

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

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## Research

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# 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.

## 1. Background

Cesarean section (C-section) is an invasive delivery procedure performed via abdominal and uterine incisions to save the mother and baby from a high-risk vaginal delivery (VD) [1]. C-section has been increasing worldwide and has surpassed the percentage set by the World Health Organization (WHO) (i.e., 5%-15%) [2]. Maternal request has been reported as one of the reasons for the increasing number of C-section [2,3]

C-section can be a necessary lifesaving procedure. However, performing C-section without any medical indication has been correlated with higher maternal mortality, and maternal and infant morbidity [4]. Moreover, C-section has been attributed to increased complications of subsequent deliveries and breastfeeding experience [2]. Previous studies have shown that women who had C-section are less likely to breastfeed and delay their breastfeeding initiation, which is an important predictor of continued breastfeeding [5-7]

Breastfeeding is considered to provide the best nutrition to infants and reduce infant morbidity significantly. The WHO recommends starting breastfeeding within one hour after delivery and to continue exclusive breastfeeding up to six months [8]. Globally, 44% of newborns are breastfed within the first hour after birth [9]. A population-based study in Ethiopia found that women undergoing a C-section had an 86% lower rate of early initiation of breastfeeding [10]. In Canada reported 4.3% women did not initiate breastfeeding after C-section[11]. Parity, type of delivery, time from birth to first contact with the mother, and socioeconomic status influence the success of breastfeeding [12]. The type of delivery has a considerable association with breastfeeding practices, and C-section is considered to have a negative effect on early breastfeeding initiation [6]. To the best of our knowledge, there has been no scoping review on the rate of breastfeeding from early initiation of breastfeeding up to 6 months after C-section, as well as the metasyntheses of qualitative studies on barriers to breastfeeding after C-section.

## 2. Aims

This scoping review aims to systematically collect, assess, and map the existing literature regarding the rate of breastfeeding from its early initiation up to 6 months after C-section, as well as the breastfeeding experiences of mothers after C-section.

## 3. Methods

This scoping review used the methodological framework of Joanna Briggs Institutes (JBI) of 2017 and was conducted in accordance with the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR). The JBI framework comprises the following elements: *identify* relevant studies in accordance with the research objectives, *select* eligible studies, *chart* the data, *summarise*, and *report* the results [13].

### 3.1 Eligibility criteria

The inclusion criteria and exclusion criteria set for this study were (Table 1);

Table 1  
Study inclusion and exclusion criteria

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

## 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 2  
Summary of results of included studies

NO	Authors	Year	Country	Study Design	Objectives	Population	Summary of Results	Other factors associated with breast feeding initiation and exclusive breastfeeding	Summary of Critical Appraisal
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	<ul style="list-style-type: none"> <li>• Mothers who gave birth by CS had a delay in their early initiation of breastfeeding.</li> <li>• Their babies were prescribed formula milk</li> <li>• Postdelivery formula milk or prelacteal feeding had no effect on exclusive breastfeeding one month after delivery.</li> </ul>		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	<ul style="list-style-type: none"> <li>• Many mothers who gave birth by CS had weaned their babies three months after birth.</li> <li>• The reason for this was related to personality traits and sociodemographic factors, not to the type of delivery.</li> </ul>		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	<ul style="list-style-type: none"> <li>• Breastfeeding initiation within 30 minutes after delivery was associated with a higher chance of breastfeeding at one and three months after delivery.</li> </ul>	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	<ul style="list-style-type: none"> <li>• CS was a barrier to breastfeeding initiation of reproductive age women in Puerto Rico</li> </ul>	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	<ul style="list-style-type: none"> <li>• CS had less mother-infant contact experiences.</li> <li>• CS had less mothers breastfeeding their babies at almost all time periods</li> </ul>		Moderate quality

