



Review Article

Breastfeeding self-efficacy in Asia and Pacific: Scoping review

Artemio Morado Gonzales Jr

Department of Midwifery, College of Arts, Sciences and Technology, Occidental Mindoro State College, Philippines

ARTICLE INFO

Received 09 March 2020  
Accepted 24 April 2020

Available online at:  
<http://npt.tums.ac.ir>

**Key words:**  
breastfeeding;  
breastfeeding interventions;  
breastmilk feeding;  
exclusive expression;  
scoping review

ABSTRACT

**Background & Aim:** Breastfeeding self-efficacy refers to a mother's perceived ability to breastfeed her new infant and is a salient variable in breastfeeding duration. This study aimed to review the current state of knowledge, including the predictors and interventions, and discuss relevant findings and gaps in the breastfeeding self-efficacy theory.

**Methods & Materials:** Scoping review of peer-reviewed articles between the years of 2009-2019. Using the keyword breastfeeding, self-efficacy, and breastfeeding confidence, an extensive search of the PubMed, Scopus, and ProQuest databases was performed. A total of 1,200 publications were found, from which, after excluding duplication and non-related papers, only 34 publications were considered relevant to the subject and examined in-depth. This study utilized the data extraction form developed by the Joanna Briggs Institute.

**Results:** There were various predictors of breastfeeding self-efficacy, such as fetal attachment, social support, and positive prenatal experience. Studies have claimed that educational programs through educational sessions, information packages, and peer education have a positive effect on breastfeeding self-efficacy and the duration of exclusive breastfeeding.

**Conclusion:** To facilitate successful breastfeeding, health care institutions could promote interventions regarding positive breastfeeding experiences. The data suggest that breastfeeding self-efficacy moves beyond our current understanding of motherhood. However, this evidence is limited to the study conducted in western and developed countries, and results are coming from studies with limited sample size. To provide an assessment and information on Asian mothers in developing countries, data are needed to describe their experiences and to examine factors associated with breastfeeding self-efficacy in this population.

Introduction

Human milk provides optimal infant nutrition and has short- and long-term health benefits for both infants and mothers. A broad array of health benefits of breastfeeding provides strong justification to protect, promote, and support breastfeeding (1,2,3). The World Health Organization recommends exclusive breastfeeding in the initial six months of life and to continue breastfeeding up to 2 years of age (4). A focus both on initiating and continuing breastfeeding is very important to reduce the risk of failure on breastfeeding maintenance (5).

Various studies have focused on the association between the initiation and duration of breastfeeding. Other studies have

also focused on the effects of breastfeeding on mothers' advanced age, educational level, socioeconomic status, breastfeeding education, social support, and infant's birth weight and age of gestation (6,7). Furthermore, the literature provides studies on the association of mothers' beliefs that their milk is inadequate, the failure to provide adequate information and support from healthcare workers, breast problems due to incorrect breastfeeding, and the increased use of bottle-feeding/pacifiers with early discontinuation of breastfeeding (8).

Recently, a study effectively identified the relationships between maternal psychosocial factors and breastfeeding initiation (9). Furthermore, it was also found that contrary to popular conceptions, breastfeeding appears to be a learned skill. If mothers achieved a level of confident commitment before birth, they were able to withstand the lack of support from

\*Corresponding Author: Artemio Morado Gonzales Jr, Postal Address: Occidental Mindoro State College, Philippines. E-mail: [jomergonzalesjr21@gmail.com](mailto:jomergonzalesjr21@gmail.com)

DOI: <https://doi.org/10.18502/npt.v8i1.4489>

significant others and common challenges that occurred as they initiated breastfeeding. Without the element of confident commitment, a decision to breastfeed appeared to fall apart once challenged (10).

Breastfeeding self-efficacy refers to a mother's perceived ability to breastfeed her new infant and is a salient variable in breastfeeding duration as it predicts whether a mother chooses to breastfeed, how much effort she will expend, whether she will have self-enhancing or self-defeating thought patterns, and how she will emotionally respond to breastfeeding difficulties. In particular, efficacious (confident) mothers are more likely to choose to breastfeed, persist when confronted with problems, employ self-encouraging thoughts, and react positively to perceived difficulties (11).

Dennis's breastfeeding self-efficacy theory was anchored within the underpinnings of Bandura's self-efficacy, defined as an individual's confidence in his or her perceived ability to perform a specific task or behavior (12). Self-efficacy is composed of two parts: (a) outcome expectancy, the belief that a given action will produce a particular outcome, and (b) self-efficacy expectancy, an individual's conviction that one can successfully perform certain tasks or behaviors to produce the desired outcome (13). As it is utilized in the breastfeeding self-efficacy theory, it is assumed that it is important to note that mothers may believe that behavior will assist them in continuing to breastfeed but have little confidence in their ability to execute that behavior.

In self-efficacy judgments, four primary sources of information should be taken into consideration: (a) performance accomplishments (previous experience with the specific behavior), (b) vicarious experience (previous observation of the performance of the specific behavior), (c) verbal persuasion (encouragement of influential others), and (d) physiological responses (somatic reactions about autonomic arousal during anticipation or experience of a potentially stressful event) (12). In relation to breastfeeding self-

efficacy, a mother determines her ability to breastfeed her new infant based on whether she has previous breastfeeding experience, observed successful breastfeeding behaviors by others, or received encouragement from significant others to breastfeed. In addition, her current physiological and affective state, including fatigue, stress, and anxiety, is an important source of information through which she evaluates her ability to breastfeed (11).

Evidence has established key strategies to promote and endure breastfeeding (14). However, existing evidence that these interventions are limited in settings that should also consider the target population in households, communities, workplaces, and health systems (15,16). Moreover, there is substantial heterogeneity in breastfeeding practices within and across countries (17,18), especially in Asian countries (19,20). Some of the studies are limited to the review of tools to measure breastfeeding self-efficacy (21). Lastly, evidence in Asia and the Pacific concentrates on the consequences of non-breastfeeding (22,23) and scaling up intervention (24,25). This study aims to review the current state of knowledge, including the predictors and interventions, and discuss relevant findings and gaps in the breastfeeding self-efficacy theory.

