going to feel sorry for you, I guess, if you are that one friend that always like, they know is poor so they're always trying to like help." (P4, mother of 2, two-adult household)

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Table 2. Themes, brief theme definitions, and illustrative quotes from interviews (n = 15) with mothers in Dunedin, New Zealand, on introducing complementary foods to their infants in the context of household food insecurity (*continued*)

Theme/definition	Illustrative quotes
	"You'd feel like, really justifying why you don't have enough money when it's already, you know, not good for the self-esteem to have to even be asking in the first place . . . so that makes you really weigh up whether it's worth it to ask for the assistance [food grant] . . . there were certainly some times where I was like, 'Oh my God, I'm never doing that again.' Or you just come away feeling really bad about yourself, and like, you're being talked down to like, 'Oh, well, if you're poor, that's your fault. You need to organize yourself better.'" (P5, mother of 1, two-adult household)
	"I felt supported knowing that it was a shared experience. But I also felt sad knowing that it was a shared experience because it was like a recurring theme amongst the mums that were of my ethnicity, that food scarcity and struggles with money were quite common." (P6, mother of 1, intergenerational household)
	"You sort of don't know where to reach out or how to reach out . . . I should've looked at sort of food banks. I just didn't know how to go about it. So I was sort of, you know, ashamed to ask." (P9, mother of 1, shared household)

supermarket online shopping apps or supermarket mailers to find discounts, compare prices across supermarkets, and plan meals around discounted ingredients. Others purchased the supermarket's own brands for specific foods, or only budget-branded products, because these were cheapest.

Although several mothers in larger households bought food in bulk to reduce the cost per serving, not all were able to do so. Those who could described managing their finances by prepaying or delaying bills, walking instead of driving to save on petrol costs, and limiting the number of shopping occasions. When food was discounted, some mothers purchased more than was needed and stored it for later. Stocking up provided a safety net by helping to prevent food shortages when unanticipated expenses arose in tight household budgets.

Mothers had extensive knowledge of where to find the best prices for staple foods, rather than relying on the nearest supermarket. For example, they bought "bread, milk, and savories [pies]" from a bakery chain, "kids' foods" from a discount department store, and produce from fruit and vegetable retailers. However, traveling to multiple or rural locations required balancing between obtaining the best price and depleting their savings on extra costs, such as transport:

> . . . you feel like you're saving because like, you know, you're getting all these veggies and it might be $20 cheaper than the supermarket. Then you get home and you're like, "[expletive], I used like $30 gas to go over there." (P8, mother of 4, single-adult household)

Although mothers knew the cheapest ways to provide nourishing food, they often felt forced to compromise on quality with fresh produce or high-protein foods like meat. Most mothers bought frozen vegetables instead of fresh, which they considered "out of reach" in terms of affordability, and others chose canned fruit or vegetables. Although the nutritional value of frozen vegetables was recognized, fresh was seen as the ideal choice: "So fresh is best, you know? But yeah, some weeks, I'd just look at it and I thought, 'I'm not paying that for that'" (P12, mother of 2, two-adult household).

The high cost of lean meat led mothers to purchase cheaper alternatives like processed meats or fattier cuts. One mother, who would have preferred to feed her infant lean meat, described: "Mostly we mainly ate chicken, sausages and mince . . . I couldn't get sort of steak or the nice sort of lamb chops or anything" (P9, mother of 1, shared household).

However, cost could not be the only consideration when making food choices. Mothers, especially those with multiple children, had to focus their food purchasing strategies on meeting the needs of the entire family, rather than just the infant. This became more challenging when a partner's and infant's needs competed for limited resources: "I wasn't allowed to buy cheap bread because it's not great. He [the infant's father] likes [a specific brand of bread], so I was like, 'Okay'" (P12, mother of 2, two-adult household).