NO	Authors	Year	Country	Study Design	Objectives	Population	Summary of Results	Other factors associated with breast feeding initiation and exclusive breastfeeding	Summary of Critical Appraisal
6	Al-Sahab et al. [21]	2010	Canada	Quantitative, cohort study	To investigate the rate of breastfeeding 6 months after delivery	CS = 1456 VD = 4146	<ul style="list-style-type: none"> <li>• Exclusive breastfeeding was correlated with the type of delivery.</li> <li>• Pain and discomfort due to C-section effect may prevent the mother to breastfed.</li> </ul>	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.	Moderate quality
7	Zanardo et al. [26]	2010	Italy	Quantitative, cohort study	To evaluate breastfeeding rate postdelivery up to six months after CS and VD	CS = 398 VD = 1496	<ul style="list-style-type: none"> <li>• Both elective and emergency CS had negatively effects on breastfeeding.</li> </ul>		Moderate quality
8	Ahluwalia, Li, & Morrow [36]	2012	United States of America	Quantitative, cohort study	To know the corelation between type of delivery and breastfeeding	CS = 489 VD = 1157	<ul style="list-style-type: none"> <li>• No significant correlation between type of delivery and breastfeeding initiation.</li> <li>• Women with assisted deliveries need additional support.</li> </ul>		Moderate quality
9	Liu, Zhang, Liu, Li, & Li [23]	2012	China	Quantitative, cohort study	To examine the corelation between type of delivery and method of breastfeeding	CS = 22462 VD = 409242	<ul style="list-style-type: none"> <li>• Women who had CS were less likely to exclusively breastfeed than women who had VD.</li> </ul>		High quality
10	Watt et al. [22]	2012	Canada	Quantitative, cohort study	To investigate the relationship between type of delivery and breastfeeding initiation and continuance up to six weeks after delivery	CS = 826 VD = 1668	<ul style="list-style-type: none"> <li>• The type of delivery was not a determining factor of breastfeeding initiation in the early post-discharge period.</li> </ul>		Moderate quality
11	Albokhary & James [33]	2014	Saudi Arabia	Quantitative, Cross sectional	To examine whether the type of delivery influenced the breastfeeding practice	CS = 30 VD = 30	<ul style="list-style-type: none"> <li>• Women who had CS were less likely to initiate breastfeeding and likely to introduce formula milk.</li> <li>• Pain after birth due to CS had negative effects on breastfeeding.</li> </ul>		Moderate quality

NO	Authors	Year	Country	Study Design	Objectives	Population	Summary of Results	Other factors associated with breast feeding initiation and exclusive breastfeeding	Summary of Critical Appraisal
12	Berde & Yalcin [15]	2016	Nigeria	Quantitative, Cross sectional	To recognize the factors associated with Early Initiation of Breast Feeding (EIBF)	CS = 263 VD = 11508	• Mothers who had VD had three times higher early initiation of breastfeeding than mothers who had CS.	breastfeeding initiation: mother's age, education, ANC visit, place of delivery, baby birth weight, occupation, wealth Index, and type of place of residence	High quality
13	Hobbs, Mannion, McDonald, Brockway, & Tough [11]	2016	Canada	Cohort study	To evaluate the correlation between type of delivery and breastfeeding initiation	CS = 739 VD = 2279	• 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.		High quality
14	Kiani et al. [16]	2017	Nicaragua	Quantitative, cross sectional	To investigate the correlation between type of delivery and breastfeeding	CS = 10 VD = 147	• 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.	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	High quality
15	Chen et al. [5]	2018	China	Quantitative, cohort study	To identify the potential effects of CS on breastfeeding practices and breastfeeding duration	CS = 387 VD = 567	• 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.		High quality

NO	Authors	Year	Country	Study Design	Objectives	Population	Summary of Results	Other factors associated with breast feeding initiation and exclusive breastfeeding	Summary of Critical Appraisal
16	Ezeh et al. [17]	2019	Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, The Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo	Quantitative, cross sectional	To investigate the possible characteristics influencing early initiation of breastfeeding in 13 members of ECOWAS	CS = 2966 VD = 73763	• Mothers who received CS had less early initiation of breastfeeding than mothers who received VD.	Breastfeeding initiation: household level,  mothers' first delivery, delivery setting.	High quality
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 VD = 315	• 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 VD = 2325	• 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 VD = 2362	• 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 [18]	2020	Ghana	Quantitative, cross sectional	To examine the percentage of breastfeeding and factors related to the initiation of breastfeeding	CS = 1663 VD = 13642	• 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 VD = 517	• 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

