

# Striving for Sufficient Milk to Have a Healthy Late Preterm Baby: a Grounded Theory Study

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## Research Article

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1 Title “Striving for sufficient milk to have a healthy late preterm baby: A grounded theory study”

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29 **Abstract**

30 **Background:** Late preterm infants are at risk for more health problems than full-term infants.  
31 They require good nutrition for growth, and breast milk is the gold standard because it contains  
32 valuable nutrients. Currently, the population of late preterm infants is increasing as exclusive  
33 breastfeeding rates decrease. Hence, this study explored exclusive breastfeeding experiences  
34 among Thai first-time mothers of late preterm infants.

35 **Methods:** Participants were recruited from the family planning unit of a university hospital in  
36 Northern Thailand. A grounded theory study design was adopted, and an interview guideline was  
37 used to interview seventeen first-time mothers who exclusively breastfed their late preterm  
38 infants for the first six weeks of life.

39 **Results:** “Striving for sufficient milk to have a healthy baby” emerged as the core category. It  
40 was defined as a process in which mothers of late preterm infants had to exert great effort to  
41 produce sufficient milk for their infants. The following three phases supported the core category:  
42 preparing for breastfeeding, overcoming the problem of insufficient milk supply, and managing  
43 to continue breastfeeding.

44 **Conclusion:** Perceived insufficient milk supply in first-time mothers is a threat to achieving  
45 exclusive breastfeeding of their late preterm infants. However, the desire to have a healthy baby  
46 results in mothers’ effort to achieve a sufficient milk supply. Nurse midwives could apply the  
47 management process of exclusive breastfeeding as a guideline when providing support for these  
48 mothers throughout the sequence of antenatal, intrapartum, and postpartum care.

49 **Trial registration:** Permission to conduct the study was obtained from the Institutional Review  
50 Board Committee, Faculty of Nursing, and the Faculty of Medicine, Chiang Mai University, No.  
51 2561-EXP065 and No. 2561-05865.

52 **Keywords:** Exclusive breastfeeding, Late premature infant, Lactation management, Grounded  
53 theory, Thailand

## 54 **Background**

55 Late preterm infants (LPIs), defined by birth at 34<sup>0/7</sup> through 36<sup>6/7</sup> weeks' gestation, are  
56 less physiologically and metabolically mature than term infants. Thus, they are at risk for more  
57 health problems and have higher death rates than full-term infants [7]. Breast milk is the ideal  
58 food for optimal nutrition and growth in preterm infants [29]. Mothers of preterm infants initially  
59 produce breast milk with higher amounts of protein, fat, free amino acids, and sodium than those  
60 of full-term infants [20]. Regarding development, breast milk contributes positively to physical,  
61 neurological, and psychological development in preterm infants [18].

62 Although breastfeeding is beneficial for all infants, the exclusive breastfeeding rate is  
63 lower than the global requirement [31]. The WHO set a goal for an exclusive breastfeeding rate  
64 in infants—both full-term and preterm—of 50% by 2025 [30]. In Thailand, a target rate of 50%  
65 for exclusive breastfeeding was also set in the Twelfth National Health Development Plan [5].  
66 However, Thailand has not reached that target. The exclusive breastfeeding rate for all infants in  
67 Thailand is 23.1% [24]. Currently, the rate of preterm birth is still increasing. Late preterm births  
68 account for more than 70% of all preterm births [23]. As a consequence, late preterm infants are  
69 less likely to be breastfed than term infants [14]. Due to the high mortality rates of preterm  
70 infants and the low rates of exclusive breastfeeding, the need to study how mothers can continue  
71 to breastfeed to ensure the survival of their late preterm children is an urgent issue.

72 Though there are studies on the experiences of mothers of LPIs, these studies were  
73 conducted with mothers of various parities who had LPIs with complications staying in the  
74 NICU. Additionally, the exclusive breastfeeding experiences and the management of successful  
75 exclusive breastfeeding in first-time mothers of LPIs have not been sufficiently studied.  
76 According to a literature review, few academic studies have focused on the exclusive  
77 breastfeeding experiences of first-time mothers of LPIs. Hence, the exclusive breastfeeding  
78 experiences of Thai first-time mothers of LPIs should be explored.

79 To explore the exclusive breastfeeding experiences of Thai first-time mothers of LPIs,  
80 the researchers conducted a grounded theory study [12]. The investigation used symbolic  
81 interactionism (SI), which focuses on the processes of interaction between people, exploring  
82 behavior and social roles [15]. Therefore, this grounded theory approach can be used to explore  
83 the meaning of breastfeeding experiences among mothers of LPIs and the breastfeeding  
84 management processes that facilitate success in exclusive breastfeeding. It is particularly suited  
85 to areas of this research that had not previously been explored. Moreover, this approach allows  
86 the emergence of theory from research material that could be explained by human behavior and  
87 social contexts [11].

88 The researchers studied mothers at 6 weeks postpartum because this period is critical for  
89 the establishment of exclusive breastfeeding [27], and a mother's ability to breastfeed at 6 weeks  
90 is a significant predictor of exclusive breastfeeding for up to 6 months [26]. In addition, a follow-  
91 up at 6 weeks postpartum can reveal the management of breastfeeding among Thai mothers of  
92 LPIs while in the hospital, until discharge and at home [6]. The aim of this study is to describe  
93 exclusive breastfeeding experiences among first-time mothers of LPIs and explore how they  
94 manage to exclusively breastfeed their LPIs.