## **Methods**

### *Study design*

The study was a scoping review that utilizes a meta-synthesis approach in a systematic review. It aims to map the key concepts rapidly underpinning a research area and the main source and types of evidence available (26), and involves the synthesis and analysis of a wide range of research and non-research materials to provide greater conceptual clarity about a specific topic or field of evidence (27). Scoping reviews provide a map of what evidence has been produced from disparate or heterogeneous sources as opposed to seeking only the best evidence to answer a

particular question related to policy or practice (28).

### *Identification of relevant studies and search strategies*

Using the keywords breastfeeding, self-efficacy, and breastfeeding confidence, an

extensive search of the PubMed, Scopus, and ProQuest was performed. As concepts associated with breastfeeding self-efficacy were identified, more specific search terms were undertaken to find current knowledge of breastfeeding self-efficacy (Table 1). The review was limited to studies published in peer-reviewed journals from 2009 to 2019.

**Table 1.** Search strategy for concepts and keywords

Database	Controlled and Natural Keywords
Scopus/ ScienceDirect	"breastfeeding self-efficacy" OR "breastfeeding self-efficacy" OR "breastfeeding self-efficacy" OR "breastfeeding self-efficacy" OR "breast feeding self-efficacy" OR "breastfeeding self-efficacy" OR "breastfeeding confidence" OR "breastfeeding confidence" OR "breast feeding confidence"
ProQuest	"breastfeeding self-efficacy" OR "breastfeeding self-efficacy" OR "breast feeding self-efficacy" OR "breastfeeding self-efficacy" OR "breastfeeding self-efficacy" OR "breastfeeding self-efficacy" OR "breastfeeding confidence" OR "breastfeeding confidence" OR "breastfeeding confidence"
PubMed	"breastfeeding self-efficacy"[All Fields] OR "breastfeeding self-efficacy"[All Fields] OR "breast feeding self-efficacy"[All Fields] OR "breast feeding self-efficacy"[All Fields] OR "breastfeeding self-efficacy"[All Fields] OR "breastfeeding self-efficacy"[All Fields] OR "breastfeeding confidence"[All Fields] OR "breastfeeding confidence"[All Fields] OR "breast feeding confidence"[All Fields] OR "breastfeeding self-efficacy"[MeSH Terms]

### *Study selection*

To be included, studies had to examine relevant findings based on breastfeeding Self-efficacy theory and conducted in Asia and the Pacific Region. Scoping searches indicated a lack of research in this area, and therefore included uncontrolled, nonrandomized, and randomized controlled studies and other studies reporting quantitative measures. All published studies reporting economic measures of health resource utilization and/or clinically related outcomes focused on clinical outcomes represent the provider and professional perspective, and humanistic outcomes represent the patient perspective (29) were considered. All papers had to be written in English. Also, review papers, expert opinions, single case or case series reports, abstracts, and studies not in a full-text form were excluded.

Studies were selected for review in a two-step process. First, the author reviewed the titles and abstracts, and second, the full-text articles. The process of selection

through stepwise inclusion and exclusion criteria is shown in Figure 1 using PRISMA (30). The decision in the screening process of the relevant papers is based on the context expertise of the author during the abstract review.

A total of 1,200 potential articles were identified through Scopus (n=204), Proquest (n=550), and PubMed (n=446). All of the 1,037 articles were reviewed after removing duplicates based on the inclusion and exclusion criteria. A total of 1,037 articles were compiled for further review of the titles. The 72 articles were reviewed, and exclusion criteria were applied to the full review. Some papers were not included for reasons such as no clinical or economic relevance as defined above; not written in English; expert opinions published in the expert collection; systematic review papers; studies on technical tools or psychometric assessment; wrong population as it refers to father's or partner efficacy; a wrong outcome which does not measure breastfeeding self-efficacy; and wrong setting that is not conducted in Asia and Pacific in order to reduce data extraction

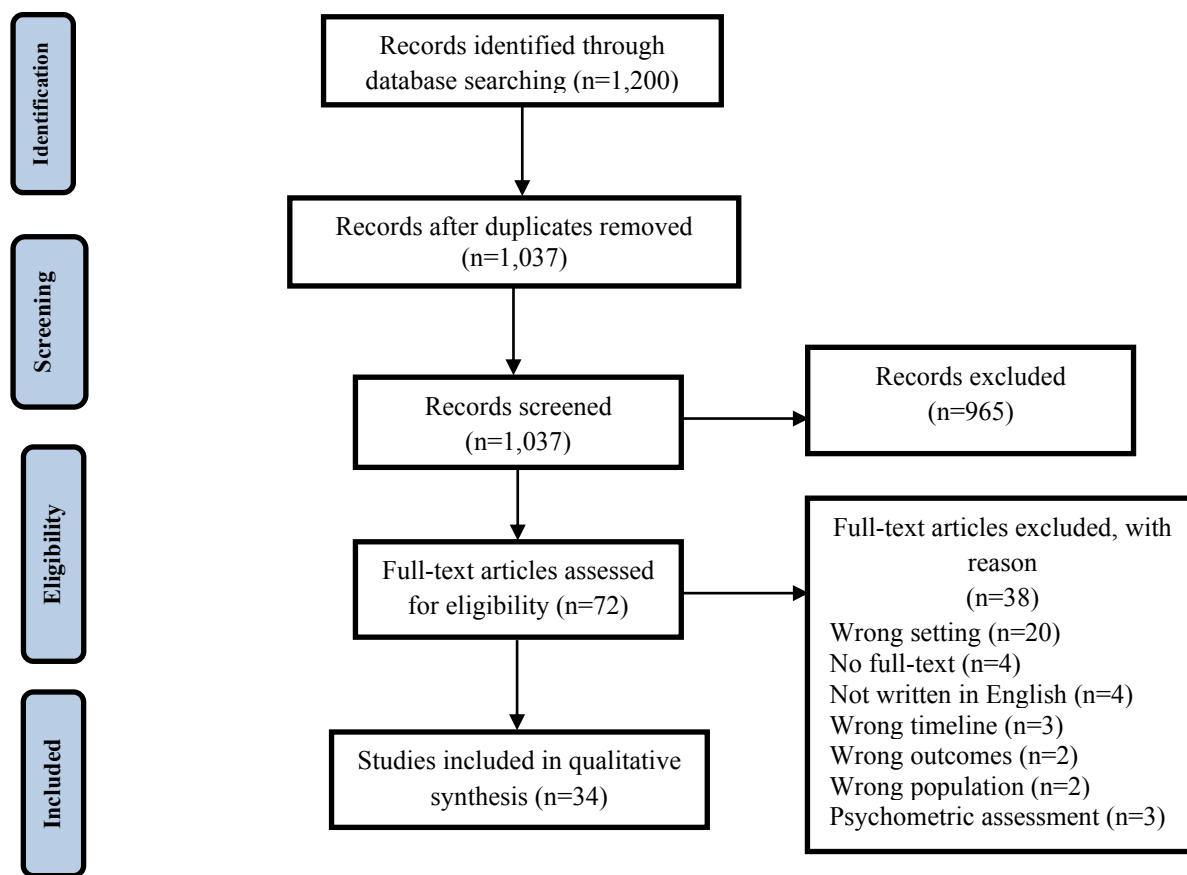
errors. Based on these findings, 34 articles were selected for data extraction.