NO	Authors	Year	Country	Study Design	Objectives	Population	Summary of Results	Other factors associated with breast feeding initiation and exclusive breastfeeding	Summary of Critical Appraisal
22	Gedefaw, Goedert, Abebe, & Demis [19]	2020	Ethiopia	Quantitative, cross sectional	To assess the impact of CS on breastfeeding initiation	CS = 165 VD = 6950	• CS was a significant factor associated with the late initiation of breastfeeding		Moderate quality
23	Hoang Nguyen et al.[37]	2020	Vietnam	Quantitative, cohort study	To evaluate the effects of CS on breastfeeding practices from delivery to 12 months postpartum	CS = 654 VD = 1061	• There were lower rates of early initiation of breastfeeding by mothers who underwent CS due to prelacteal feeding of their infants.		Moderate quality
24	Paksoy Erbaydar & Erbaydar [35]	2020	Turkey	Quantitative, cohort study	To determine the relationship between CS and early breastfeeding practices among primiparas	CS = 417 VD = 360	• Women who had CS had late breastfeeding initiation and non-exclusive breastfeeding during the three days following delivery.		Moderate quality
25	Baxter, 2006 [24]	2006	England	Qualitative, focus group discussion	To explore the experiences of feeding CS babies	CS = 11	• The reasons for stopping breastfeeding were the perception of insufficient milk and inconvenience, difficulty with attachment, pain, and lack of support		Moderate quality
26	Chaplin et al. [27]	2016	Queensland, Australia	Qualitative, interpretive phenomenological research	To explore the experiences of women with breastfeeding problems	CS = 8	• 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		High quality
27	Tully, Kristin P. & Ball [25]	2014	Northeast England	Qualitative, semistructured, open-ended interview	To examine the maternal perspectives of mechanisms that contribute to the difficulty of early breastfeeding after CS	CS = 115	• The barriers to breastfeeding after CS were maternal mobility limitations, positioning difficulties, and frustration at the need for assistance.		High quality

**Figure 2** shows that the percentages of early initiation of breastfeeding ( $\leq 1$  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 8** 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 3  
Themes and quotes of breastfeeding experiences after C-Section

Theme	Category	Subcategory	Quotes
Barriers to breastfeeding after CS	Mother's physical discomfort	Limited maternal mobility	"I can't get up...felt bit let down by that [limited mobility]" [25]
		Positioning difficulties	"Very traumatised after labour, baby did not latch properly and I found it painful" [24]
		Pain of scare	"Too painful to lift and carry baby post CS" [24,27] "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" [27]
	Low self-efficacy	Feelings of failure	"I don't want to try anymore...feel stressed and the baby has mucus. I'm disappointed that I couldn't [breast feed]." [25]
	Lack of breastfeeding knowledge	False belief	"Not having enough breast milk – baby was still hungry no matter how long I fed her" [24]
		Misperception of insufficient milk	"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" [24]
	Inadequate support from healthcare provider	Separation of mother and baby	"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" [27]
		Unnecessary formula supplementation	"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" [27]
		Lack of professional skills on breast latching	"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" [24]
CS, Cesarean section			

## 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 as 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.

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### 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.