95

## 96 **Methods**

### 97 **Research design**

98 A grounded theory approach is used in this study to develop or create a theory from the  
99 research process via the inductive method, that is, conclusion drawn through collection and  
100 systematic analysis of data derived from the studied phenomenon. The process for this research  
101 involves a method of simultaneously collecting and analyzing qualitative research data by  
102 providing codification to categorize the data, select core category, and define relationships with  
103 other categories to develop a rational relationship model or theoretical diagram. A grounded

104 theory approach enables researchers to describe how individuals interpret objects and other  
105 people in their lives and how this process of interpretation leads to certain behaviors in certain  
106 contexts [12].

107

### 108 **Participants and setting**

109 A purposive sampling strategy and theoretical sampling were used in this study.  
110 Seventeen first-time mothers of LPIs who had delivered at gestational ages of 34–36<sup>+6</sup> weeks  
111 were eligible to participate if they met the following inclusion criteria, in order to ensure  
112 homogeneity of study participants: a) 20 years of age or older, b) exclusively breastfeeding, c)  
113 normal delivery, d) no underlying diseases, e) Thai-speaking, and  
114 f) having a healthy infant without congenital abnormalities and exclusively breastfeeding for the  
115 first six weeks of life. The researchers selected mothers who were exclusively breastfeeding in  
116 order to analyze their experience and how they managed to exclusively breastfeed successfully.  
117 Enrollment occurred when the participants came for a six-week postpartum checkup at the  
118 family planning clinic of a university hospital in Northern Thailand. After a mother agreed to  
119 participate in the research, the researcher made appointments and set up dates, times, and private  
120 places for the interviews that were convenient for the patient. The in-depth interviews were  
121 conducted in the family planning clinic room.

122

### 123 **Data collection**

124 The first author (RC), who was not an employee of the unit or hospital, collected all the  
125 data between November 2018 and September 2019. RC had no prior contact or relationships  
126 with the research participants prior to initiation of the study. The first author conducted an  
127 individual, face-to-face interview with each participant in the family planning clinic room at the  
128 study site using an interview guide to obtain intensive descriptions of experience related to the

129 purposes of the research. An interview guide was constructed based on symbolic interactionism  
130 and grounded theory study. It included opened-ended questionnaires. The interviews inquired  
131 about the experiences and management of exclusive breastfeeding among mothers of late  
132 preterm infants during pregnancy, giving birth and postpartum period. The researcher submitted  
133 this guide to two breastfeeding experts and one expert in grounded theory methodology to  
134 examine the properties of the content and the language used in the instrument. After developing  
135 an interview guide, the researcher tested the guide before collecting data. All interviews were  
136 conducted by the first author, lasted an average of one hour, and were audio recorded and  
137 transcribed verbatim. Table 1 provides examples of the questions asked during the interviews.  
138 After several pro forma, general questions establishing identity, the researcher opened with a  
139 broad research question: “Can you tell me about your breastfeeding experience?” During the  
140 interviews, the researcher probed more deeply into specific issues the participants had introduced  
141 in order to gain deeper and clearer information, using expressions such as “Please tell more  
142 about...” and “How?” The researchers used an audio recorder to collect the data. The interviews  
143 lasted from 30 to 60 minutes. The field notes were made after the interview. The researcher then  
144 wrote theoretical memos and transcribed the entire recording. To ensure accuracy after the  
145 interviews, each participant received a written summary of her first interview to review. There  
146 were no changes requested by the participants. All participants were interviewed twice in the  
147 interest of thoroughness and academic accuracy. The data was continually collected until it is  
148 saturated [13].

149

### 150 **Ethical considerations**

151       Permission to conduct the study was obtained from the Institutional Review Board  
152 Committee, Faculty of Nursing, and the Faculty of Medicine, Chiang Mai University, No. 2561-  
153 EXP065 and No. 2561-05865. The potential participants were informed about the purpose and

154 process of the research and ensured, with oral and written guarantees, anonymity and  
155 confidentiality. It was clarified that they could refuse to participate or withdraw from the study at  
156 any time. All participants signed informed consent forms, which included permission to record  
157 the interviews. All interview transcripts were kept confidential and anonymous, and only the  
158 advisory committee could check them for review purposes.

159

## 160 **Data analysis**

161 Data collection and analysis were performed simultaneously using the three steps of data  
162 analysis described by Glaser (1998), which involves a constant comparative method during the  
163 coding procedure, memos with diagrams, and theoretical sensitivity [13]. Codes were identified  
164 in the initial phase by using open, line-by-line, and incident-by-incident coding, followed by  
165 selective, focused, and theoretical coding. The topic codes were grouped to form categories. In  
166 the memos-with-diagrams step, each category was linked and compared with the other categories  
167 to verify the findings and the categories to ensure that these categories fit the data by using the  
168 constant comparative method. Finally, the researcher used theoretical sensitivity to assist in the  
169 formulation of a theory that was specific to the phenomena under study [12]. Following analysis,  
170 member checking was used to ascertain whether the participants recognized the research findings  
171 to be true to their experiences. The researcher revisited the participants to ensure that the  
172 interpretation of their responses suitably reflected their thoughts about their experience. In the  
173 peer debriefing process, the first three interviews were coded and discussed with the advisory  
174 committee. The data analysis was supervised by a committee consisting of two experts in  
175 grounded theory, three experts in breastfeeding and one expert in preterm infant care throughout  
176 the research inquiry process.