Mothers stretched their food budgets while balancing other household expenses to make ends meet. Although food provision was a high priority, meeting housing and utility costs was equally important. Household items like laundry powder, toilet paper, and shampoo reduced the money available for food, thus contributing to food insecurity. However, mothers considered these essential for

maintaining a clean, functional home and retaining a sense of a "normal life" for the family. The constant juggling required to meet the family's needs within a climate of instability placed significant mental strain on mothers:

> Food, money, everything like that sort of stuff was always a constant, like, "Do I have enough?" Like, "Okay I've done my groceries on the payday, but am I gonna make it through to the next payday?" I hated living week to week, I hated it. I hated it. (P8, mother of 4, single-adult household)

Theme 2: The Infant's Nutrition Was Prioritized. Most mothers emphasized nutrition when describing the ideal diets for their infants, valuing "healthy" and "homemade" foods that featured fresh fruits and vegetables. One mother, who aimed to feed her infant the "most whole" and "nutritionally beneficial" foods possible, was unable to afford what she considered ideal. The gap between her goals and reality, which persisted beyond infancy, affected her sense of success as a mother:

> I see a lot of people like me in social standing who feel, I guess, kind of a failure in some sense that I can't buy everything organic. I can't make everything with no added sugar. And this, that, the other, that would be amazingly, perfectly nutritional for my child, I have to compromise, and that can feel really hard as—as a mum, to feel like you're not able to provide the perfect thing for your child. (P5, mother of 1, two-adult household)

Commercial baby foods were valued by mothers with limited time. Although using commercial baby foods helped mothers overcome time constraints that made preparing homemade meals challenging, mothers felt they were not doing their best for their infants. One mother, who had returned to full-time work and tried to prepare purées at home, reflected that "it didn't feel right feeding from a packet" (P11, mother of 2, two-adult household), but felt she had no alternative. Another mother, whose flexible work hours gave her more time at home, was able to prepare homemade food for her infant:

> It's just stuff that I wish I would have done with the other kids but didn't because you've still got to make ends meet, so you've got to just work . . . just the whole time factor . . . being away because we've got to work because we've got to make money to survive. (P13, mother of 4, two-adult household)

Mothers planned meals strategically to make expensive ingredients last longer. They bulked up family meals by adding more affordable, starchy ingredients like pasta or rice, helping vegetables and meat last across multiple meals. To further stretch their food expenditure, some mothers puréed leftovers from meals prepared for other household members and fed them to their infants.

Mothers universally reserved the most nutritious foods for their children, readily compromising the quality of their own diets:

> Like she was always fed first and had the most nutritional things for her meals and her snacks . . . she's always come first kind of thing, and I'd never jeopardize [that] just for me to get a meal or whatever. (P7, mother of 1, single-adult household)

Mothers ate cheap filler foods, particularly bread, instead of the meals they prepared for their children. Some ate sandwiches or toast for their evening meal rather than the cooked meals they fed their children; 1 mother explained that "a piece of bread will fill you up" when she was hungry.

Several mothers described limiting their own food intake to ensure more food was available for their children, either by reducing their portion sizes or skipping meals entirely. They were adamant that they had to "go without" so their children would have enough food. One mother's recollection illustrates how carefully she had to ration food, including planning for when she would "go without" and masking her hunger with water, which risked lowering her nutrient intake:

> I could only afford 1 loaf of bread a week. So, I'd have to count out, "So we need 2 slices of bread for a sandwich, you know, for 5 days" . . . I found out there's 17 slices of bread in a loaf . . . that means I'd only get say—what would that be? Like, 3 days of having toast in the morning for the 2 of us. And she quite likes toast, so I was like, "No, that's not gonna work." So, I'd have to miss out this day, this day, this day. (P7, mother of 1, single-adult household)

Theme 2, Subtheme: Breast Milk Was Perceived to Support the Infant's Nutrition

For several mothers, breastfeeding their infant was a feeding goal, and their accounts demonstrated a strong understanding of the nutritional benefits of breast milk. Although breastfeeding mothers did not describe breastfeeding as a strategy to cope with food insecurity, some acknowledged that the cost of infant formula was a "driver." However, breastfeeding was not always perceived as a "free" option, with some mothers describing experiencing "mental and physical exhaustion" associated with keeping up their milk supply. Continuing to breastfeed required mothers to manage their own nutrition despite limited financial resources, with breast milk serving as an important food source for the infant.