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## Figures

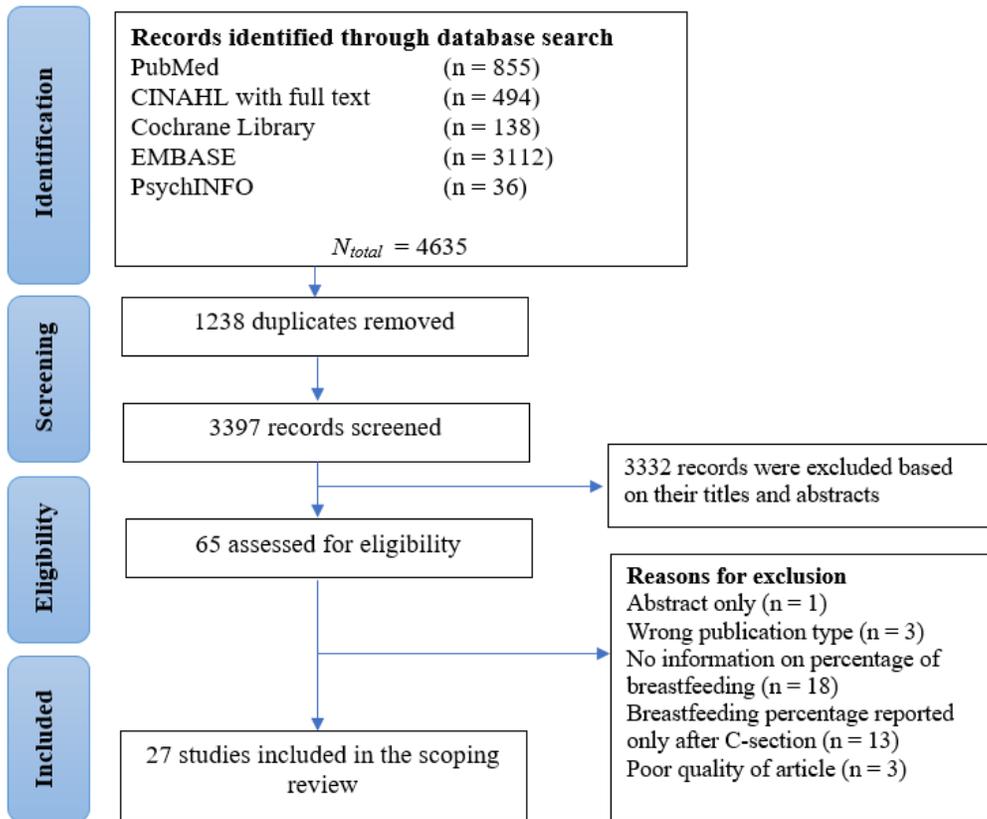
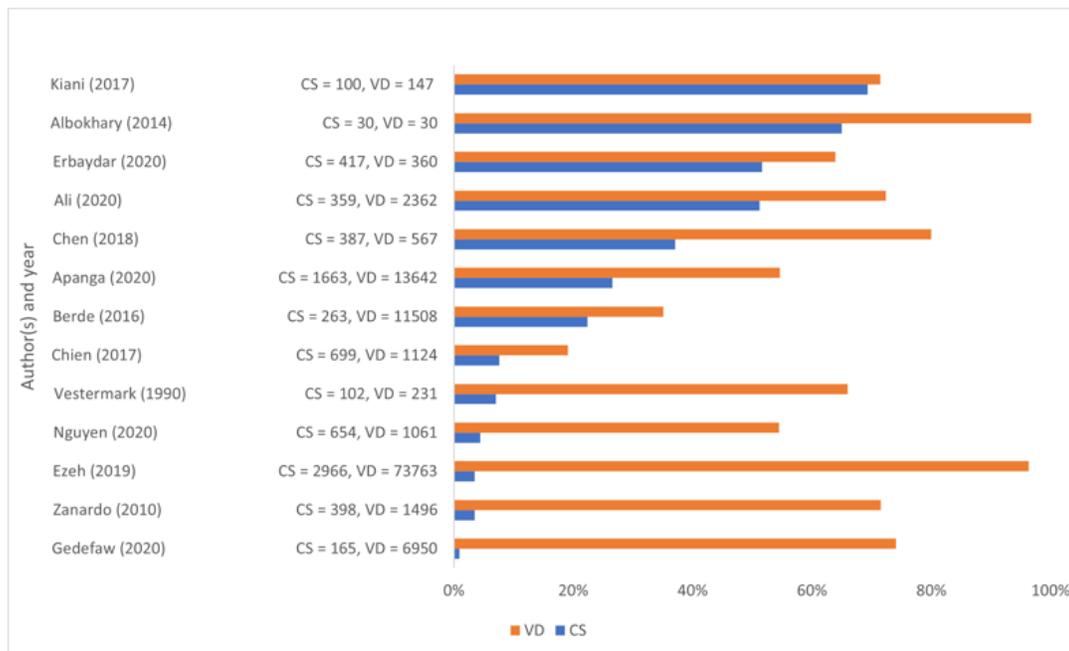