177

178



179 **Trustworthiness of the study**

180 Member checking with participants and peer debriefing ensured credibility. In addition,  
181 the researchers used thick description, purposive sampling and theoretical sampling to judge the  
182 transferability potential. The research team regularly checked in with the participants to ensure  
183 that they understood the research process and to address any concerns they might have. The data  
184 analysis was regulated by the committee throughout the research inquiry process. The  
185 researchers' conceptualizations were discussed with two grounded theory experts, two experts in  
186 breastfeeding, and one expert in preterm infants. Through these means, external credibility was  
187 strengthened. Agreement pertained to the emerging categories and the core category. A summary  
188 of the emerging themes was given to participants to determine whether the codes and categories  
189 matched their perspectives.

190

191 **Results**

192 **Participant characteristics**

193 The participants were 17 Thai first-time mothers of LPIs. Of the mothers, 88.24% lived  
194 in extended families; 52.94% gave birth at 35–35<sup>+6</sup> weeks of gestation; 70.59% of the infants  
195 were transferred to the neonatal ward (NS2 unit) and 29.41% were transferred to the neonatal  
196 intensive care unit (NICU); and 64.71% of the infants were given breast milk at 6 weeks  
197 postpartum by breastfeeding, while 32.29% were given breast milk by bottle feeding (Table 2).

198

199 **Core Category**

200 *Process of “Striving for sufficient milk to have a healthy baby”*

201 The data analysis revealed that “Striving for sufficient milk to have a healthy baby” was a  
202 process in which the participants had to exert great effort to secure sufficient milk for their  
203 infants. This process is a basic social process in the life journey that begins when participants

204 plan to give breast milk to their babies during pregnancy and lasts until they achieve  
205 breastfeeding, which continues at 6 weeks postpartum. The process consists of the following  
206 three phases: (1) preparing for breastfeeding; (2) overcoming the problem of insufficient milk  
207 supply; and (3) managing to continue breastfeeding (Fig. 1).

### 208 **Phase 1: Preparing for breastfeeding**

209 The mothers began preparing for breastfeeding from while they were pregnant until they  
210 delivered their preterm babies. As all participants received antenatal care services from the  
211 hospital, they received information on the benefits of breastfeeding from professionals,  
212 particularly nurses at the antenatal clinics, through group learning sessions. Therefore, all  
213 participants made the decision to breastfeed prenatally, recognizing its value with regard to  
214 enhancing infant growth and immunity and saving money.

215 *I decided to breastfeed when I got pregnant... because breast milk has all the nutrients  
216 and immunity, so babies are healthy and strong. (P11)*

217 *I intended to breastfeed... breast milk is easy to digest... he will receive high immunity  
218 from breast milk...I got the information by asking nurses and doctors...They  
219 recommended that breast milk is good and should be provided exclusively from at least 6 months  
220 to 2 years. (P14)*

221 To prepare for breastfeeding while pregnant, they also managed themselves by seeking  
222 and receiving information and by consuming healthy foods.

### 223 **Seeking and receiving information**

224 The mothers sought to obtain as much information as they could about breastfeeding  
225 from various sources, including health care professionals, non-professionals, and the internet.  
226 Most indicated that they sought and received much information through a group learning session  
227 on breastfeeding, which was a part of their antenatal care.

228 *In antenatal care, the nurses advised watching the VDO with content on breast milk... It*  
229 *recommended that we should breastfeed for two years... breastfeeding for 6 months, then*  
230 *adding dietary supplements...The nurses gave information about how much nutrition*  
231 *breast milk contains. (P4)*

232 Although the breastfeeding information provided by health care professionals was  
233 accurate, they still described a gap between knowledge and practice.

234 *I obtained very good knowledge...the nurses taught the group how to eat right and how*  
235 *to bring the baby to the breast, but it still didn't seem real...how to hold a baby by*  
236 *learning to hold a doll, but I felt different. (P13)*

237 The mothers sought and received information from friends who breastfed their babies.  
238 This motivated them to breastfeed as well. One participant stated:

239 *Friends who have children said breast milk is the best. Suckling milk from the breast*  
240 *promotes bonding. So, I wanted to give breast milk after giving birth. (P9)*

241 In addition, they sought breastfeeding information from an application and the internet to  
242 obtain additional knowledge.

243 *I downloaded an application... since I knew I was pregnant...This application is very*  
244 *good and has many details... It's like having a nurse there all the time. (P1)*

### 245 **Consuming healthy foods**

246 The mothers consumed healthy foods that stimulate milk supply, such as dates and  
247 ginger, to prepare for lactation during pregnancy. They also drank ginger tea to boost breast milk  
248 based on information they received from relatives.

249 *When I was 5 months pregnant, I ate dates sometimes. I ate dried dates or dates boiled*  
250 *with pandan leaves. It is so good for drinking. People in the maternity group on*  
251 *Facebook said that eating dates gave them a lot of milk. (P14)*

252 *During pregnancy...I drank ginger tea in the morning every day. My relatives advised me*  
253 *that it helps give a lot of milk. (P4)*

254

## 255 **Phase 2: Overcoming the problem of insufficient milk supply**

256 Phase 2 started when the mothers gave birth and included the time when the babies were  
257 in the hospital. After the mothers gave birth to the preterm infants, they were confronted with  
258 separation from their infants and lack of skin-to-skin contact, causing lactation problems that led  
259 to insufficient milk supply.

260 *After delivery, I saw my baby only for a second...the doctor told me my baby had to*  
261 *stay in the pediatric ward. He was preterm and his lungs weren't strong yet. I was*  
262 *afraid I wouldn't have any milk. Everything I'd read had said newborns have to be*  
263 *offered*

264 *breastfeeding within an hour or two after birth. (P4)*

265 The mothers overcame the problem of insufficient milk supply by learning and practicing  
266 strategies to produce sufficient milk and exerting every effort toward achieving a sufficient milk  
267 supply.

