Early Initiation of Breastfeeding up to Six Months and Breastfeeding Experience of Mothers who had Cesarean Section: A Scoping Review

Yunefit Ulfa ( 17dn901@slcn.ac.jp) 
St. Luke's International University Japan  https://orcid.org/0000-0001-5728-337X

Naoko MARUYAMA 
St. Luke’s School of Nursing: Saint Luke's School of Nursing

Yumiko IGARASHI 
St. Luke’s School of Nursing: Saint Luke's School of Nursing

Shigeko HORIUCHI 
St. Luke’s School of Nursing: Saint Luke's School of Nursing

Research

Keywords: breast feeding, cesarean section, lactation, postpartum period

Posted Date: December 29th, 2021

DOI: https://doi.org/10.21203/rs.3.rs-1157298/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License. Read Full License
Abstract

Background: Breastfeeding is a gold nutritional feeding for the infant for optimal growth and development. Early initiation of breastfeeding is an important initial step for successful continuing breastfeeding. Cesarean section (C-section) has been reported to have negative effects on early initiation of breastfeeding. However, no current literature summarized the breastfeeding rate after C-section and vaginal delivery globally. Therefore, this scoping review aimed to systematically collect, assess, and map the existing literature regarding the rate and experience of breastfeeding of mothers after C-section.

Design: We conducted a scoping review in accordance with the PRISMA extension for scoping reviews (PRISMA-ScR) statement.

Methods: We performed an electronic database search on Cumulative Index of Nursing and Allied Health Literature, PubMed, Embase, Cochrane Library, and PsychINFO on March 16, 2021. The inclusion criteria were (a) research, experiential, and case reports; (b) reports on the rate of breastfeeding after C-section and vaginal delivery; (c) qualitative studies on the experience of breastfeeding after C-section.

Results: The search identified 4635 potentially relevant articles. After screening, 27 articles (24 quantitative and three qualitative studies) were included in the scoping review from 1990 to 2020. Most studies reported a higher breastfeeding rate in mothers who had vaginal delivery than in mothers who had C-section at breastfeeding initiation, hospital discharge, one month, three months, and six months postoperatively. A large difference in breastfeeding rate was found at early breastfeeding initiation between the vaginal delivery and C-section groups. Most studies showed a breastfeeding rate of more than 30% at late breastfeeding initiation, one month, and three months after C-section. A mother's physical discomfort, low self-efficacy, and lack of knowledge, and the insufficient support from healthcare providers were identified as breastfeeding barriers after C-section.

Conclusions: The rate of breastfeeding after C-section has remained low to date. Lack of breastfeeding knowledge and insufficient healthcare provider support after C-section are the common underlying issues. Approaches to enhance breastfeeding must be developed and consistently implemented.
Table 1

<table>
<thead>
<tr>
<th>Inclusion criteria</th>
<th>Exclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research, experiential, and case reports</td>
<td>Editorials, letters, commentaries, opinion papers, and grey literature studies</td>
</tr>
<tr>
<td>Reports on the rate or percentage of breastfeeding</td>
<td>Report the odds ratio</td>
</tr>
<tr>
<td>Reports on the rate or percentage of breastfeeding both after C-section and VD</td>
<td>Reports on the rate or percentage of breastfeeding only after C-section or only after VD</td>
</tr>
<tr>
<td>English</td>
<td>Non-English</td>
</tr>
<tr>
<td>Full text</td>
<td>Non full text</td>
</tr>
<tr>
<td>High and moderate quality (based on critical appraisal)</td>
<td>Poor quality (based on critical appraisal)</td>
</tr>
</tbody>
</table>

### 3.2 Search strategy and information sources

An electronic database literature search was conducted on March 16, 2021. The databases searched included Cumulative Index of Nursing and Allied Health Literature, PubMed, Embase, Cochrane Library, and PsychINFO. The search terms were related to postpartum, breastfeeding, and C-section. The full search strategy is shown in Appendix 1. Date limitation was not set.

### 3.3 Selection of studies

The search results were downloaded into RefWorks to identify and remove duplicates. The results were then transferred to Rayyan application to ease screening [14]. Titles and abstracts that met the inclusion criteria were independently screened by the lead researcher. Then, eligible full text articles were assessed independently for inclusion in the study.