*Data extraction and data charting*

Data were extracted from full-text journal articles meeting the inclusion criteria. The study utilized the data extraction form developed by the Joanna Briggs Institute (31), which includes a descriptive summary

of the main results organized based on the theoretical concept underpinning the review.

A draft analytic frame was developed to document selected studies into an Excel spreadsheet, including study characteristics such as year, country, methodology, study question, study design, participants, and outcomes. The results are reported in a narrative form focusing on the identified themes that emerged from the literature associated with breastfeeding self-efficacy.



**Figure1.** PRISMA flow diagram

**Results**

*Characteristics of reviewed articles*

The results of the analysis (Table 2) revealed that studies about breastfeeding self-efficacy in Asia and the Pacific mostly concentrate in Turkey (n=8), Australia (n=6), Iran (n=6), China (n=5), Hong Kong (n=3), Cyprus (n=1), Japan (n=1), Jordan (n=1), Saudi Arabia (n=1), Taiwan (n=1), and Vietnam (=1).

The 34 research projects have various types of research design in reporting: there are cross-sectional studies (n=18), randomized controlled trials (n=6), quasi-experimental studies (n=3), prospective observational studies (n=2), retrospective observational studies (n=2), interventional studies (n=2), and experimental two-group design (n=1).

### Predictors of Breastfeeding Self-efficacy

It has shown that successful maternal-attachment, positive social support (32,33,34,35,36), breastfeeding knowledge (37,38,39), psychosocial factors (40), previous breastfeeding experience, the timing of their decision to initiate breastfeeding (35,36), antenatal breastfeeding class attendance (35), husband's attitude toward breastfeeding (36), and breastfeeding success during early postpartum (41) are sought to be the common predictors of breastfeeding self-efficacy.

Moreover, studies revealed that as the mother perceived that breastmilk to be sufficient, the more she becomes confident in breastfeeding her child (42,43). On the other hand, it was also found that the mother's fatigue during the postpartum period was not associated with breastfeeding self-efficacy (44).

Another study claimed that breastfeeding self-efficacy was related to mothers' age,

mother's occupation, previous breastfeeding experience, and extent of breastfeeding in the hospital. The study also claimed that breastfeeding self-efficacy was significantly lower in women with postpartum depression (34). Moreover, studies revealed that the mode of delivery and mothers who held their babies immediately after birth had better breastfeeding self-efficacy (34,37). However, this result differed from a Turkish study stating that women who underwent vaginal birth, cesarean with epidural anesthesia, and cesarean with general anesthesia had similar levels of breastfeeding self-efficacy (45). In another study involving both multiparous and primiparous mothers found that the use of second-line strategies for feeding, such as nipple shields, syringe, cup, supply line, and bottle feeding, predicted lower breastfeeding self-efficacy. Nevertheless, the significantly lower BSES-SF score of women using a second-line strategy highlighted women have particular needs that require attention (46).

**Table 2.** Summary of the literature on Breastfeeding Self-Efficacy

No	Author/s	Year	Country	The main topic explored	Period	Sample	Research design	Outcomes	Limitations /Concerns
1	Cinar et al. (32)	2015	Turkey	Determine the relationship between maternal attachment, perceived social support, and breast self-sufficiency	Postpartum	122 mothers	Cross-sectional design	Successful maternal attachment and positive social support positively affect breastfeeding self-sufficiency (breastfeeding self-efficacy).	-limited to one geographic area -comparison with primiparous and multiparous was not made
2	Liu et al. (33)	2017	China	Examine the effect of a self-efficacy intervention on primiparous mothers' breastfeeding behaviors.	Antenatal to postpartum	130 primiparous mothers	Quasi-experimental design	Breastfeeding support program increases breastfeeding self-efficacy and the duration of breastfeeding exclusivity.	-non-random sample and recruitment of expectant mothers from university-affiliated hospitals after delivery
3	Ngo et al. (34)	2019	Vietnam	Explore factors related to breastfeeding self-efficacy and its predictors.	Postpartum	164 postpartum women	Cross-sectional design	Breastfeeding self-efficacy was related to mothers' age, mother's occupation, previous breastfeeding experience, mode of delivery, skin-to-skin contact with the baby, and extent of breastfeeding in the hospital. It was also positively correlated with social support and was significantly lower in women with more postpartum depression.	-unable to assess whether breastfeeding self-efficacy changes throughout the postpartum period -recruited only women who had given birth to full-term babies