## 268 **Learning and practicing strategies to produce sufficient milk**

269 The mothers received advice on how to produce sufficient milk by massaging from  
270 nurses and learned proper breastfeeding positioning and attachment. They learned to compress  
271 and massage the breasts and express breast milk for their infants every 2–4 hours. The nurses  
272 brought in towels with hot water and placed them on the breasts before the breast massage. The  
273 mothers tolerated learning to collect milk in a syringe for their babies:

274 *The nurses taught me how to massage my breasts...they would bring me towels soaked in*  
275 *hot water... I tried to express milk. If I was able to get milk, I would collect it in a*  
276 *syringe. (P1)*

277 After learning the breast massage technique, the mothers mentioned that they produced a  
278 considerable amount of milk within a few days after massaging and expressing breast milk every  
279 2–4 hours.

280 *I expressed milk every 2–3 hours...the more frequently I expressed, the more I got...Once*  
281 *I was discharged, I was able to express about 1 ounce of milk. (P7)*

282 In addition, the mothers learned to achieve proper breastfeeding positioning and  
283 attachment from pediatric nurses in the NS2 ward after their infant's condition had improved.  
284 The participants spent 30 minutes to one hour practicing every four hours or as the nurses were  
285 available:

286 *I practiced positioning my baby at the breast in the NS2...Then they advised me about*  
287 *compressing my breasts and how to hold my baby at times when they could watch ...I*  
288 *practiced for an average of 30 minutes to 1 hour, depending on the nurses. (P15)*

289 The mothers practiced the breastfeeding positions and attachment until they could  
290 execute them properly and the babies suckled well. Then, they could be discharged from the  
291 hospital:

292 *When I knew how to do it, he suckled well. The baby was really good at it. When the baby*  
293 *suckled well, my milk kept flowing...and we were able to go home. (P13)*

#### 294 **Exerting every effort toward achieving a sufficient milk supply**

295 After learning and practicing techniques to produce sufficient milk, the mothers followed  
296 the nurses' advice. All of the mothers recognized that breastfeeding was beneficial for their  
297 babies. They wanted healthy babies, so they exerted every effort toward achieving a sufficient  
298 milk supply for them. The mothers mentioned that breast milk contains good nutrients, with  
299 more nutrition and immunity benefits than formula milk.

300 *Breastfed babies are healthy, and breast milk has benefits. I'd like to breastfeed my baby*  
301 *for a year...but I'll be satisfied if we make it to six months. (P1)*

302 *Mother's milk contains better immunity and more nutrients. If my baby were to drink*  
303 *formula milk, my baby would become bloated and so many other things...I want my baby*  
304 *to be healthy. (P2)*

305 The mothers disciplined themselves to breastfeed, even though they had small amounts of  
306 milk at first. They woke up every night to pump milk to obtain a sufficient supply. Pumping milk  
307 was very painful, but the mothers were able to endure the pain because of their love for their  
308 child and desire to have a healthy infant:

309 *When there wasn't milk and I was pumping, it hurt a lot until I thought about giving up....*  
310 *If I was able to endure the pain when my baby was born, why wasn't I able to take just*  
311 *this? I endure this because I don't want my baby to be hurt or sick. (P8)*

312 *It's in a mother's nature to produce milk. It's up to me to have the discipline to get it*  
313 *out... I have to pump, even at night...If I don't wake up to pump milk at night, there won't*  
314 *be enough milk...if I'm not strong... I won't be able to breastfeed successfully. (P4)*

315 The mothers attempted to produce enough milk by breastfeeding frequently. They  
316 pumped milk so that they could give breastmilk at every feeding. After breastfeeding frequently,  
317 they had a greater milk supply. They felt glad to have sufficient milk for their babies:

318 *My baby has eight feedings a day...I try to pump for every feeding...I try to pump the*  
319 *amount my baby needs for each feeding... I try to pump as much milk as possible, and I*  
320 *don't limit the time...so, I have enough for my baby at each feeding. (P2)*

321 *When I pumped more frequently and on time, the milk increased...when I had enough*  
322 *milk, I cried. I was happy that I had enough milk and my baby was healthy. (P4)*

323 While their babies were hospitalized, the mothers went to the hospital every day. They  
324 pumped milk and brought fresh breast milk to their babies, and they had appointments to practice  
325 breastfeeding. They also pumped breast milk at the lactation clinic at every hospital visit:

326 *I come to the hospital at times scheduled by the nurses to pump milk for my baby and*  
327 *practice breastfeeding... I have to come every day. When I come home, I have to pump*  
328 *milk for my baby. (P9)*

329 *I have to deliver milk to my baby every day. My baby needs fresh milk, as he is small and*  
330 *drinking fresh milk is best... I pump milk at night; when I get to the hospital, I pump*  
331 *again in the lactation clinic. (P5)*

332 During breastfeeding, ten mothers had breast engorgement. This condition was relieved  
333 by massaging the breasts to express milk, with lactation nurses' assistance and independently:

334 *My breasts were engorged... I went to the lactation clinic. The nurses helped massage my*  
335 *breasts, so I felt better. (P4)*

336 *My breasts were as hard as coconuts... I applied warm towels and brought a compress...I*  
337 *used the pump and hand compresses. It helped a lot. (P3)*

338 Some mothers had babies with jaundice. Three babies had jaundice with glucose-6-  
339 phosphate dehydrogenase deficiency (G6PDD). Most of the infants were treated by phototherapy  
340 and breastfeeding.