> I was trying to feed myself so that I could feed her, and that wasn't always easy because you had to be so onto it with budgeting and planning . . . I absolutely did not have enough to eat. I didn't eat often enough . . . the pressure to keep that [breastfeeding] going was really difficult when I couldn't get myself something to eat or there just wasn't that much to choose from to eat. (P5, mother of 1, two-adult household)

Theme 3: Support Was Appreciated, But Seeking Money or Food Often Brought a Sense of Shame and Disempowerment. Several mothers depended on financial support from their parents or parents-in-law. Some received money for food, childcare, or unexpected expenses, and others received small amounts of pocket money to supplement their household income. Mothers were very reluctant to ask their parents for money, only doing so when they

were "really struggling" financially, such as when food ran out, or they could not afford fresh fruit for their children, or to pay unexpected bills.

Maintaining dignity and a sense of autonomy was central to many mothers' accounts. Although financial support eased household pressures, mothers felt that, as parents, they should be able to provide for their families—a value of self-sufficiency passed down from their own parents. One mother, who emphasized that she was "really good with money," described how asking her parents for assistance undermined her sense of pride:

> Good, good old bank of Mum and Dad. I hate it though. I don't like asking. And there's times I probably should have, and I haven't . . . it's embarrassing . . . I don't like relying on other people. I'm independent. But sometimes you've got to swallow your pride. (P14, mother of 3, two-adult household)

Conversely, receiving unexpected food gifts from family members like dropped-off groceries, gifts of game meats and fish, and sharing a family meal, eased the pressure on the food budget and spared mothers the discomfort of asking family for money.

Mothers highlighted the value of emotional support from friends, who offered a listening ear, understanding, and a sense of belonging. Although they were hesitant to ask friends for food or money, due to concerns about being a burden, they felt that mutual support, such as sharing meal ingredients and kitchen utensils or helping with shopping and childcare, was more acceptable.

A few mothers sought food parcels from food banks when they were "really broke," which provided basic foods for their households: "The food was alright, I suppose. You know, they made sure you had plenty of stuff to keep you alive" (P8, mother of 4, single-adult household).

However, food parcels did not always include specific infant foods like infant formula or commercial baby food pouches. One mother commented that, as food parcels did not contain allergy-suitable options, she was unable to use them to feed her infant with a dairy allergy. Although mothers were aware of food banks, not all sought food parcels, because they felt embarrassed about using food relief services or believed that other families were in greater need.

Several mothers applied for one-off food grants from Work and Income New Zealand—a government service that administers pensions and benefits—when their household finances were stretched thin. All shared negative perceptions of their experiences with Work and Income New Zealand, and for some, the experience intensified the shame they already felt from needing support to feed their children. Although food grants offered temporary relief, interactions with staff members and the lengthy questioning involved in applying for a grant were felt as judgmental or belittling. As a result, mothers sought food grants as an "absolute last resort," limiting their requests to the "bare minimum" or avoiding them altogether, despite knowing they were entitled to a grant.

> Nowhere in my life have I ever portrayed that I'm trying to rip off the system. I'm trying to do actually the complete opposite. I'm trying to get out of the system because I don't want to be in the system . . . I just felt like I was constantly getting looked down on because I'm a single parent. And it's like, I didn't choose to be put in that situation, like, he [the infant's father] walked out. That wasn't my choice . . . I've just had a horrendous time with them, to be honest. (P7, mother of 1, single-adult household)

DISCUSSION

This study explored maternal experiences of infant feeding in the context of food insecurity, revealing mothers' resourcefulness in stretching limited budgets through food purchasing strategies, their determination to provide nutritious food for their infants and other children, and the disempowerment they felt when seeking support. Although breastfeeding is considered the foundation of "first food security,"[37,38] infants require nutrient-rich solid foods from age 6 months.[39] This research explored mothers' broader experiences of feeding these complementary foods in food-insecure environments.

Mothers' accounts of navigating food insecurity illustrated the challenges of household food provision on a tight budget. The substantial effort involved in planning, researching, implementing, and evaluating strategies to stretch financial resources is well-documented in qualitative studies of food-insecure mothers with children of different ages in New Zealand[40] and comparable countries.[41,42] These similarities underscore the extensive and universal food-related labor and psychological distress among food-insecure mothers, regardless of their children's age.