Figure 1

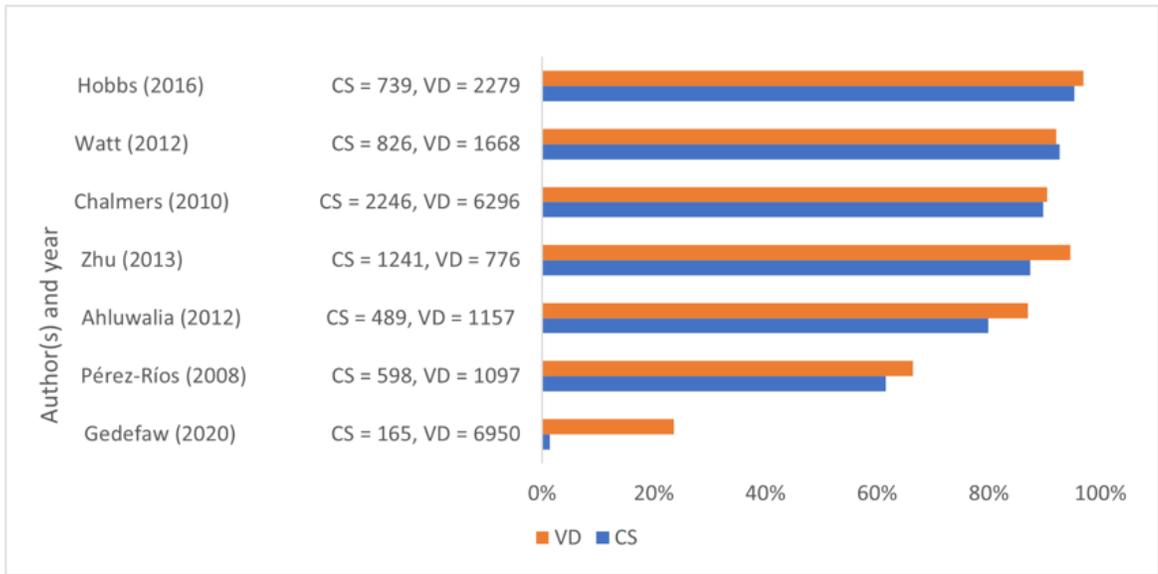
Flow diagram of study selection



VD, Vaginal Delivery (population)  
CS, C-Section (population)