341 *My baby was treated with phototherapy ...I brought him to breastfeed in the morning at 8*  
342 *am and every 2–3 hours...then at night..., I pumped milk to bring to my baby...I wanted*  
343 *my baby to take milk and excrete a lot because the yellow substance comes out with urine*  
344 *and excrement. (P13)*

345 *My baby was jaundiced on the fifth day...she didn't get phototherapy. They told me to*  
346 *breastfeed her frequently. (P3)*

347 In addition, the mothers resolved issues with ineffectively suckling babies by stimulating  
348 them to suckle by touching them, speaking with them, expressing milk into their mouth and  
349 stroking their cheeks. They tried to breastfeed until their babies suckled well:

350 *Once my baby had latched on, he would fall asleep...the nurse told me to stroke my*  
351 *baby's cheeks and talk to him...after stroking my baby's cheeks, I talked to him and he*  
352 *suckled some and slept some. (P9)*

353 *Most of the time, my baby slept. He didn't suckle well. The nurse told me to try to wake*  
354 *my baby by speaking to or unwrapping my baby...my baby started to suckle well on the*  
355 *last day before coming home. (P15)*

### 356 **Phase 3: Managing to continue breastfeeding**

357 Phase 3 started when the infants were discharged and lasted from when the babies went  
358 home to 6 weeks postpartum. The mothers recognized that breast milk is good for the health of  
359 the infant. However, at home, the mothers encountered lactation problems and could not consult  
360 with health care professionals; these problems included sleepiness, refusal to breastfeed and  
361 crying on the part of the infant.

362 *Breast milk has so many benefits. It helps with bowel movements, but formula milk makes*  
363 *it difficult for babies to have bowel movements. My baby is healthy. (P11)*

364 *When we came back home, my baby was always asleep. I had to wake my baby up to*  
365 *breastfeed. (P4)*

366 *My baby wouldn't suckle, no matter what I did. ...I tried to get my baby to latch on, but*  
367 *my baby wouldn't. When I tried too hard, my baby struggled and cried. (P2)*

368 Therefore, the mothers managed to continue breastfeeding by solving breastfeeding  
369 problems, boosting breast milk supply, adapting to daily activities and being committed to  
370 breastfeeding. Their strategies are discussed below:

371

### 372 **Solving breastfeeding problems**

373 The mothers had sore nipples because the babies mouthed at the nipples without deeply  
374 suckling over the areola. They solved this problem by stimulating their babies to open wide.



375 They modified the breastfeeding position for attachment following the advice given to them by  
376 nurses in the hospital:

377 *I wasn't able to attach...My baby cracked my nipples...I tried to get my baby to suck*  
378 *deeply on the areola. (P3)*

379 *I think my nipples hurt...it's probably because my baby can't suckle up to the areola. I*  
380 *feel that...if I had my baby open wide and put it in his mouth, he would push it out after a*  
381 *while. He would take only the nipple...I took him off and gave it to him again. (P17)*

### 382 **Boosting breast milk supply**

383 The mothers received advice from nurses, colleagues, and their family members to drink  
384 herbal teas and avoid prohibited foods to boost breast milk supply for continued breastfeeding.  
385 They drank ginger and banana blossom tea. They also drank a Northern Thai herb tea called Mai  
386 Nomnang (xantolis) instead of water to increase milk production. After drinking, they felt their  
387 breasts were full:

388 *Most of the time, I have ginger tea...like drinking it in place of water.... I drink when I*  
389 *feel thirsty and after pumping milk. I always drink it after waking up. I just drink it all the*  
390 *time. (P6)*

391 *Mai Nomnang is effective, because I had less milk and my breasts seemed empty while I*  
392 *was brewing it... When my aunt brewed some for me...I felt like I had milk flow. (P8)*

393 The mothers avoided drinking cold water. They consumed only certain kinds of foods. If  
394 they did not follow a proper diet for an extended period, they might have insufficient milk for  
395 their babies:

396 *I'd have no milk if I drank cold water because my body would be cold...So, I drank warm*  
397 *water before and after breastfeeding. I've mostly had rice porridge and boiled*  
398 *vegetables. I haven't had anything fried. I add pork without sauce... If I'd kept eating*

399 *things that didn't help increase milk supply, my milk would have run out and dried up.*

400 *(P1)*

### 401 **Adapting to daily activities**

402 The mothers adapted their activities in daily life to continue breastfeeding by managing  
403 their time to perform activities in a variety of situations. They made adjustments by sleeping in  
404 the daytime, doing activities while their babies were sleeping and asking family members to  
405 support them.

406 *I didn't really get any sleep and my body was tired...I was tired in those early days.... I*  
407 *took some daytime naps, too. (P5)*

408 *If I'm alone, it's kind of hard...Things like showering, eating or doing laundry have to*  
409 *wait until the baby is asleep. Then I can do it. (P13)*

410 *My mom manages all of the housework, diapers and other laundry. I feed the baby. Once*  
411 *my baby goes to sleep, I get to rest, too. (P15)*

### 412 **Being committed to breastfeeding**

413 The mothers persevered with breastfeeding, despite their fatigue. They endured sleeping  
414 less because they were happy to breastfeed their babies. They felt rejuvenated when they saw  
415 their babies' faces and responses. Their babies were healthy while receiving breastfeeding.  
416 Hence, the mothers were committed to breastfeeding because of their love for their babies:

417 *Breastfeeding causes a child to have good health to avoid severe illnesses and being*  
418 *admitted to a hospital. (P13)*