Although quality appraisal is not required in scoping reviews, three researchers critically appraised the included studies using the JBI framework for cross-sectional and cohort studies and the critical appraisal skill programme for qualitative studies to rigorously screen the studies included and remove poor-quality studies. The quality score of the studies were divided into three categories: high quality (total score > 70%), moderate quality (total score 40%-70%), and poor quality (total score < 40%). The three researchers scored the articles independently, and the scores were then compared and discussed. An old article published in 1990 was included in this study because of its valuable old study.

### 3.4 Data charting

Data were extracted by the lead researcher and confirmed by the other researchers. The extracted studies were characterized as follows: (1) author(s), (2) year of publication, (3) country, (4) study design, (5) objectives, (6) population, (7) Other factors associated with breast feeding initiation and exclusive breastfeeding, (8) summary of results, and (9) quality appraisal.

### 4. Results

#### 4.1 Selection of sources

The database search identified 4635 potentially relevant articles. Of these, 1238 duplicate articles were removed. A total of 3397 articles were screened and 3332 records were excluded based on their titles and abstracts. The remaining 65 articles were assessed for eligibility. After full text screening, 38 articles that did not meet the eligibility criteria were removed. Finally, 27 articles were included in the scoping review (Figure 1).

Twenty-seven published articles from 1990-2020 were identified and included in this scoping review. Twenty-four were quantitative studies and three were qualitative studies. As for the quantitative studies, nine articles were cross-sectional studies and 15 articles were cohort studies.

#### 4.2 Study characteristics

The studies were conducted in the following countries: Five studies from African continent [15-19], four studies from Canada [11,20-22], three studies from China [5,7,23], two studies from England [24,25] and two studies from Italy [12,26], and one studies from each of the following: Australia [27], Bangladesh [28], Denmark [29], Lebanon [30], Puerto Rico [31], Sweden [32], Saudi Arabia [33], Taiwan [34], Turkey [35], United State of America [36], and Vietnam [37].

The present study investigated the breastfeeding rate of mothers after C-section and VD. We included the time of breastfeeding. There were 13 studies on the early initiation of breastfeeding (within one hour after delivery), seven studies on the late initiation of breastfeeding (after one hour of delivery), six studies on breastfeeding at hospital discharge (hospitalization: two to five days), eight studies on exclusive breastfeeding one month after delivery, six studies on exclusive breastfeeding three months after delivery, and eight studies on exclusive breastfeeding six months after delivery.