*Breastfeeding self-efficacy in Asia and Pacific*

4	Yang et al. (35)	2016	China	Examine breastfeeding self-efficacy and identify its predictors in the early postpartum period.	Postpartum	571 postpartum mothers	Cross-sectional design	Predictors of breastfeeding self-efficacy in the early postpartum period are the intention of breastfeeding, support from husband, support from nurse/midwife, attending antenatal breastfeeding classes, time from childbirth to initiate breastfeeding, and previous breastfeeding experience.	-single-site research -breastfeeding self-efficacy was measured only once in the immediate postpartum period -lacking qualitative insights to substantiate quantities findings
5	Zhu et al. (36)	2014	China	Examine breastfeeding self-efficacy and identify its predictors in the antenatal period.	Antenatal	201 expectant mothers	Cross-sectional design	Predictors of breastfeeding self-efficacy are previous breastfeeding experience, previous experience of watching other mothers breastfeeding, the timing of their decision to breastfeed, social support, and their perceptions of their husband's attitudes towards breastfeeding.	-non-random sample and recruitment of expectant mothers from university-affiliated hospital -breastfeeding self-efficacy only before the start of breastfeeding
6	Bureu et al. (37)	2018	Turkey	Determine the relationship between breastfeeding self-efficacy of mothers and the starting time of supplementary food.	Postpartum	282 mothers	Cross-sectional design	There is a positive correlation between the starting time of supplementary food and breastfeeding self-efficacy.	-single-site research
7	Hadjiona, et al. (38)	2016	Cyprus	Assess breastfeeding self-efficacy among mothers after birth and explore their views with regards to the implementation of the '10 steps' during the first 48 hours.	Postpartum	216 mothers	Cross-sectional design	Mothers have limited experience of the '10 steps' during their hospital, leading to low exclusive breastfeeding and breastfeeding self-efficacy.	-low response rate -breastfeeding self-efficacy was assessed within the first 48 hours -single-site research
8	Ku et al. (39)	2010	Hong Kong	Explore the relationships between breastfeeding knowledge, self-efficacy, and demographic factors on breastfeeding patterns among primiparous women	Postpartum	82 subjects who had a normal vaginal delivery	Cross-sectional design	breastfeeding knowledge positively correlated with breastfeeding self-efficacy, and breastfeeding self-efficacy is significantly associated with exclusive breastfeeding.	-non-random sampling and use of only one study site for data collection -collected breastfeeding patterns at six weeks pose recall bias -confounders such as breastfeeding attitude, breast condition, and presence of postpartum depression were not included.
9	de Jager et al. (40)	2014	Australia	Investigate the psychosocial variables associated with the ability to breastfeed to six months postpartum exclusively.	Pregnancy to postpartum	174 women who had given birth between six months to two years	Retrospective study	Psychosocial factors are likely to play a significant role in the maintenance of exclusive breastfeeding for six months post-birth Women exclusively breastfed to six months postpartum exhibited higher breastfeeding self-efficacy.	-antenatal experiences may have influenced the woman's recall and bias -sampling issues in online research (self-selection bias)
10	Kilci et al. (41)	2016	Turkey	Determine the correlation between breastfeeding success in the early postpartum period and the perception of self-efficacy in breastfeeding and breast problems in late postpartum.	Postpartum	200 mothers	Cross-sectional design	Breastfeeding success in the early postpartum period reduced breast problems and increased the perception of breastfeeding self-efficacy in the late postpartum period.	-use of convenient sample
11	Gökçeoğlu et al.(42)	2017	Turkey	Investigate the relationship between perceived insufficient milk and breastfeeding self-efficacy.	Postpartum	200 mothers of hospitalized infants	Cross-sectional design	Breastfeeding self-efficacy level increased, the milk was perceived to be more sufficient.	-sampling technique not specified -single-site research

12	Kent et al. (43)	2015	Australia	Assess the effects of actual measurement of milk supply to mothers' breastfeeding confidence.	Postpartum	120 mothers	Cross sectional design	A higher measurement of actual milk supply improves breastfeeding confidence.	-low response rate -weighing an infant before and after every feeding for 24 hours
13	Fata et al. (44)	2019	Turkey	Examine the relationship between fatigue and breastfeeding self-efficacy.	Postpartum	352 mothers	Cross-sectional design	Mothers' fatigue during the postpartum period was not associated with breastfeeding self-efficacy.	- single-site research
14	Alus Tokat et al. (45)	2015	Turkey	Compare the breastfeeding outcomes and breastfeeding self-efficacy scores, in the first 24 hours postpartum after vaginal or cesarean birth	Antepartum to postpartum	386 mothers	Cross-sectional design	Women underwent vaginal birth, cesarean with epidural anesthesia, and cesarean with general anesthesia has a similar level of breastfeeding self-efficacy.	-women received epidural anesthesia during vaginal birth are not included -purposive sampling was used in the study - breastfeeding problems were assessed by mother perception, not medically - evaluated the breastfeeding results within the first 24 postpartum hour
15	Keemer (46)	2013	Australia	Examine breastfeeding self-efficacy in a sample of women using second-line strategies for feeding healthy term infants in the first week postpartum.	Postpartum	128 postpartum mothers	Retrospective study	The women using second-line strategies had significantly lower BFSE than those who did not use these strategies.	-individualized assessment and intervention must be done to support breastfeeding women.
16	Lee et al. (47)	2019	Taiwan	Examine the effectiveness of breastfeeding education and peer support groups during the first week and the fifth to sixth week postpartum in terms of breastfeeding self-efficacy and exclusive breastfeeding rate.	Postpartum	214 postpartum women	quasi-experimental design	Breastfeeding education and support groups during early postpartum hospitalization may increase mothers' breastfeeding self-efficacy and exclusive breastfeeding rate.	-design prevented the study from a fully implemented randomized assignment -limited only in a single hospital -lower participation rate in the intervention group -providers of the intervention are recruited inside the unit for implementation -the study did not restrict group size -implementation of enormous intervention turning confusion which element is effective
17	Ip et al. (48)	2016	China	Examine the relative effect of maternal breastfeeding self-efficacy and selected relevant factors on the exclusive breastfeeding rate at 6 months postpartum.	Postpartum	562 in-hospital mothers	Prospective cohort study	The mother has higher breastfeeding self-efficacy more likely to breastfeed with in 72 hours postpartum exclusively.	-mothers in the study were highly educated working women who delivered in a cosmopolitan city
18	de Jager et al. (49)	2015	Australia	Examine the effect of psychosocial factors on exclusive breastfeeding duration to six months postpartum	Antenatal to postpartum	125 pregnant women	Prospective study	Self-efficacy, psychological adjustment, body image, motivation, and confidence are all important psychosocial factors implicated in a woman's ability to maintain exclusive breastfeeding over time.	-the small study sample for path analysis - inclusion of both primigravida and multigravida women together in the analysis -high attrition rate