419 *I feel good that I'm breastfeeding. I'm tired, but I have to endure this. I can't do anything*  
420 *about it. I have to endure for my baby because I love him... At night, my baby sleeps*  
421 *longer, for three hours. When he wakes up, he is hungry. He is very cute in my opinion*  
422 *(smiles and laughs). (P8)*

423           *Breastfeeding is more tiring than before. From previously getting enough sleep, I have to*  
424           *try to wake up and pump. But just seeing my baby's face makes me feel happy. I'm tired,*  
425           *but I'm having fun. I feel that I'm doing all of this for something. (P3)*

426           In summary, the mothers of late preterm infants adopted a maternal role of “striving for  
427 sufficient milk to have a healthy baby”. A grounded theory approach was used to reach a  
428 preliminary stage of theory-construction. This enabled the researchers to define the phenomenon  
429 of producing sufficient milk as a process of great effort and exertion with respect to correct  
430 gestures, timing, facial expression, and offering the breast for infants to breastfeed. A theoretical  
431 diagram was developed regarding provision of adequate milk supply to breastfeed babies for  
432 improved health, composed of three categories: 1) preparing for breastfeeding, 2) overcoming  
433 the problem of insufficient milk supply, and 3) managing to continue breastfeeding. The process  
434 of producing sufficient milk helped participants achieve successful exclusive breastfeeding and  
435 improved health of their infants.

436

## 437 **Discussion**

438           Our findings highlight the core category of *striving for sufficient milk to have a healthy*  
439 *baby*. In a grounded theory study, according to the symbolic interactionist perspective, social  
440 interactions with others and the sociocultural environments encountered influence individuals’  
441 interpretations [2]. The theme of “Striving for sufficient milk to have a healthy baby” emerged  
442 from social interactions with others and the sociocultural environments of the first-time mothers  
443 of LPIs. During interactions, they expressed the thoughts, emotions, needs, and management  
444 processes leading to their actions or behaviors. This finding can be explained by the fact that the  
445 mothers of the LPIs entered the maternity world once they became aware of their pregnancies.  
446 They took on the maternal role. They demonstrated their behaviors for having healthy babies  
447 through gestures, timing, facing, and offering their breasts to breastfeed.

448           At first, when the mothers learned that they were pregnant, they prepared for  
449 breastfeeding by seeking and receiving information from nurses, friends, and the internet and by  
450 consuming healthy foods during pregnancy. This finding is consistent with that of Bryant et al.,  
451 who found that women sought information during pregnancy from various sources, including  
452 friends, family, and the internet [3]. Interestingly, the mothers in the study consumed ginger tea  
453 and dates to promote their milk supply during pregnancy. This finding was in contrast with a  
454 literature review in which women consumed foods and herbs to increase their milk production  
455 during the postpartum period [4].

456           In the study, the mothers had preterm births, a situation they had not expected. At the  
457 time, they were separated from their infants by hospital protocol for caring for preterm infants.  
458 LPIs are typically healthier and suckle and swallow more effectively than early preterm infants  
459 [18], despite being separated from their mother. However, LPIs have more difficulty latching,  
460 suckling, and swallowing than full-term infants [1]. They do not have stimulation to initiate  
461 breastfeeding and skin-to-skin contact to promote breastfeeding. Hence, oxytocin, which is an  
462 essential hormone for triggering milk flow or the milk ejection reflex, is not released as it  
463 normally would be during breastfeeding [20]. Separation and a lack of skin-to-skin contact  
464 interrupt the breastfeeding process and lead to insufficient milk. Maastrup et al. (2014) found  
465 that early initiation of breast milk pumping before 12 hours postpartum may increase  
466 breastfeeding rates. The mothers in our study learned how to massage the breasts, express milk,  
467 and collect milk to produce a milk supply during separation from their babies until their babies  
468 were ready to breastfeed [21]. Jose et al. (2019) reported that breast massage is effective in  
469 increasing breast milk volume among mothers of premature neonates [16].

470           Furthermore, breastfeeding is a new experience, and first-time mothers experience  
471 difficulty maintaining milk supply. Our findings agree with those of Demirci et al. (2015) and  
472 Cescutti-Butler (2017), who reported that preterm mothers faced breastfeeding problems and

473 difficulty maintaining their milk supply [9,8]. The mothers in this study breastfed frequently,  
474 every 2–3 hours, to achieving a sufficient milk supply. This finding is similar to that of Sarapat  
475 et al. (2017), who reported that mothers stimulated and expressed every 2–3 hours to maintain a  
476 sufficient milk supply [25]. The mothers in this study relieved engorged breasts by massaging  
477 their breasts, expressing milk, and pumping to remove milk. The management of breast  
478 engorgement in this study is in accordance with a systematic review on treatment for breast  
479 engorgement by Mangesi and Zakarija-Grkovic (2016) [22].

480 At home, the mothers encountered lactation problems but could not consult with health  
481 care professionals. They dealt with these problems by themselves. They modified the baby's  
482 position to allow good attachment to resolve cracked nipples. Yilak et al. (2020) reported that  
483 poor positioning is a sign of ineffective breastfeeding techniques, potentially causing nipple pain  
484 [32]. Incorrect suckling causes the mother's nipples to crack, leading to inadequate milk  
485 production. In addition, the mothers in this study sought ways to boost their breast milk supply.  
486 They drank herbal teas (ginger, banana blossom, and Mai Nomnang tea) to ensure sufficient milk  
487 production, as advised by nurses, colleagues, and family members. Herbs (banana blossoms and  
488 ginger) are used in Thailand to stimulate breast milk production and have long been widely  
489 popular. Traditionally, herbs have been used in cooking or have been boiled to make teas [33].  
490 During breastfeeding, the mothers in this study consumed only certain kinds of foods and  
491 avoided cold water to ensure that they had an adequate milk supply for their babies. This finding  
492 is consistent with that of a study of traditional beliefs in China in which cold foods such as pork  
493 liver soup, cock, and cuttlefish were found to be prohibited foods thought to decrease breast milk  
494 production [28].