Direct and responsive infant caregiving is time and energy-intensive because infants rely entirely on caregivers for their basic needs, protection, and development.[43] Our study results revealed the unique pressures that food-insecure mothers face in feeding their infants to support optimal infant health. For some mothers, these pressures were compounded by the need to work to supplement household income, which created additional time constraints to feeding their infants as they had aspired to feed them.

Mothers' infant feeding goals aligned with complementary feeding recommendations,[39] reflecting strong nutritional awareness. However, despite knowing that frozen and canned foods could provide healthy and affordable options, mothers still viewed them as inferior to fresh food, consistent with the belief that "fresh is best," reported in a study of infant feeding beliefs and behaviors among socioeconomically disadvantaged mothers in Australia.[44] In our study, cost and time constraints often prevented mothers from meeting their goals of preparing home-cooked meals, leading them to choose commercial baby foods. Despite the popularity of commercial baby food pouches among mothers experiencing food insecurity,[28] pouch feeding was not necessarily the preferred option, and for some mothers, it brought feelings of guilt. This may stem from the moralizing of infant feeding,[45] where the labor involved in feeding is seen as a reflection of the extent of the mother's love and bond with the infant.[46]

Mothers viewed breast milk as highly nutritious for their infants, and this was a key motivator to maintain breastfeeding. In contrast, there is evidence from the United States that low-income Hispanic mothers perceived poor maternal diets and high stress as affecting the nutritional quality of

their breast milk, which contributed to reduced breastfeeding frequency.[17] Breastfeeding mothers in our study found it challenging to maintain breastfeeding, which is not surprising given the high mental load associated with chronic poverty and food insecurity.[47,48] The more positive views of breast milk may reflect New Zealand's publicly funded maternity care system, which provides free breastfeeding education and support throughout infancy,[49] as opposed to the greater reliance on privatized maternity care in the United States.[50] New Zealand's stricter regulations on infant formula marketing, compared with those in the United States, limit direct advertising of formula for infants younger than 6 months and restrict its distribution in maternity facilities.[51] These regulations may reduce mothers' exposure to commercial influences promoting infant formula.

For mothers who cannot or choose not to breastfeed, the lack of financial support to purchase infant formula may further strain low-income household finances. Despite stretching food budgets and food in the household, mothers described compromising their own diets in favor of their children's food intake, suggesting they were shouldering the burden of food insecurity to buffer their children from its impacts. The shielding of children is well-established in the literature exploring maternal experiences of food insecurity in high-income countries.[52,53] Indeed, quantitative research investigating low-income mother-child pairs in Canada has found that children tend to have higher-quality diets than their mothers.[54,55] However, these studies did not include infants, who appear yet to be investigated.

Mothers' social support networks helped them cope with the inherent stress of food insecurity, although not all felt comfortable asking family and friends for material support. Seeking help to access food can negatively impact self-esteem and result in feelings of shame,[56] referred to as the "hidden costs" of accessing free food.[57] The stigma surrounding the use of social welfare and food charity, reflected in the mothers' accounts, is consistent across high-income countries.[52,56]

Along with others,[40,58] our study underscores the urgent need for stronger financial support for low-income families in New Zealand. The historical framing of hunger in New Zealand as an issue of individual responsibility rather than of social justice[59] has likely contributed to the lack of national action on food insecurity among pregnant mothers and mothers with infants specifically. As we found in our study, food-insecure mothers often draw on a patchwork of resources to feed their children, from food banks and one-off food grants to support from family and friends. This places a disproportionate burden on mothers who do not have strong social networks or local knowledge. Unlike the United States[60] and the United Kingdom,[61] many high-income countries, including New Zealand, do not have national government-funded programs supporting the nutrition of low-income mothers and infants or young children. Although food banks can help to prevent immediate household food shortages, their primary purpose is not to support dietary needs.[62]

Our study results provide valuable insights into the experiences of food-insecure mothers with infants. They highlight that providing nutritious food is intertwined with mothers' social roles and underscore the importance of recognizing their strengths, skills, and persistence in feeding infants under challenging circumstances. Mothers' experiences of the personal unacceptability of relying on food charity and social welfare illustrate the need for more acceptable support for those experiencing, or at risk of, food insecurity. New Zealand has well-established public maternal and child health services, such as the universal Well Child Tamariki Ora program, which provides free child health and development assessments from age 6 weeks to 5 years, as well as support for maternal health and well-being.[63] However, unlike the Special Supplemental Nutrition Program for Women, Infants, and Children in the United States[60] and the Healthy Start scheme in the United Kingdom,[61] food assistance is not integrated into these services.