#### 4.3 Synthesis of results

The characteristics of included studies is summarized in Table 2. The results showed that most of mothers who had VD can initiate breastfeeding compared with mothers who had C-section. Most of the studies showed that a successful early initiation of breastfeeding will continue to exclusive breastfeeding at one and three months. However, we cannot definitively conclude an association of early initiation of breastfeeding with exclusive breastfeeding at six months.
<table>
<thead>
<tr>
<th>NO</th>
<th>Authors</th>
<th>Year</th>
<th>Country</th>
<th>Study Design</th>
<th>Objectives</th>
<th>Population</th>
<th>Summary of Results</th>
<th>Other factors associated with breastfeeding initiation and exclusive breastfeeding</th>
<th>Summary of Critical Appraisal</th>
</tr>
</thead>
</table>
| 1  | Vestermark et al.[29]           | 1990 | Denmark     | Quantitative, cohort study | To evaluate whether the mode of delivery affects breastfeeding.           | Cesarean section (CS) = 102 Vaginal delivery (VD) = 231 | • Mothers who gave birth by CS had a delay in their early initiation of breastfeeding.  
• Their babies were prescribed formula milk  
• Postdelivery formula milk or prelacteal feeding had no effect on exclusive breastfeeding one month after delivery. | Poor quality                                                    |                  |
| 2  | Wiklund, Edman, & Andolf [32]   | 2007 | Sweden      | Quantitative, cohort study | To investigate the breastfeeding of mothers who experienced CS for the first time | CS = 357 VD = 266 | • Many mothers who gave birth by CS had weaned their babies three months after birth.  
• The reason for this was related to personality traits and sociodemographic factors, not to the type of delivery. | Moderate quality                                           |                  |
| 3  | Chien, L.-, & Tai [34]          | 2007 | Taiwan      | Quantitative, cohort study | To evaluate the effects of type of delivery on the initiation of breastfeeding, and breastfeeding at 1 and 3 months after delivery. | CS = 699 VD = 1124 | • Breastfeeding initiation within 30 minutes after delivery was associated with a higher chance of breastfeeding at one and three months after delivery. | Breastfeeding initiation: maternal age, education, work status, and spousal support for breastfeeding. | Moderate quality               |
| 4  | Pérez-Ríos, Ramos-Valencia, & Ortiz [31] | 2008 | Puerto Rico | Quantitative, cross sectional | To investigate the association between CS and breastfeeding initiation | CS = 598 VD = 1097 | • CS was a barrier to breastfeeding initiation of reproductive age women in Puerto Rico | Breastfeeding initiation: educational attainment, marital status, and employment status. | Moderate quality               |
| 5  | Chalmers et al. [20]            | 2010 | Canada      | Quantitative, cross sectional | To know the correlation between CS and breastfeeding | CS = 2246 VD = 6296 | • CS had less mother-infant contact experiences.  
• CS had less mothers breastfeeding their babies at almost all time periods |                                                                 | Moderate quality               |
<table>
<thead>
<tr>
<th>NO</th>
<th>Authors</th>
<th>Year</th>
<th>Country</th>
<th>Study Design</th>
<th>Objectives</th>
<th>Population</th>
<th>Summary of Results</th>
<th>Other factors associated with breastfeeding initiation and exclusive breastfeeding</th>
<th>Summary of Critical Appraisal</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Al-Sahab et al. [21]</td>
<td>2010</td>
<td>Canada</td>
<td>Quantitative, cohort study</td>
<td>To investigate the rate of breastfeeding 6 months after delivery</td>
<td>CS = 1456</td>
<td>• Exclusive breastfeeding was correlated with the type of delivery.</td>
<td>• Exclusive breastfeeding 6 months after delivery: Mother’s education, marital status, smoking during pregnancy, type of setting of baby’s birth, Baby’s admission to NICU, employment status.</td>
<td>Moderate quality</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VD = 4146</td>
<td>• Pain and discomfort due to C-section effect may prevent the mother to breastfeed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Zanardo et al. [26]</td>
<td>2010</td>
<td>Italy</td>
<td>Quantitative, cohort study</td>
<td>To evaluate breastfeeding rate post-delivery up to six months after CS and VD</td>
<td>CS = 398</td>
<td>• Both elective and emergency CS had negatively effects on breastfeeding.</td>
<td></td>
<td>Moderate quality</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VD = 1496</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Ahluwalia, Li, &amp; Morrow [36]</td>
<td>2012</td>
<td>United States of America</td>
<td>Quantitative, cohort study</td>
<td>To know the correlation between type of delivery and breastfeeding</td>
<td>CS = 489</td>
<td>• No significant correlation between type of delivery and breastfeeding initiation.</td>
<td>• Women with assisted deliveries need additional support.</td>
<td>Moderate quality</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VD = 1157</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Liu, Zhang, Liu, Li, &amp; Li [23]</td>
<td>2012</td>
<td>China</td>
<td>Quantitative, cohort study</td>
<td>To examine the correlation between type of delivery and method of breastfeeding</td>
<td>CS = 22462</td>
<td>• Women who had CS were less likely to exclusively breastfeed than women who had VD.</td>
<td></td>