495 According to the findings, the mothers adapted their daily activities to continue  
496 breastfeeding, such as by eating and bathing while their babies were sleeping, and asked their  
497 family members to help them with housework while they were breastfeeding. The findings agree

498 with the results of Flacking et al. (2007) that mothers struggle to balance life responsibilities  
499 while dealing with uncertain breastfeeding progress and muted feeding cues [10]. The mothers of  
500 the LPIs were committed to breastfeeding. They felt good about breastfeeding when they saw  
501 their babies' faces and responses, even though they felt fatigued. This finding is in accordance  
502 with that of Sarapat et al. (2017) [25], who showed that mothers were delighted when their  
503 babies fed at their breasts, and with the findings of Kair et al. (2015), who showed that  
504 breastfeeding is a beautiful bonding experience [17].

505

### 506 **Limitations**

507 The study was conducted at a university hospital in Chiang Mai, Thailand. The findings  
508 from this study are representative of a small group of first-time mothers of LPIs and cannot be  
509 generalized. Further research is needed using different types of triangulation methods to validate  
510 the findings in other groups across different cultures and societies.

511

### 512 **Conclusion**

513 This research has highlighted a specific aspect of mothers' experience of having an LPI,  
514 thereby providing new insights and contributing to a greater understanding of the breastfeeding  
515 experiences of such mothers. The aim of this study was to describe the experiences and  
516 management of exclusive breastfeeding among first-time mothers of LPIs. Using the grounded  
517 theory method [11], data analysis revealed that the experience and management of exclusive  
518 breastfeeding among first-time mothers of LPIs had three phases and a core category of *striving*  
519 *for sufficient milk to have a healthy baby*. This process describes the experience of first-time  
520 mothers with LPIs who adjusted to exclusive breastfeeding in order to have healthy babies.

521 The first of the three phases was *preparing for breastfeeding*, which began when the  
522 women became aware they were pregnant. The duration of Phase 1 extended from pregnancy to

523 birth. Phase 2 was focused on *overcoming the problem of insufficient milk supply*, which began  
524 when the mothers had preterm births and continued until their babies were discharged home.  
525 Phase 3 was *managing to continue breastfeeding*, which began when the infants were discharged  
526 home and lasted up to 6 weeks postpartum. From Phase 1 to Phase 3, the management process of  
527 the first-time mothers of the LPIs was focused on striving for *sufficient milk to have a healthy*  
528 *baby*. Thai first-time mothers of LPIs did everything they could to succeed in exclusively  
529 breastfeeding their babies. They were resourceful and applied many strategies as they  
530 endeavored to have an adequate milk supply to have a healthy infant.

531         Therefore, the knowledge gained from this study can help in developing nursing practices  
532 that support first-time mothers of LPIs in successfully exclusively breastfeeding their babies.  
533 Health care professionals play important roles in supporting these mothers by mobilizing social  
534 support networks and encouraging breastfeeding. Moreover, nursing interventions can help  
535 mothers achieve a sufficient milk supply. It is our hope that this study can be a useful  
536 contribution to the existing literature on exclusive breastfeeding among first-time mothers of  
537 LPIs.

538         Furthermore, the findings can be used as baseline data to encourage health care policy-  
539 makers to enact policies that meet the needs of mothers, particularly those of LPIs who intend to  
540 exclusively breastfeed. Specifically, the findings will help Thai policy-makers and health care  
541 professionals understand the process of successfully striving to have a sufficient milk supply for  
542 a healthy LPI, particularly when exclusive breastfeeding is involved. Group support, effective  
543 mentorship programs, and national follow-up services for resource utilization targeting  
544 breastfeeding mothers of LPIs could be offered as standard care in Thai hospitals. With this  
545 study, health care professionals can reshape extant policies in ways that promote exclusive  
546 breastfeeding for mothers of LPIs. By doing so, the health care community can provide support  
547 for these mothers to exclusively breastfeed their babies to achieve good health.

548 **List of abbreviations**

549 LPIs: Late preterm infants; WHO: World Health Organization; UNICEF: United Nations  
550 Children's Fund; NICU: Neonatal Intensive Care Unit

551

552 **Declarations**

553 **Ethics approval and consent to participate**

554           Permission to conduct the study was obtained from the Institutional Ethics Review Board  
555 Committee, Faculty of Nursing, and the Faculty of Medicine, Chiang Mai University, No. 2561-  
556 EXP065 and No. 2561-05865. Potential participants were informed about the purpose and  
557 process of the research and given oral and written guarantees of anonymity and confidentiality. It  
558 was clarified that they could refuse to participate in or withdraw from the study at any time. All  
559 participants signed informed consent forms, which included permission to record the interviews.  
560 All interview transcripts were kept confidential and anonymous, and only the advisory  
561 committee could check them for review purposes.

562

563 **Consent for publication**

564 Consent for the use of the qualitative data and for publication was obtained from each participant  
565 before each interview.

566

567 **Availability of data and materials**

568 The datasets generated and/or analyzed during the current study are available from the  
569 corresponding author upon reasonable request.