Figure 2

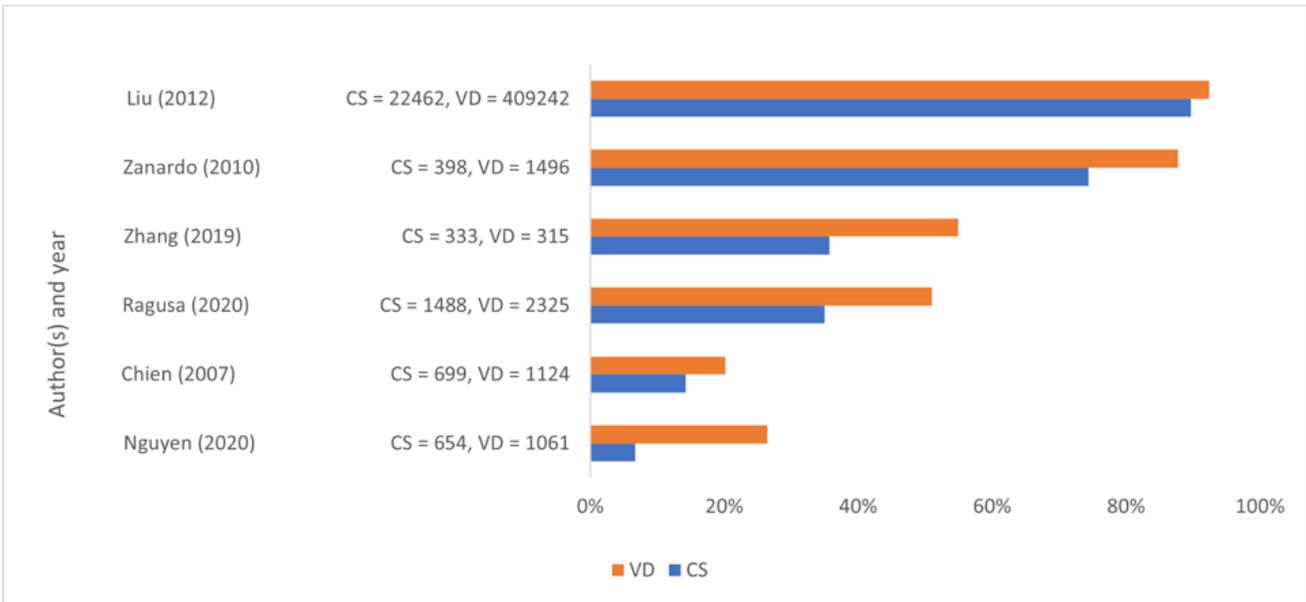
Percentages of early initiation of breastfeeding ( $\leq 1$  hr)



VD, Vaginal Delivery (population)  
 CS, C-Section (population)

Figure 3

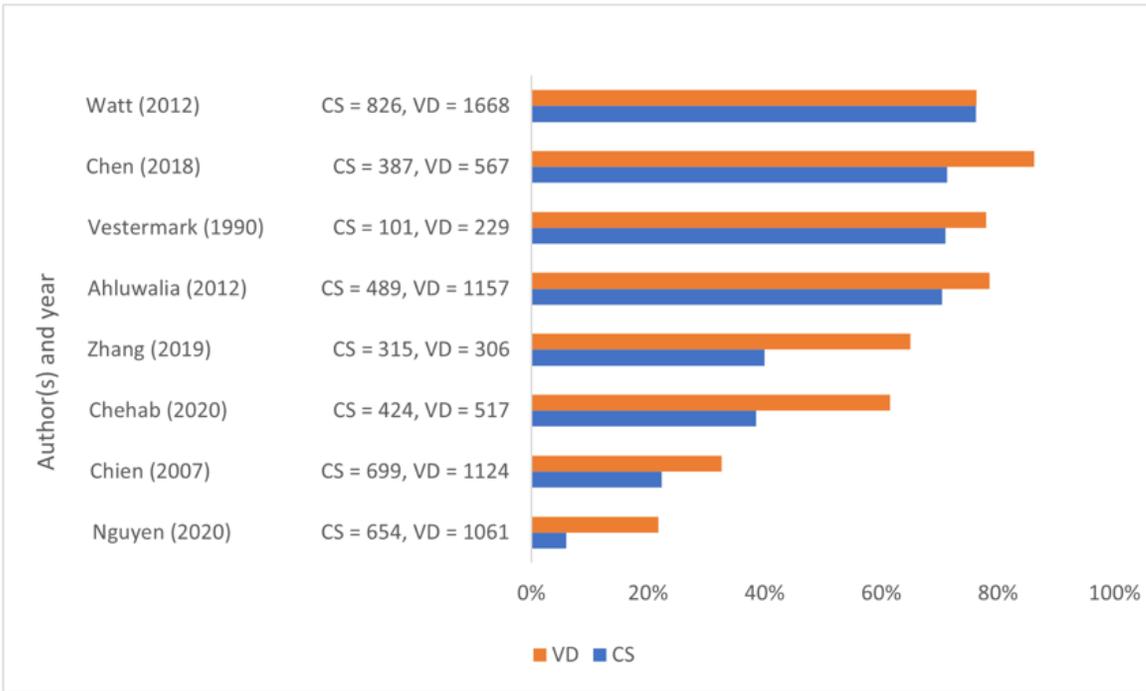
Percentages of late initiation of breastfeeding (> 1 hr)