<td>High quality</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VD = 409242</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Watt et al. [22]</td>
<td>2012</td>
<td>Canada</td>
<td>Quantitative, cohort study</td>
<td>To investigate the relationship between type of delivery and breastfeeding initiation and continuance up to six weeks after delivery</td>
<td>CS = 826</td>
<td>• The type of delivery was not a determining factor of breastfeeding initiation in the early post-discharge period.</td>
<td></td>
<td>Moderate quality</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VD = 1668</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Albokhary &amp; James [33]</td>
<td>2014</td>
<td>Saudi Arabia</td>
<td>Quantitative, Cross sectional</td>
<td>To examine whether the type of delivery influenced the breastfeeding practice</td>
<td>CS = 30</td>
<td>• Women who had CS were less likely to initiate breastfeeding and likely to introduce formula milk.</td>
<td>• Pain after birth due to CS had negative effects on breastfeeding.</td>
<td>Moderate quality</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VD = 30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NO</td>
<td>Authors</td>
<td>Year</td>
<td>Country</td>
<td>Study Design</td>
<td>Objectives</td>
<td>Population</td>
<td>Summary of Results</td>
<td>Other factors associated with breastfeeding initiation and exclusive breastfeeding</td>
<td>Summary of Critical Appraisal</td>
</tr>
<tr>
<td>----</td>
<td>---------</td>
<td>------</td>
<td>---------</td>
<td>--------------</td>
<td>------------</td>
<td>------------</td>
<td>-------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>12</td>
<td>Berde &amp; Yalcin [15]</td>
<td>2016</td>
<td>Nigeria</td>
<td>Quantitative, Cross sectional</td>
<td>To recognize the factors associated with Early Initiation of Breast Feeding (EIBF)</td>
<td>CS = 263 VD = 11508</td>
<td>• Mothers who had VD had three times higher early initiation of breastfeeding than mothers who had CS.</td>
<td>Breastfeeding initiation: mother's age, education, ANC visit, place of delivery, baby birth weight, occupation, wealth Index, and type of place of residence</td>
<td>High quality</td>
</tr>
<tr>
<td>13</td>
<td>Hobbs, Mannion, McDonald, Brockway, &amp; Tough [11]</td>
<td>2016</td>
<td>Canada</td>
<td>Cohort study</td>
<td>To evaluate the correlation between type of delivery and breastfeeding initiation</td>
<td>CS = 739 VD = 2279</td>
<td>• There was no significant difference in the breastfeeding practice between women who had CS and women who had VD. • Women who had CS were more likely to discontinue breastfeeding before three months after delivery.</td>
<td></td>
<td>High quality</td>
</tr>
<tr>
<td>14</td>
<td>Kiani et al. [16]</td>
<td>2017</td>
<td>Nicaragua</td>
<td>Quantitative, cross sectional</td>
<td>To investigate the correlation between type of delivery and breastfeeding</td>
<td>CS = 10 VD = 147</td>
<td>• There was no difference in breastfeeding initiation between mothers who had CS and mothers who had VD. • Providing prelacteal feeds before early initiation of breastfeeding has a negative effect on breastfeeding.</td>
<td>Breastfeeding initiation: mother's BMI and mother's age Exclusive breastfeeding 6 months after delivery: travel time to health centre, and weight of baby at birth</td>
<td>High quality</td>
</tr>
<tr>
<td>15</td>
<td>Chen et al. [5]</td>
<td>2018</td>
<td>China</td>
<td>Quantitative, cohort study</td>
<td>To identify the potential effects of CS on breastfeeding practices and breastfeeding duration</td>
<td>CS = 387 VD = 567</td>
<td>• Mothers who had CS reported a low percentage of exclusive breastfeeding and any breastfeeding compared with mothers who had VD. • CS also shortened the breastfeeding duration. • CS was also associated with delayed breastfeeding initiation and giving formula milk.</td>
<td></td>
<td>High quality</td>
</tr>
<tr>
<td>NO</td>
<td>Authors</td>
<td>Year</td>
<td>Country</td>
<td>Study Design</td>
<td>Objectives</td>
<td>Population</td>
<td>Summary of Results</td>
<td>Other factors associated with breastfeeding initiation and exclusive breastfeeding</td>
<td>Summary of Critical Appraisal</td>
</tr>
<tr>
<td>----</td>
<td>--------------------</td>
<td>------</td>
<td>-------------------------------------------------------------------------</td>
<td>-----------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>------------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>16</td>
<td>Ezeh et al. [17]</td>
<td>2019</td>
<td>Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, The Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo</td>
<td>Quantitative, cross sectional</td>
<td>To investigate the possible characteristics influencing early initiation of breastfeeding in 13 members of ECOWAS</td>
<td>CS = 2966</td>
<td>- Mothers who received CS had less early initiation of breastfeeding than mothers who received VD.</td>
<td>Breastfeeding initiation: household level, mothers' first delivery, delivery setting.</td>
<td>High quality</td>
</tr>
</tbody>
</table>
| 17 | Zhang et al. [7]    | 2019 | China                                                                   | Quantitative, cohort study        | To investigate the correlation of early initiation of breastfeeding with long-term breastfeeding outcome after CS | CS = 333   | - CS had a negative effect on early breastfeeding behaviors and continued to have long-term effects on breastfeeding outcomes.  
- CS is not a negative factor; however, infants who have feeding difficulties at the early stage of breastfeeding will have long-term problems. | High quality                                                                     |                                      |