570

571 **Competing interests**

572 The authors declare that they have no competing interests.



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577

578 **Author contributions**

579 Study Design: RC, KK, JC, NC

580 Data Collection: RC

581 Data Analysis: RC, KK

582 Manuscript Preparation: RC, KK, JC, NC

583 Study Supervision: KK, JC, NC

584

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737 **Figure legends**

738 **Fig.1 The process of “striving for sufficient milk to have a healthy baby”.**

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740 **Table 1: Examples from the interview guideline**

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What was your experience during pregnancy?

What were your postpartum experiences during your stay in the hospital?

How about your breastfeeding experience?

- How do you feel about breastfeeding?
- How does breastfeeding affect your life? How do you feel about this effect?

What are the needs (encouragement/support) during breastfeeding?

- From whom? How much support do you want? For what reasons?

How do you manage to exclusively breastfeed?

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742 **Table 2: Demographic Characteristics of the Participants (N=17)**

Characteristics	Number	Percentage
Age (years)		
21–30	10	58.82
31–37	7	41.18
Educational Level		
Secondary School	2	11.76
Vocational College	3	17.65
Bachelor’s Degree	11	64.71
Master’s Degree	1	5.88
Occupation		
General Employee	7	47.06

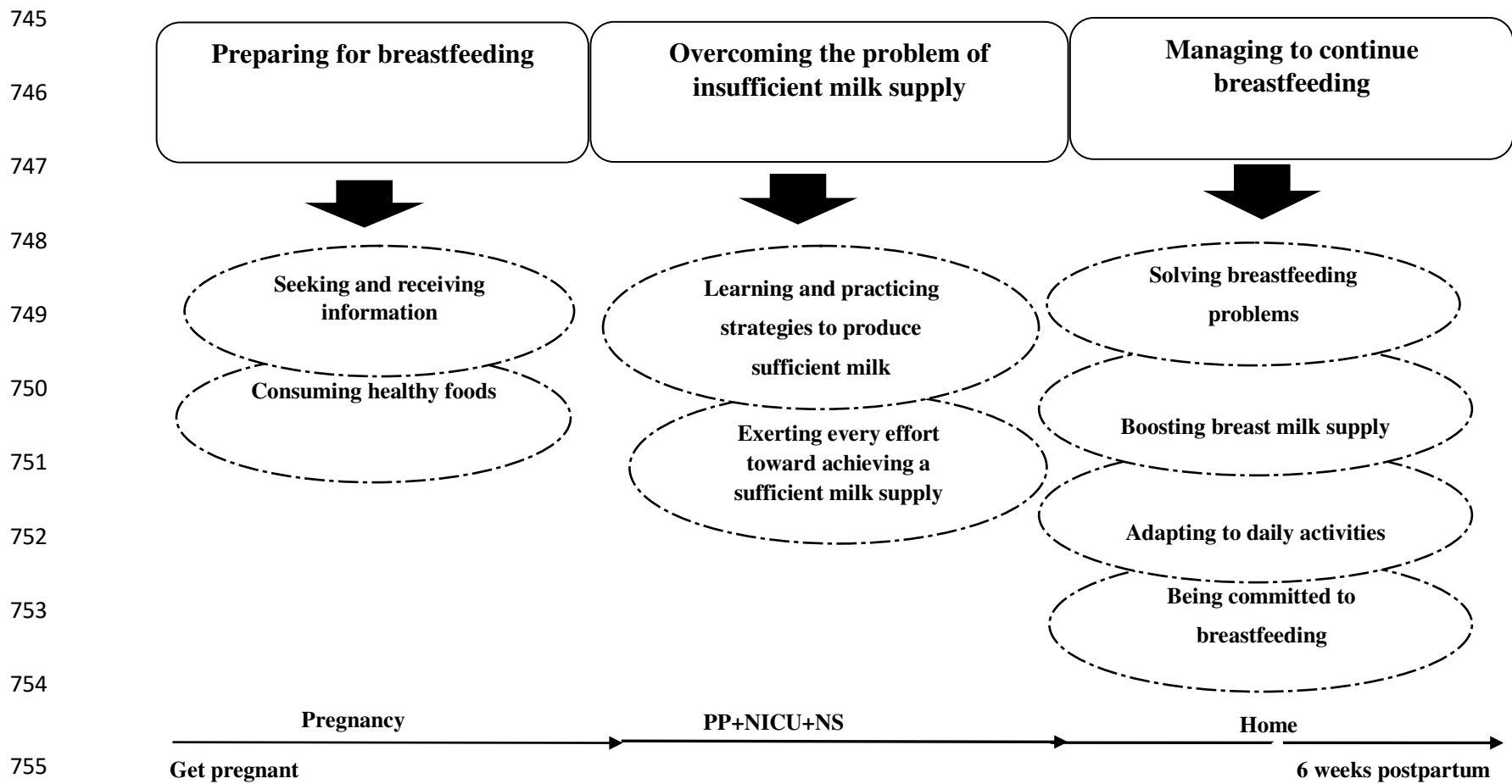
Housewife	3	17.65
Merchant	2	11.76
Civil Servant	1	5.88
Government Employee	3	17.65
Type of Family		
Extended	15	88.24
Nuclear	2	11.76
Number of Family Members (persons)		
3–4	9	52.94
5–6	8	47.06
Family Monthly Income (baht)		
5001–10,000	1	5.88
10,001–15,000	3	17.65
15,001–20,000	3	17.65
20,001–25,000	8	47.06
25,001–30,000	2	11.76

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**Fig. 1** The process of “striving for sufficient milk to have a healthy baby”.