*Breastfeeding self-efficacy in Asia and Pacific*

19	Loke et al. (50)	2013	Hong Kong	Explore the maternal breastfeeding self-efficacy, breastfeeding behaviors of newborns, and the relationship with breastfeeding outcomes at 6 weeks postpartum.	Postpartum	199 postnatal women	Cross sectional design	Maternal breastfeeding confidence and newborn breastfeeding behavior are strong predictors of breastfeeding duration as well as exclusivity.	-non-random sample -the intervention was only offered for 1-hour prenatal and for 1-hour within 24 hours after delivery -one site study
20	Faridvand et al.(51)	2018	Iran	Determine the predictors of breastfeeding performance in women.	Postpartum	220 breastfeeding women	Cross-sectional design	Increasing breastfeeding self-efficacy in women improves their breastfeeding performance.	-variables do not necessarily indicate causal relationships -only women able to read and write and with a singleton birth were included in the study -sampled only from urban centers
21	Gerçeket al. (52)	2017	Turkey	Investigate the relationship between breastfeeding self-efficacy and the LATCH score.	Postpartum	303 postpartum women	Cross-sectional design	maternal breastfeeding self-efficacy was correlated with LATCH scores in the early postpartum period.	-single-site research -breastfeeding self-efficacy and LATCH scores only assessed in the first 24 hours of birth -women who were included in this study had a similar socioeconomic status
22	Mirghafourvand et al.(53)	2018	Iran	Examine the relationship between breastfeeding self-efficacy and quality of life	Postpartum	547 breastfeeding mothers	Cross sectional design	There is a direct and significant relationship between breastfeeding self-efficacy and quality of life.	-does not exactly reflect a causal relationship -sampled exclusively from one city -most of the respondents were multiparous
23	Khreshheh et al. (54)	2018	Saudi Arabia	Examine the association between prenatal breastfeeding self-efficacy type of feeding at 4 weeks postpartum.	Prenatal to postpartum	200 pregnant women	Cross sectional design	Prenatal breastfeeding self-efficacy can be predictive of breastfeeding exclusivity at 4 weeks postpartum.	-use of convenient sample -limited to urban public hospitals -unavailability of the data regarding women who initiated breastfeeding
24	Araban et al. (55)	2018	Iran	Determine the effects of a prenatal breastfeeding self-efficacy intervention on breastfeeding self-efficacy and breastfeeding outcomes.	Prenatal to postpartum	120 low-risk, nulliparous women	Randomized controlled trial	At 8 weeks postpartum, participants in the intervention group had significantly higher breastfeeding self-efficacy and rates of exclusive breastfeeding than those in the control group	-limited to one geographic area -reasons for breastfeeding discontinuation were not collected -not blinded in group allocation
25	Chan et al. (56)	2016	Hong Kong	Investigate the effectiveness of a self-efficacy-based breastfeeding educational program (SEBEP) in increasing breastfeeding self-efficacy, breastfeeding duration, and exclusive breastfeeding rates.	Antenatal to postpartum	71 primigravida	Prospective randomized controlled trial	self-efficacy-based breastfeeding educational program increases breastfeeding self-efficacy for those who received compared to those who not.	-small sample size -high refusal rate -limited to one geographic area -intervener was the researcher of this study -only highly motivated participants joined the study
26	Ansari et al. (57)	2014	Iran	Determine the effect of an educational program on breastfeeding self-efficacy and duration of exclusive breastfeeding	Prenatal to postpartum	120 nulliparous pregnant women	Randomized controlled trial	There is a significant difference in the self-efficacy scores in the intervention group before and after an intervention.	-not able to educate participants in the intervention group according to their education level



27	Nichols et al. (58)	2009	Australia	Increase breastfeeding self-efficacy and actual breastfeeding through an intervention based on Bandura's self-efficacy theory	Antenatal to postpartum	90 pregnant women	Intervention study design	Breastfeeding self-efficacy interventions increases breastfeeding self-efficacy and breastfeeding exclusivity duration.	-small convenience sample -information was collected only at 4 weeks postpartum -the intervention was provided at the end of the prenatal period -workbook format was the intervention vehicle
28	Wu et al. (59)	2014	China	Evaluate the effects of a breastfeeding intervention on primiparous mothers' breastfeeding self-efficacy, breastfeeding duration, and exclusivity.	Postpartum	74 primiparous mothers	Experimental pre-test and posttest, two-group design	An intervention aimed at increasing self-efficacy has a significant impact on maternal breastfeeding self-efficacy and short-term breastfeeding outcomes.	-small convenience sample - single-site research - potential misclassification of a few values -majority of the participants had a cesarean section -all collected through self-report or telephone interview, social desirability may have a bias on the study findings
29	Thorpe et al. (60)	2018	Australia	Establish the effect on maternal breastfeeding self-efficacy of calls made to a nurse-led parenting helpline.	Postpartum	women presenting a breastfeeding concern as a	Cross sectional design	A small significant increase in breastfeeding self-efficacy was found after calls.	-not allow follow up to assess the actions and breastfeeding outcomes -some nurses had not been trained in phone counseling
30	Abuidhail et al (61)	2019	Jordan	Measure the effectiveness of prenatal web-based breastfeeding education program on enhancing knowledge, attitude, and self-efficacy of breastfeeding after giving birth	Prenatal to postpartum	112 pregnant mothers in the third trimester	Prospective randomized controlled trial	There was no significant difference between the experimental and control groups on post-intervention scores on BSES.	-lacks representativeness from the sample - post-intervention assessment is not done in a face-to-face interview
31	Mizrak et al. (62)	2017	Turkey	Evaluate the effect of antenatal breastfeeding education on breastfeeding self-efficacy and breastfeeding success	Antenatal to postpartum	45 pregnant women	Intervention study design	Antenatal breastfeeding education and support given from the prenatal to the postnatal period increases breastfeeding self-efficacy and breastfeeding success.	-no prescribed duration for any of the sessions
32	Awano et al. (63)	2010	Japan	Evaluate the effect of the breast self-care program through changes in self-efficacy regarding breastfeeding and the breastfeeding rate.	Early postpartum	117 primiparous women	Quasi-experimental longitudinal design	Women who received breast self-care program had a significantly greater increase in self-efficacy than women who did not receive.	-the study was quasi-experimental intervention research lacking random selection -hospital population may not have reflected the general population of women giving birth -women with no access to DVD playback systems were excluded -data were based on the mothers' subjective views
33	Karbandi et al.(64)	2017	Iran	Evaluate the effect of using progressive muscle relaxation (PMR) technique on the breastfeeding self-efficacy in mothers with preterm infants.	Postpartum	60 mothers with preterm infants	Randomized controlled trial	Progressive muscle relaxation (PMR) technique improves the breastfeeding self-efficacy of mothers with premature infants.	-no power analysis
34	Aghdas et al. (65)	2014	Iran	Evaluate the effect of mother-infant immediate skin-to-skin contact on primiparous mother's breastfeeding self-efficacy.	Postpartum	114 mothers who anticipated normal vaginal delivery	Randomized controlled trial	Immediate mother-infant skin-to-skin contact leads to higher breastfeeding self-efficacy in mothers.	-no pre-intervention baseline information on breastfeeding self-efficacy.