| 18 | Ragusa et al. [12]  | 2020 | Italy                                                                   | Quantitative, cross sectional     | To assess the percentage of breastfeeding during hospital stay              | CS = 1488  | - Exclusive breastfeeding was less adopted in women who had CS than in women who had VD. | Moderate quality                                                                      |                                      |
| 19 | Ali et al. [28]     | 2020 | Bangladesh                                                              | Quantitative, cross sectional     | To evaluate the relationship of childbirth location and type of delivery with early breastfeeding practices | CS = 359   | - Early initiation of breastfeeding was less frequent in women who had CS than in women who had VD. | Initiation of breastfeeding: place of delivery.                                      | High quality                  |
| 20 | Apanga & Kumbeni   | 2020 | Ghana                                                                   | Quantitative, cross sectional     | To examine the percentage of breastfeeding and factors related to the initiation of breastfeeding | CS = 1663  | - Breastfeeding initiation was less in women who had CS than in women who had VD. | Initiation of breastfeeding: delivery assisted by skilled attendant, Planned pregnancy, and weight of baby at birth | High quality                  |
| 21 | Chehab, Nasreddine, Zgheib, & Forman [30] | 2020 | Lebanon                                                                | Quantitative, cross sectional     | To assess the frequency of and factors related to exclusive breastfeeding at 40 days and at six months | CS = 424   | - The frequency of exclusive breastfeeding was higher in the VD group than in the CS group at 40 days and at six months  
- Exclusive breastfeeding at 40 days and at six months: family monthly income and educational level. | High quality                                                                      |                                      |
<table>
<thead>
<tr>
<th>NO</th>
<th>Authors</th>
<th>Year</th>
<th>Country</th>
<th>Study Design</th>
<th>Objectives</th>
<th>Population</th>
<th>Summary of Results</th>
<th>Other factors associated with breastfeeding initiation and exclusive breastfeeding</th>
<th>Summary of Critical Appraisal</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>Gedefaw, Goedert, Abebe, &amp; Demis [19]</td>
<td>2020</td>
<td>Ethiopia</td>
<td>Quantitative, cross sectional</td>
<td>To assess the impact of CS on breastfeeding initiation</td>
<td>CS = 165 VD = 6950</td>
<td>• CS was a significant factor associated with the late initiation of breastfeeding</td>
<td>Moderate quality</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Hoang Nguyen et al.[37]</td>
<td>2020</td>
<td>Vietnam</td>
<td>Quantitative, cohort study</td>
<td>To evaluate the effects of CS on breastfeeding practices from delivery to 12 months postpartum</td>
<td>CS = 654 VD = 1061</td>
<td>• There were lower rates of early initiation of breastfeeding by mothers who underwent CS due to prelacteal feeding of their infants.</td>
<td>Moderate quality</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Paksoy Erbaydar &amp; Erbaydar [35]</td>
<td>2020</td>
<td>Turkey</td>
<td>Quantitative, cohort study</td>
<td>To determine the relationship between CS and early breastfeeding practices among primiparas</td>
<td>CS = 417 VD = 360</td>
<td>• Women who had CS had late breastfeeding initiation and non-exclusive breastfeeding during the three days following delivery.</td>
<td>Moderate quality</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Baxter, 2006 [24]</td>
<td>2006</td>
<td>England</td>
<td>Qualitative, focus group discussion</td>
<td>To explore the experiences of feeding CS babies</td>
<td>CS = 11</td>
<td>• The reasons for stopping breastfeeding were the perception of insufficient milk and inconvenience, difficulty with attachment, pain, and lack of support</td>
<td>Moderate quality</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Chaplin et al. [27]</td>
<td>2016</td>
<td>Queensland, Australia</td>
<td>Qualitative, interpretive phenomenological research</td>
<td>To explore the experiences of women with breastfeeding problems</td>
<td>CS = 8</td>
<td>• The problems of breastfeeding practice after CS were anesthetic recovery, lack of true skin-to-skin contact, separation of mother and baby, inconsistent information, inadequate support, unnecessary milk formula supplementation and feelings of failure</td>
<td>High quality</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Tully, Kristin P. &amp; Ball [25]</td>
<td>2014</td>
<td>Northeast England</td>
<td>Qualitative, semistructured, open-ended interview</td>
<td>To examine the maternal perspectives of mechanisms that contribute to the difficulty of early breastfeeding after CS</td>
<td>CS = 115</td>
<td>• The barriers to breastfeeding after CS were maternal mobility limitations, positioning difficulties, and frustration at the need for assistance.</td>
<td>High quality</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 2** shows that the percentages of early initiation of breastfeeding (≤ 1 hr) were higher in the mothers who had VD than in the mothers who had C-Section. Most of the studies showed that more than 50% the mothers who had VD had early initiation of breastfeeding and only two studies reported an initiation below 50%.