The strong nutritional awareness demonstrated by food-insecure mothers supports research that New Zealand families experiencing food insecurity do have adequate nutrition knowledge, but face socioeconomic barriers in meeting their healthy food aspirations.[64] However, health promotion strategies could help to shift perceptions about the inferiority of canned and frozen produce by means of raising awareness that canned produce and fresh produce have a similar nutrient content, and frozen produce may contain even higher levels of certain nutrients.[65,66]

A key strength of this study was the use of reflexive thematic analysis. The rigorous inductive approach to coding and theme development allowed for mothers' experiences to be explored open-endedly, generating rich detail. Another important strength was the purposeful selection strategy, which included mothers experiencing varying degrees of household food insecurity and diverse household compositions. The shared narrative among these mothers strengthened the credibility of the findings.

Nevertheless, mothers' accounts of infant feeding may have been influenced by more recent events, as they were asked to recall experiences from when their infants were aged 7 to 10 months—their children were aged 18 months to almost 3 years at the time of the interview. In addition, all mothers lived in a single urban location in New Zealand, which may limit the transferability of the findings to other high-income country contexts. Future research should include mothers from rural areas, where unique factors, such as social connectedness, physical access to food, and the higher cost of non–locally sourced food, may influence complementary feeding in the context of food insecurity.[67]

CONCLUSIONS

This study illustrates mothers' resourcefulness, skill, and persistence in feeding their infants despite limited resources, highlighting that providing nutritious food is closely tied to their social roles. With a strong awareness of healthy infant feeding, mothers navigated food insecurity by stretching food budgets, balancing household finances, and carefully managing the food needs of their infants and households. Some mothers received and reciprocated support from family and friends, although being in a position of relying on others was often difficult. Mothers' determination to feed their infants nutritiously is remarkable, given their financial constraints, the social stigma of food charity, and unwelcome interactions with Work and Income New Zealand. However, compromising their own diets and enduring the ongoing stress of financial hardship may have jeopardized mothers'

health over time. These findings underscore the need to move beyond reliance on charitable food assistance and one-off food grants toward longer-term, family-centered, and systemic solutions to address food insecurity in New Zealand mothers. Integrating food assistance programs into existing maternal and child health services for low-income families could provide streamlined nutritional support during infancy and the early years of parenthood, while improving acceptability to mothers and reducing stigma. Policies across multiple sectors—including health, housing, labor, and social welfare—that increase financial resources for low-income households with infants are essential to enable mothers to feed themselves and their children nutritiously.

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STATEMENT OF POTENTIAL CONFLICT OF INTEREST

No potential conflict of interest was reported by the authors.

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AUTHOR CONTRIBUTIONS

I. Katiforis conceptualized and designed the study. S. E. Styles, C. Smith, A. L. M. Heath, and L.A. Te Morenga had input into the study design. I. Katiforis undertook data collection, analysis, and interpretation. I. Katiforis prepared the first and subsequent drafts of the manuscript, with contributions from S. E. Styles, C. Smith, A. L. M. Heath and L.A. Te Morenga. S. E. Styles had primary responsibility for the final content. All authors have read and approved the final manuscript.

DATA AVAILABILITY STATEMENT

The data used and/or analyzed in the present study are not publicly available due to ethical restrictions related to the consent provided by participants. An ethically compliant data set may be made available by the corresponding author on reasonable request and on approval by the University of Otago Human Ethics Committee.