VD, Vaginal Delivery (population)  
 CS, C-Section (population)

Figure 4

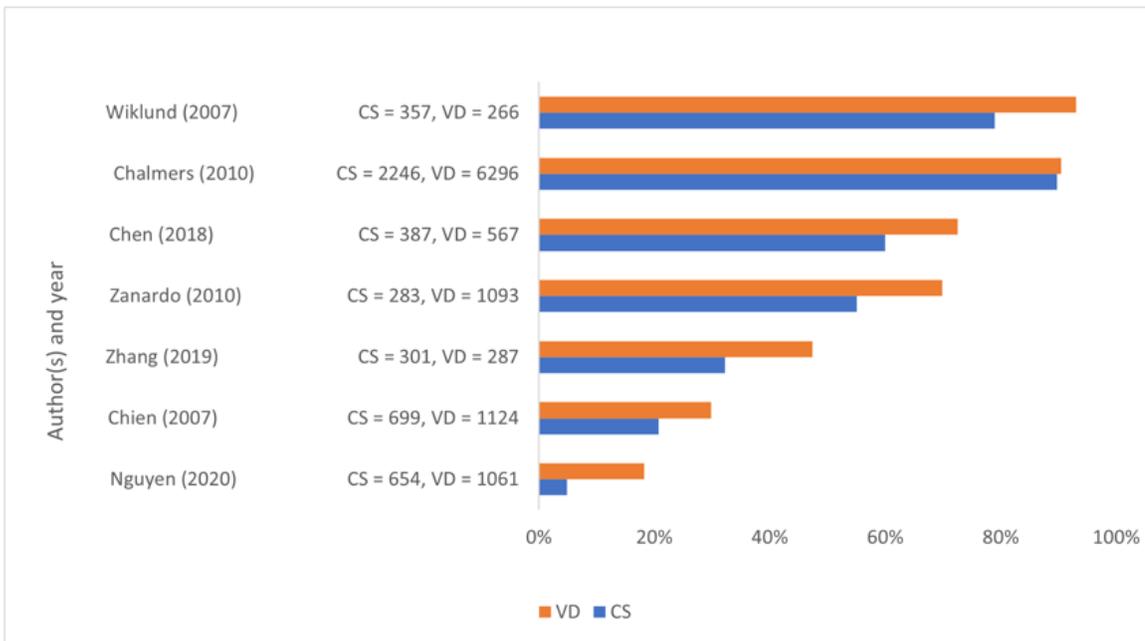
Percentages of exclusive breastfeeding at hospital discharge



VD, Vaginal Delivery (population)  
 CS, C-Section (population)