As for the mothers who had C-Section, nine studies reported that the rate of early initiation of breastfeeding were below 50%. In addition, **Figure 2** shows a large difference in the percentages of early initiation of breastfeeding between VD and C-section, and only 1 article showed a small difference in the rate of...
early initiation of breastfeeding between these two groups [16].

Most of the studies reported that the rate of exclusive breastfeeding at hospital discharge were more than 50% in the mothers who had VD and more than 30% in the mothers who had C-Section (Figure 4). Only two studies from Vietnam and Taiwan showed that the rate of exclusive breastfeeding at hospital discharge were below 25% in both the mothers who had VD and the mothers who had C-section [34,37]. Two studies showed a large difference in the rate of early initiation of breastfeeding between the mothers who had VD and the mothers who had C-section [7,12].

Figure 5 shows that the percentages of any breastfeeding 6 months after delivery in most studies were more than 50% for both the VD and C-section groups. There were almost same percentage between vaginal delivery and C-section of any breastfeeding 6 months after delivery [5,30,37].

As for the qualitative study, we synthesized the findings from three articles on barriers to breastfeeding experience after C-section. The categories were mother's physical discomfort, low self-efficacy, lack of breastfeeding knowledge, and inadequate support from a healthcare provider. The subcategory of these three articles is shown in Table 2.

<table>
<thead>
<tr>
<th>Theme</th>
<th>Category</th>
<th>Subcategory</th>
<th>Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barriers to breastfeeding after CS</td>
<td>Mother's physical discomfort</td>
<td>Limited maternal mobility</td>
<td>&quot;I can't get up... felt bit let down by that [limited mobility]&quot; [25]</td>
</tr>
<tr>
<td></td>
<td>Positioning difficulties</td>
<td>&quot;Very traumatised after labour, baby did not latch properly and I found it painful&quot; [24]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pain of scar</td>
<td>&quot;Too painful to lift and carry baby post CS&quot; [24,27]</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;I sort of moved to get up on the bed or to sort of move down a bit to go to sleep then I got the pain&quot; [27]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low self-efficacy</td>
<td>Feelings of failure</td>
<td>&quot;I don't want to try anymore... feel stressed and the baby has mucus. I'm disappointed that I couldn't [breast feed].&quot; [25]</td>
</tr>
<tr>
<td></td>
<td>Lack of breastfeeding knowledge</td>
<td>False belief</td>
<td>&quot;Not having enough breast milk – baby was still hungry no matter how long I fed her&quot; [24]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Misperception of insufficient milk</td>
<td>&quot;I was unsure that I was giving enough milk as she was not gaining substantial weight, also when breastfeeding I could hear the wind in her stomach&quot; [24]</td>
</tr>
<tr>
<td></td>
<td>Inadequate support from healthcare provider</td>
<td>Separation of mother and baby</td>
<td>&quot;they just showed me the baby in theatre when he first came out. I don't think I got to touch him... I thought I would have been allowed to touch him&quot; [27]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unnecessary formula supplementation</td>
<td>&quot;after 24–48 hours I just couldn't get her to latch so I started expressing but then I wasn't expressing much at all... so we had to go and get the formula&quot; [27]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lack of professional skills on breast latching</td>
<td>&quot;I received much conflicting advice from ward staff with each shift change and feel this prevented me from adequately latching my baby and therefore being able to breastfeed her&quot; [24]</td>
</tr>
</tbody>
</table>

5. Discussion

5.1 Low percentage of breastfeeding after C-Section

This scoping review synthesized data of breastfeeding after C-Section from 1990 to 2020. Surprisingly, the results showed that the percentage of breastfeeding after C-section did not improve compared with the results of a previous study by Prior et al in 2012 [6]. Prior et al. conducted a systematic review of studies on breastfeeding after C-section published from 1983 to 2011 from 33 countries. They reported that unsuccessful or delayed breastfeeding initiation was associated with C-section [6].