*Outcomes of Breastfeeding Self-efficacy*

The results also found the associated outcomes of breastfeeding self-efficacy

starting from the time of supplementary feeding (37), woman's ability to maintain exclusive breastfeeding (38,39,40,47,48,49,50), improvement in breastfeeding performance (51), proper latching (52), and quality of life (53). Moreover, prenatal breastfeeding self-efficacy can be predictive of breastfeeding exclusivity at 4 weeks postpartum (54).

*Implemented Interventions and their Effectiveness*

Eight of the articles reviewed were interventional studies that directly aimed to improve breastfeeding self-efficacy. Studies claimed that educational programs through educational sessions, information packages, and peer education have positive effects on breastfeeding self-efficacy and duration of exclusive breastfeeding of nulliparous mothers (55,56,57,58) and primiparous and postpartum mothers (59). Establishing nurse-led parenting hotlines (60) to support mothers with hardship in breastfeeding is found to be effective. On the contrary, one study measured the effectiveness of the prenatal web-based breastfeeding education program on enhancing knowledge, attitude, and self-efficacy of breastfeeding after giving birth. Results, however, showed that there was no significant relationship between the breastfeeding self-efficacy of mothers who received prenatal web-based breastfeeding education programs compared to those who did not receive the intervention (61).

Relatively, breastfeeding education and support groups during early postpartum hospitalization may increase mothers' breastfeeding self-efficacy and exclusive breastfeeding rate (47). A similar study with other contexts revealed that antenatal breastfeeding education and support given from the prenatal to postnatal period increases breastfeeding self-efficacy and

breastfeeding success (62). A quasi-experimental study found that a self-care program containing advantages and basics of breastfeeding, baby's feeding cues, positioning, latch-on, and positive signs of baby's feeding had increased mothers' self-efficacy for breastfeeding and had a positive effect on the continuation of breastfeeding (63).

Another study examined the effect of using progressive muscle relaxation (PMR) technique on the self-efficacy of breastfeeding in mothers with preterm infants. The intervention involved the Jacobson method of 30-45 minutes of individual training involving contracting the 16 groups of muscles until they experience the feeling of pressure and then relax these muscles. The results showed that these techniques facilitated the self-efficacy of breastfeeding in mothers with preterm infants (64).

Lastly, a study evaluated the effect of mother-infant immediate skin-to-skin contact on primiparous mother's breastfeeding self-efficacy and revealed that it led to a higher breastfeeding self-efficacy of the mother (65).

**Discussion**

The purpose of this paper is to review the current state of knowledge, including the predictors and interventions, and discuss relevant findings and gaps in the breastfeeding self-efficacy theory. In doing so, this review includes relevant findings on the predictors, outcomes, and interventions related to breastfeeding self-efficacy. The review found that successful maternal attachment, positive social support, breastfeeding knowledge, previous breastfeeding experience, timing of their decision to initiate breastfeeding, antenatal breastfeeding class attendance, breastfeeding success during early postpartum, perceived breastmilk sufficiency, feeling of comfort, and husband's attitude toward breastfeeding are sought to be the common predictors of breastfeeding self-efficacy. On the other hand, the findings revealed that mode of

delivery and mothers who held their babies immediately after birth had better breastfeeding self-efficacy (34,37) differed from the findings of another study stating that women who underwent vaginal birth, cesarean with epidural anesthesia, and cesarean with general anesthesia had similar levels of breastfeeding self-efficacy (45). These differences can be explained by the effect of the cesarean section procedure that can possibly affect the metabolic adaptations to the lactation of the mother, which delays the onset of lactogenesis (66,67), which could later be known to affect weight loss in neonates (68). Other findings highlighted was the use of second-line strategies for feeding, such as nipple shields, syringe, cup, supply line, and bottle feeding, predicted lower breastfeeding self-efficacy (46). For some reason, some infants have breastfeeding challenges because they are small or premature, or from anatomical issues affecting feeding. To overcome these challenges, help from a lactation consultant may be beneficial (69).

Furthermore, the use of these second-line strategy materials may also pose to the baby's health. These products might have residual bisphenols (BPA) bottles, even a small risk of BPA intake exceeding the total daily intake; the combined use of BPA bottles with other plastic utensils might result in reaching it (70). Another, it may also affect the dentition of the baby as it may develop abnormal occlusal characteristics (71). It is advisable to refrain the use of plastic bottles and other second-line strategies for breastfeeding in different clinical, community, and home settings.