**Figure 5**

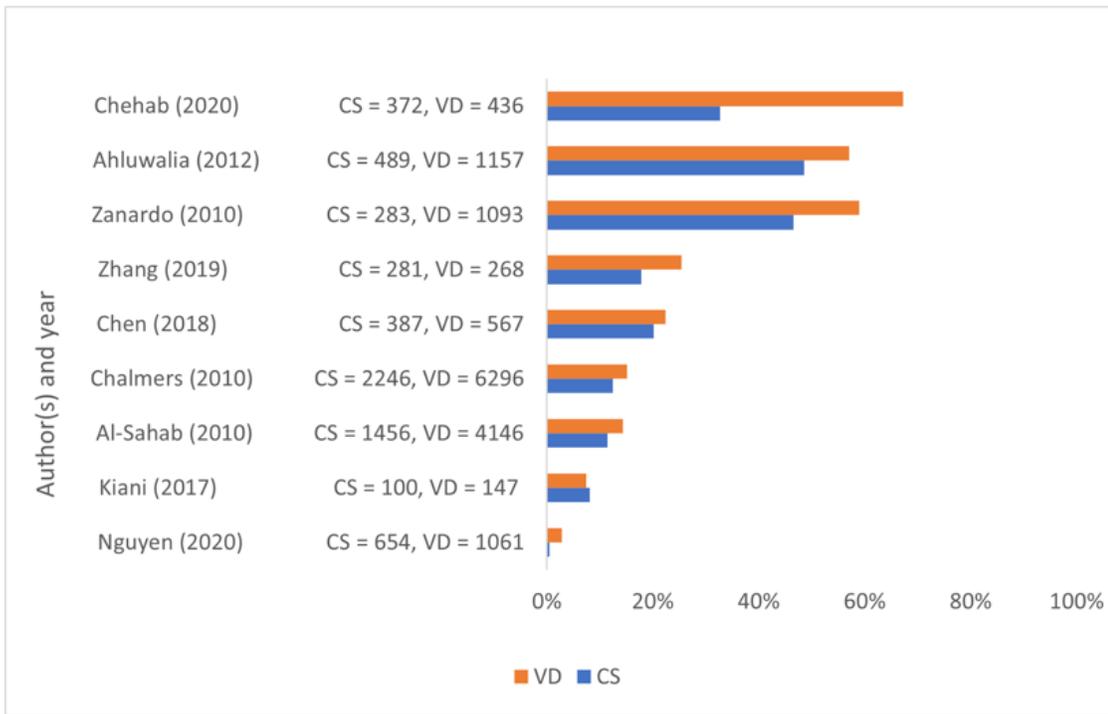
Percentages of exclusive breastfeeding one month after delivery



VD, Vaginal Delivery (population)  
 CS, C-Section (population)

**Figure 6**

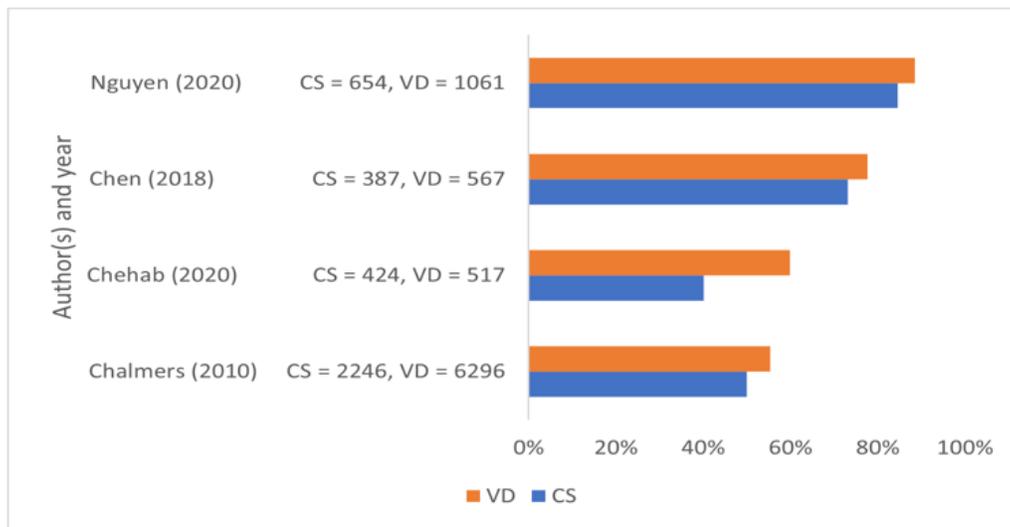
Percentages of exclusive breastfeeding three months after delivery



VD, Vaginal Delivery (population)  
 CS, C-Section (population)

Figure 7

Percentages of exclusive breastfeeding six months after delivery



VD, Vaginal Delivery (population)  
 CS, C-Section (population)

Figure 8

Percentages of any breastfeeding six months after delivery

## Supplementary Files

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