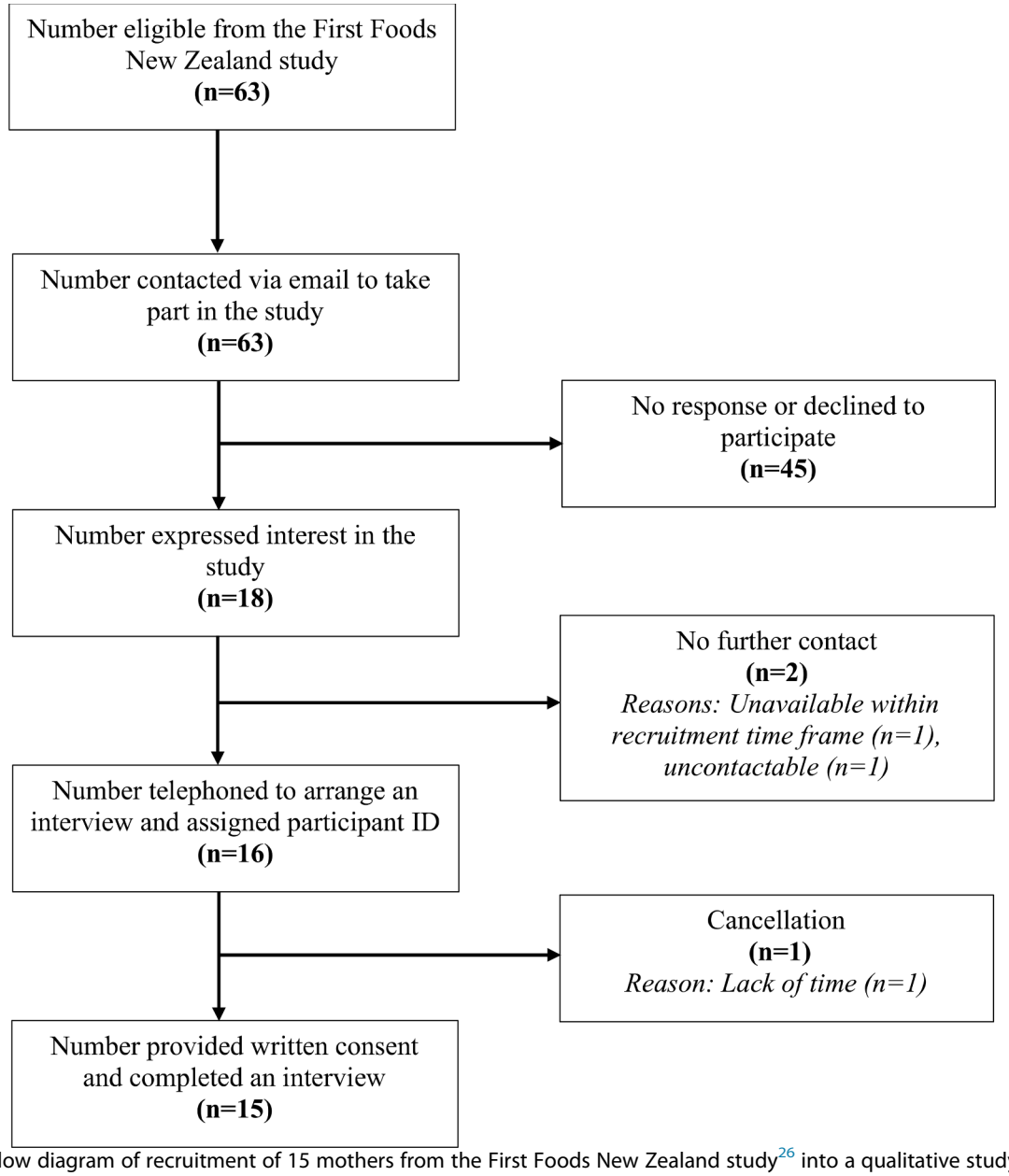

Figure 1. Flow diagram of recruitment of 15 mothers from the First Foods New Zealand study[26] into a qualitative study exploring their experiences of introducing complementary foods to their infants in the context of household food insecurity.