The present results showed a large difference in the percentage of early initiation of breastfeeding between the VD and C-section groups (Figure 2). Several factors have been reported to cause the delayed breastfeeding initiation after C-Section. These include the mother's physical discomfort after delivery, low self-efficacy, and lack of breastfeeding knowledge, as well as the inadequate support from healthcare providers [24,25,27]. Limited mobility and difficult mother-baby attachment owing to the pain after C-section impair the mother's ability to breastfeed her baby. Moreover, the absence of a rooming-in policy in a hospital/clinic after C-section and instead keeping the baby in a nursery room further delays the early initiation of breastfeeding [24,26,29,37]. Chaplin et al. also observed that most infants born by C-section were given formula milk in a nursery room before they were given to their mothers [27]. However, rooming-in is still raising a debate. Rooming-in can boost breastfeeding and self-efficacy [38,39]. On the other hand, rooming-in has been reported to
disturb well-rested mothers after delivery [40]. In their systematic review, Jaafar, Lee & Ho showed that rooming-in was associated with successful breastfeeding initiation [41].

In Figure 4, two studies from Vietnam and Taiwan showed that the rate of exclusive breastfeeding at hospital discharge were below 25% in both the VD and C-Section groups [34,37]. This phenomenon in Taiwan is rooted in the traditional cultural belief of Chinese that pregnancy and delivery are considered as a tiring process which weakens the physical condition of women. Therefore, it is believed that women should take sufficient rest in bed after delivery. Moreover, mothers believe that there was insufficient milk for infants before breast engorgement [34]. In Vietnam, the low percentage of breastfeeding was due to the high rate of prelacteal feeding (particularly formula milk) and usage of antibiotics after C-Section. Mothers will delay breastfeeding to avoid passing on the antibiotics to their infants [37].

As for exclusive breastfeeding at six months after delivery, the results showed that the rate of exclusive breastfeeding were under 80%. The reasons for the low percentages were returning to work, less milk production, and the introduction of solid food [21,24]. Healthcare providers should point out that the first period of hospitalization is very important to the successful continuance of breastfeeding.

5.2 Forms of support to increase breastfeeding after C-section

Barriers to breastfeeding after C-section can be overcome with appropriate assistance and breastfeeding education. For assistance, professional healthcare providers can provide physical and mental support to mothers in performing breastfeeding after C-section, particularly in the early postpartum period.

Skin-to-skin contact (SSC) is a form of support to increase successful breastfeeding after C-Section [42]. Healthcare providers can help administer SSC after C-Section to increase the mother’s confidence and intimacy with her baby. Moran-Peter et al. explained that SSC contact after delivery can enhance exclusive breastfeeding practices [43].

As for the limited mobility and pain caused by surgery, the use of pain control (analgesia) has been recommended [44]. Healthcare providers can introduce different kinds of painkiller such suppository, oral medicine, and epidural anaesthesia. Tiredness was also reported to delay breastfeeding. Therefore, physical support from nurses or families is needed to help in the mother-baby attachment for breastfeeding and to build the confidence of mothers in breastfeeding their baby.

5.3 Provision of evidence through breastfeeding education

Providing counselling, motivation, and education to mothers about breastfeeding is an important task by healthcare providers. This is especially crucial in terms of providing adequate information about the breastmilk process, myths, and mother mobilization. Evidence suggests that breastfeeding education is effective in increasing both the rate of breastfeeding initiation and breastfeeding duration [45]. Lumbiganon et al. showed that breastfeeding education in antenatal care for mothers and spouses/families can have a marked effect on breastfeeding at the postpartum period [46].

Breastfeeding education is not only for mothers and their families, but also for healthcare providers. As science and research are constantly evolving, healthcare providers should receive continuing education, particularly on lactation knowledge and professional assistance on breastfeeding after C-section. A regular update on the knowledge of healthcare providers can be considered as part of a successful breastfeeding program.

Recently, healthcare providers have also introduced a decision-making aid on breastfeeding to help mothers decide whether to breastfeed their babies after delivery. In 2020, the Ottawa Hospital Research Institute launched a breastfeeding decision aid that can be used by healthcare providers. Breastfeeding education regarding the proper position and baby attachment has been given following the postnatal period. Home visits by peer counsellors have also been shown to significantly increase exclusive breastfeeding 12 and 24 weeks postpartum [47].