In a review of interventional studies, studies have claimed that educational programs through educational sessions, information packages, nurse-led parenting hotlines, and peer education have positive effects on breastfeeding self-efficacy and duration of exclusive breastfeeding. On the contrary, one study revealed that a prenatal web-based breastfeeding education program on enhancing knowledge, attitude, and self-efficacy of breastfeeding after giving birth is found not to be effective. Since there are

proven effective interventions, efforts should focus on these to the key to help the mother not only in breastfeeding but in postnatal transition. It also suggests having nursing and midwifery home care to help women's successful transition to motherhood.

Aside from the relevant findings of this review, some limitations need to be highlighted. In observational studies, issues related to sample enrollment were common. Studies have claimed the effect in the generalizability of the result because of the use of non-random, non-probable, and limited samples with high attrition rates and low response rates (36,38,39,40,41, 43,49,50,54). In terms of sample selection, some studies were also limited to one geographic area or single-site setting (32,35,36,37,38,39,42,44,48,50,51,53,52, 54). It is therefore recommended to use probability, and random sampling, which demands full completion to guarantee that survey estimates are unbiased; hence, survey researchers can maximize the response rate (72). Another limitation raised was the selection criteria of the participants. One study reviewed did not include women who received epidural anesthesia during vaginal birth in assessing breastfeeding self-efficacy (45), which recommends to include such populations in future study efforts. Other studies only included women in a similar socioeconomic status (52), highly educated working women (48,51), multiparous women (53), and mothers who gave birth to a full-term baby (34). Two studies suggested including both primiparous and multiparous mothers in assessing breastfeeding self-efficacy since there is an obvious difference between the two. In assessing breastfeeding self-efficacy, various studies have declared that there is a need to assess breastfeeding self-efficacy through various periods from pre-pregnancy up to the late postpartum period (32,49).

There were also issues regarding intervention studies. Some reviewed articles declared the lack of representativeness of the sample (33,47,55,56,58,59,61,63). Further, several studies declared that there was no standard protocol to implement interventions

and measure breastfeeding self-efficacy; the implementers of the intervention were nurses who work in the unit, the researcher, or nurses with no training (47,56,65). Based on the CONSORT guidelines in reporting interventional and clinical trials, the study must ensure that the study subjects are randomized. The primary reason for randomly assigning subjects is to equalize the characteristics of experimental and control groups prior to the experimental intervention and eliminate selection bias (73). However, even with flawless sequence generation and allocation concealment, failure to separate creation and concealment of the allocation sequence from assignment to study group may introduce bias. Also, as concerning good clinical practice standards suggest that the implementer of the intervention must be knowledgeable or trained for the interventions they are going to provide to the study subjects or mainly to the study protocol (74). Hence, training or orientation prior to the conduct of the study may be considered.

The limitations of this scoping review should be noted. First, studies written in languages other than English were excluded. Thus, we are unable to claim to have captured the full breadth of the field. Secondly, as intrinsic to a scoping review, the review did not systematically assess the scientific rigor of the literature sample. Lastly, the decision in the screening process of the relevant papers is based on the context expertise of the author. Accordingly, not all methodological weaknesses of the research base may have been considered.

## **Conclusion**

Health professionals caring for a pregnant woman should be aware of how the complex range of biological, personal, and social factors related to mothers' physical and psychological well-being that could also affect the capacity of the mother to breastfeed her child. To facilitate successful breastfeeding, health care institutions could promote interventions regarding positive breastfeeding experiences such as

establishing a breastfeeding support group consisting of health professionals and breastfeeding mothers and nursing midwifery home care. It can be an additional benefit of strengthening social relationships, an important attribute of higher breastfeeding self-efficacy.

Changes in our educational approach in nursing and midwifery educational institutions to include differences in women's experiences are needed. As a health care provider, we need to understand the ways in which women assume motherhood and its role in order to respond accordingly in a more meaningful way that requires critical analysis.

The review suggests that breastfeeding self-efficacy moves beyond our current understanding of motherhood based on Western countries and in the middle class with a limited sample size. To provide assessment and information in Asian mothers, especially in low-income and developing communities, data are needed to describe their experiences and to examine factors associated with breastfeeding self-efficacy in this population, since most of them do not have access to the phone hotlines and other technologically driven interventions. Studies using various methods, approaches and tools that are reliable and valid in diverse populations will facilitate our understanding of the factors that help or hinder women's confidence in breastfeeding. Lastly, the need to develop interventions, education modalities, and strategies to enhance motherhood and breastfeeding skills, initiation, and maintenance is highlighted in the reviewed studies.

## **Conflict of Interest**

There are no conflicts of interest to declare.

## **Acknowledgments**

This study was supported by the Research, Development and Extension Unit of Occidental Mindoro State College.