Introduction:

If it's OK with you, I thought I might start by sharing with you a little bit about what food insecurity is, and why we're doing this study. 'Food insecurity' is different for different people. Some families might change what they eat, or how much they eat, so that they can get by. Or they might feel stressed and worried about providing food. Or they might need to rely on other people for food. We know that for many mothers in New Zealand, having food on the table and feeding their babies in the way that they want to, is not always easy.

We are going to use what we learn in this study to make recommendations to Government and community services to help them better support families with food insecurity. But to work towards positive change, we need to start from the beginning and find out about what it's like for mothers looking after babies. Because right now we don't have that knowledge or understanding. This is why we are doing our study – we'd like to learn from your stories, thoughts and ideas. A lot of my questions will be about what it was like getting the food you needed for your household to eat and share. Please only share with me what you feel comfortable sharing and feel OK about having recorded. I'd like you to know how valuable your sharing is. And thank you for talking with me today.

We're going to think back to when you were in the First Foods study in [*month and year of participation*]. I'm going to be using words like 'feeding' and 'food', but it would be really good to hear about what [*child's name*] was drinking as well – things like breast milk, formula, and other drinks, as well as foods. So, it would be good to hear about anything [*child's name*] had to eat or drink when they were a baby.

Figure 2. Interview guide used to explore maternal experiences of introducing complementary foods to their infants in the context of household food insecurity in New Zealand.

Opening 'warm up' question
Thinking back to when [*child's name*] was a baby, could you tell me a bit about how you were feeding [*child's name*] back then? **Prompt for:** What sorts of foods, drinks, breastfeeding, formula feeding?
Experiences/influencing factors
Many parents say that when their child was a baby there were times when feeding them was easier, and times when it was harder. You shared with us in First Foods that [*affirmative answers or summary of affirmative answers to food security questionnaire*]. I would like to learn about what that was like when you were feeding [*child's name*]. **Probes:** • Were there times when [*child's name*] was a baby and feeding them was easier? • What about a time when it was harder? • What was that like? • What was going on around that time? What made it easier [*or*] harder?
Impact on infant
While you were going through this, was there anything you were worried about in terms of it affecting [*child's name*]? • If response suggests impact: Do you think these experiences around food [*use participant's language and relate to key points raised by participants*] we've been talking about had an effect on [*child's name*] when they were a baby? What sort of effect? Has it had any effect you can still see now? What sort of effect? • [If response suggests no impact]: Was there anything you did to make sure it didn't impact them? Do you think that how you [*summary of participant's strategies/navigating*] meant that there wasn't an impact on [*child's name*]?

Figure 2. *(coninued).* Interview guide used to explore maternal experiences of introducing complementary foods to their infants in the context of household food insecurity in New Zealand.

Navigating
Thinking about when [*affirmative answers or summary of affirmative answers to food security questionnaire*], I'd like to ask you about how things went feeding [*child's name*] when they were a baby. What sorts of things did you do to get by? How did that work out? **Probes:** • What was prioritized? • What was sacrificed / compromised / swapped? [*Use participant's words*]
Support
In those times where [*affirmative answers or summary of affirmative answers to food security questionnaire*], what were your thoughts around support [*or*] assistance? [*Only if participant needed support*] Were you able to get some support? What sort of support? How did that go? What kind of support would have helped? **Probes:** • *How support helped, or didn't help*
Standalone question 1
If you were talking to a new mum who was also [*affirmative answers or summary of affirmative answers*] and she asked you what she could do, what would you say to her? [*or*] What do you think you might say to her based on your experience?
Aspirations
How did you hope you would be able to feed [*child's name*] when they were a baby? What sorts of foods? **Probes:** ○ What would have helped you to be able to do this? ○ Where would you have wanted to get the food for your baby?

Figure 2. *(coninued).* Interview guide used to explore maternal experiences of introducing complementary foods to their infants in the context of household food insecurity in New Zealand.