5.4 Adopting a baby friendly hospital initiative program

In 1991, the WHO and United Nations International Children’s Emergency Fund promoted the early initiation of breastfeeding through the Baby Friendly Hospital Initiative (BFHI) programme. This programme introduced breastfeeding domains such as no infant formula, promotion and support (prenatal breastfeeding education), and mother-baby rooming-in throughout the hospital [48].

The policy of the BFHI programme can be adopted by maternity clinics and hospitals to improve the breastfeeding practices of mothers who gave birth by VD or C-section. Thus, it is crucial to support mothers to breastfeed just after delivery and avoid formula milk. Rooming-in is considered as one of the approaches to creating a bond between the mother and the baby, making it easier for mothers to breastfeed their baby on demand. However, there is still no definitive evidence regarding the correlation of rooming-in with breastfeeding duration [41]. Optimal breastfeeding care for mothers who had C-section may increase their rate of early initiation of breastfeeding.

5.5 Strengths and Limitations

This study has several limitations. It was limited to peer-reviewed studies published in English. Specifically, it included only studies reporting on the percentages of breastfeeding after C-section and VD. Moreover, only three qualitative studies were included. Despite these limitations, the strengths of this study were its rigorous methodological frameworks for conducting and reporting this scoping review and the meticulous review of studies for critical appraisal by three independent reviewers.

6 Conclusion
This scoping review found a low percentage of breastfeeding among mothers who had C-section. The underlying reasons for the large differences in the percentages of breastfeeding after C-section and VD were the physical discomfort, low self-efficacy, and lack of breastfeeding knowledge of mothers, as well as the inadequate support from healthcare providers. Pain control, SSC, breastfeeding education in antenatal care, development of a breastfeeding decision aid, and implementing a baby friendly hospital policy are some important approaches to improving breastfeeding after C-section.

**Abbreviations**

CS/C-section
Cesarean section
PRISMA-ScR
Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for scoping reviews
VD
Vaginal delivery
WHO
World Health Organization
JBI
Joanna Briggs Institutes
SSC
Skin-to-skin contact
BFHI
Baby Friendly Hospital Initiative

**Declarations**

**Ethical approval**

Ethical approval was not required for this paper

**Consent for publication**

Not applicable.

**Competing interests**

The authors declare that they have no competing interest associated with this study.

**Funding**


**Author information**

**Yunet Ulfa**, Ph.D.
Graduate School of Nursing Science, St. Luke's International University, Tokyo Japan
E-mail: 17dn901@slcn.ac.jp

**Naoko Maruyama**, RN, CNM, PhD
Graduate School of Nursing Science, St. Luke's International University, Tokyo Japan
E-mail: naoko-maruyama@slcn.ac.jp

**Yumiko Igarashi**, RN, CNM
Graduate School of Nursing Science, St. Luke's International University, Tokyo Japan
E-mail: 19dn002@slcn.ac.jp

**Shigeko Horiuchi**, RN, CNM, PhD
Graduate School of Nursing Science, St. Luke's International University, Tokyo Japan
Author contributions

Y.U. contributed to the conception, formal analysis, methodology, software, and writing of the original draft presentation and design of this study; N.M. was involved in the critical appraisal, writing-review and editing; Y.I. was involved in the critical appraisal, writing-review and editing; S.H. was involved in developing the overall concept of the study, funding acquisition, supervision, validation, and writing-review and editing. All authors have read and approved the final manuscript.

ACKNOWLEDGEMENTS

We thank Dr. Edward Barroga (https://orcid.org/0000-0002-8920-2607), Medical and Nursing Science Editor and Professor of Academic Writing at St. Luke’s International University for his editorial review of the manuscript.

References


48. Pérez-Escamilla R. Breastfeeding in the 21st century: How we can make it work. Social science & medicine 2020, 244, 112331. https://doi.org/10.1016/j.socscimed.2019.05.036

Figures
Figure 1
Flow diagram of study selection

Figure 2
Percentages of early initiation of breastfeeding (≤ 1 hr)
Figure 3

Percentages of late initiation of breastfeeding (> 1 hr)

Figure 4

Percentages of exclusive breastfeeding at hospital discharge
Figure 5

Percentages of exclusive breastfeeding one month after delivery

Figure 6

Percentages of exclusive breastfeeding three months after delivery
**Figure 7**
Percentages of exclusive breastfeeding six months after delivery

**Figure 8**
Percentages of any breastfeeding six months after delivery

**Supplementary Files**
This is a list of supplementary files associated with this preprint. Click to download.