Food sovereignty prompts: Traditional hunting and gathering, sharing knowledge and kai, local food production
Standalone question 2
What do you think needs to be done to help families? [*or*] What do you think would be helpful for families with babies who are finding it hard to get the food they need for their household to eat and share? Is there anything that families themselves could do that you think could be helpful to them? **Prompt for:** Help from government, family, community, friends? *May suggest national or community level.*
Final question
Is there anything else you would like to add to what we've talked about, or anything we haven't talked about that you'd like to share?
Thank you so much for your time today and for all those things you've shared with me. I really appreciate it. [*Ask for the following at the time of participating in the First Foods study*] • Household composition • Main source of income in household

Figure 2. *(coninued).* Interview guide used to explore maternal experiences of introducing complementary foods to their infants in the context of household food insecurity in New Zealand.

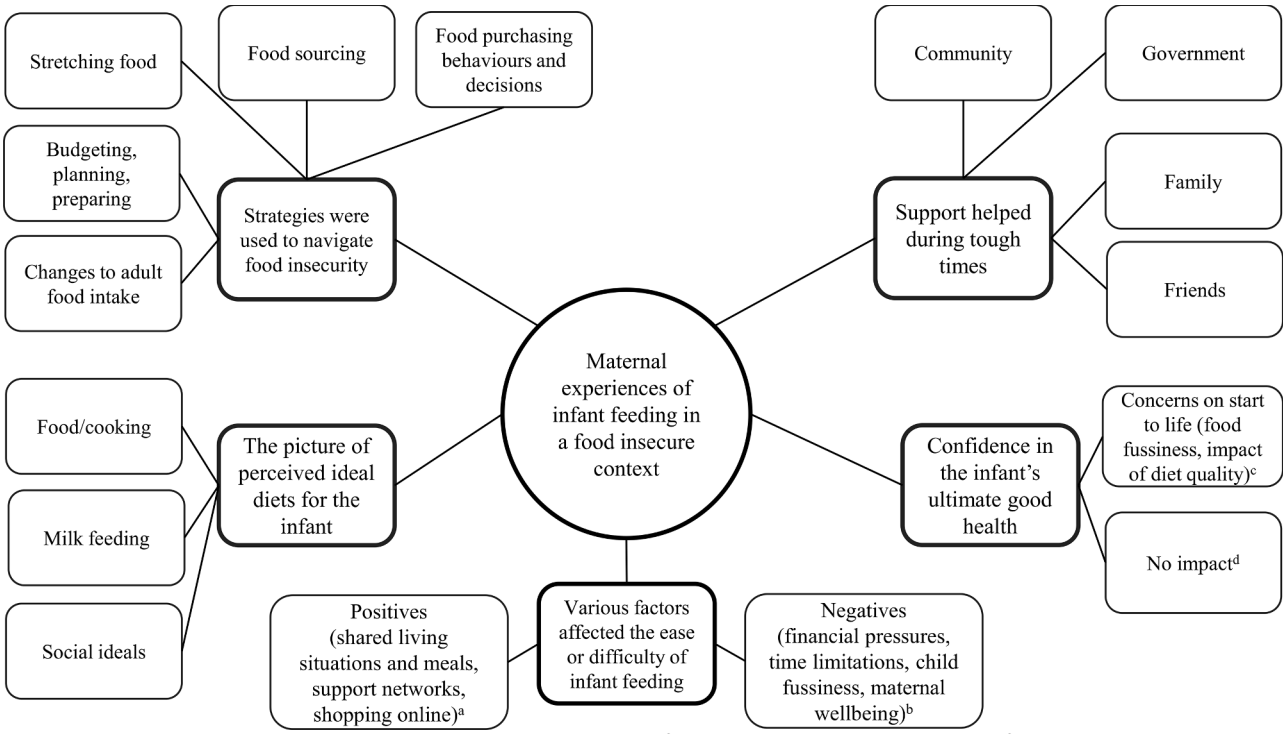

Figure 3. Mind map illustrating thematic relationships generated from interviews with 15 mothers from Dunedin, New Zealand, exploring maternal experiences of introducing complementary foods to their infants in the context of household food insecurity. [a]Factors perceived by mothers to positively influence infant feeding in the context of household food insecurity. [b]Factors perceived by mothers to negatively influence infant feeding in the context of household food insecurity. [c]Concerns expressed by mothers regarding the potential impact of household food insecurity on the infant's early life. [d]Indications that mothers did not perceive household food insecurity as affecting the infant's health.