## References

1. Victora CG, Bahl R, Barros AJ, França GV, Horton S, Krasevec J, Murch S, Sankar MJ, Walker N, Rollins NC, Group TL. Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. *The Lancet*. 2016 30 January;387(10017):475-90.
2. World Health Organization. Global strategy for infant and young child feeding. World Health Organization; 2003.
3. Mahmood H, Suleman Y, Hazir T, Akram DS, Uddin S, Dibley MJ, Abassi S, Shakeel A, Kazmi N, Thow AM. Overview of the infant and young child feeding policy environment in Pakistan: Federal, Sindh and Punjab context. *BMC public health*. 2017 Jun;17(2):474.
4. Yılmaz E, Öcal FD, Yılmaz ZV, Ceyhan M, Kara OF, Küçüközkan T. Early initiation and exclusive breastfeeding: Factors influencing the attitudes of mothers who gave birth in a baby-friendly hospital. *Turkish journal of obstetrics and gynecology*. 2017 Mar;14(1):1.
5. Zakarija-Grković I, Šegvić O, Vučković Vukušić A, Lozančić T, Božinović T, Čuže A, Burmaz T. Predictors of suboptimal breastfeeding: an opportunity for public health interventions. *The European Journal of Public Health*. 2016 Apr 1;26(2):282-9.
6. Lau CY, Lok KY, Tarrant M. Breastfeeding duration and the theory of planned behavior and breastfeeding self-efficacy framework: A systematic review of observational studies. *Maternal and child health journal*. 2018 1 March;22(3):327-42.
7. Avery A, Zimmermann K, Underwood PW, Magnus JH. Confident commitment is a key factor for sustained breastfeeding. *Birth*. 2009 Jun;36(2):141-8.
8. Dennis CL. Theoretical underpinnings of breastfeeding confidence: a self-efficacy framework. *Journal of human lactation*. 1999 Sep;15(3):195-201.
9. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychological review*. 1977 Mar;84(2):191.
10. Bandura A, Adams NE, Beyer J. Cognitive processes mediating behavioral change. *Journal of personality and social psychology*. 1977 Mar;35(3):125.
11. Smith J, Cattaneo A, Iellamo A, Javanparast S, Atchan M, Gribble K et al. Review of effective strategies to promote breastfeeding. The Sax Institute, 2018. 204
12. M, Benzie K, Hayden KA. Interventions to improve breastfeeding self-efficacy and resultant breastfeeding rates: A systematic review and meta-analysis. *Journal of Human Lactation*. 2017 Aug;33(3):486-99.
13. Haroon S, Das JK, Salam RA, Imdad A, Bhutta ZA. Breastfeeding promotion interventions and breastfeeding practices: a systematic review. *BMC public health*. 2013 1 September;13(S3):S20.
14. Benedict RK, Craig HC, Torlesse H, Stoltzfus RJ. Effectiveness of programmes and interventions to support optimal breastfeeding among children 0–23 months, South Asia: A scoping review. *Maternal & child nutrition*. 2018 Nov;14:e12697.
15. Tuthill EL, McGrath JM, Graber M, Cusson RM, Young SL. Breastfeeding self-efficacy: a critical review of available instruments. *Journal of Human Lactation*. 2016 Feb;32(1):35-45.
16. Lee MK, Binns C. Breastfeeding and the risk of infant illness in Asia: A Review. *International Journal of Environmental Research and Public Health*. 2020 Jan;17(1):186.
17. Carroll G, Safon C, Buccini G, Vilar-Compte M, Teruel G, Pérez-Escamilla R. A systematic review of costing studies for implementing and scaling-up breastfeeding interventions: what do we know and what are the gaps?. *Health Policy and Planning*. 2020 May;35(4):461-501.
18. Joanna Briggs Institute. Joanna Briggs Institute reviewers' manual: 2015 edition/supplement. Adelaide: The Joanna Briggs Institute. 2015 2 July.
19. Cinar N, Köse D, Altinkaynak S. The relationship between maternal attachment, perceived social support and breastfeeding sufficiency. *Journal of the College of Physicians and Surgeons Pakistan*. 2015 1 April;25(4):271-5.
20. Liu L, Zhu J, Yang J, Wu M, Ye B. The effect of a perinatal breastfeeding support program on breastfeeding outcomes in primiparous mothers. *Western journal of nursing research*. 2017 Jul;39(7):906-23.
21. Ngo LT, Chou HF, Gau ML, Liu CY. Breastfeeding self-efficacy and related factors in postpartum Vietnamese women. *Midwifery*. 2019 Mar 1;70:84-91.
22. Yang X, Gao LL, Ip WY, Chan WC. Predictors of breast feeding self-efficacy in the immediate postpartum period: A cross-sectional study. *Midwifery*. 2016 1 October;41:1-8.
23. Zhu J, Chan WC, Zhou X, Ye B, He HG. Predictors of breast feeding self-efficacy among Chinese mothers: A cross-sectional

- questionnaire survey. *Midwifery*. 2014 1 June;30(6):705-11.
24. Burcu K, Remziye S, Seda ST, Buket D. The relation between breastfeeding self-efficacy and starting times of supplementary food. *International Journal of Caring Sciences*. 2018;11(1):231-8.
25. Hadjiona V, Middleton N, Kouta C, Hadjigeorgiou E, Lambrinou E, Kolokotroni O. Cyprus mothers' breast feeding self-efficacy and their perceptions about the implementation of the '10 steps' in the first 48 hours after birth. *Midwifery*. 2016 May 1;36:43-52.
26. Ku CM, Chow SK. Factors influencing the practice of exclusive breastfeeding among Hong Kong Chinese women: a questionnaire survey. *Journal of clinical nursing*. 2010 Sep;19(17-18):2434-45.
27. De Jager E, Broadbent J, Fuller-Tyszkiewicz M, Skouteris H. The role of psychosocial factors in exclusive breastfeeding to six months postpartum. *Midwifery*. 2014 1 June;30(6):657-66.
28. Kılıcı H, Çoban A. The correlation between breastfeeding success in the early postpartum period and the perception of self-efficacy in breastfeeding and breast problems in the late postpartum. *Breastfeeding Medicine*. 2016 1 May;11(4):188-95.
29. Gökçeoğlu E, Küçüköğlü S. The relationship between insufficient milk perception and breastfeeding self-efficacy among Turkish mothers. *Global health promotion*. 2017 Dec;24(4):53-61.
30. Kent JC, Hepworth AR, Langton DB, Hartmann PE. Impact of measuring milk production by test weighing on breastfeeding confidence in mothers of term infants. *Breastfeeding Medicine*. 2015 1 July;10(6):318-25.
31. Fata S, Atan ŞÜ. The relationship between fatigue and breastfeeding self-efficacy. *Nigerian journal of clinical practice*. 2018;21(11):1408-14.
32. Alus Tokat M, Serçekuş P, Yenal K, Okumuş H. Early postpartum breast-feeding outcomes and breastfeeding self-efficacy in Turkish mothers undergoing vaginal birth or cesarean birth with different types of anesthesia. *International journal of nursing knowledge*. 2015 Apr;26(2):73-9.
33. Keemer F. Breastfeeding self-efficacy of women using second-line strategies for healthy term infants in the first week postpartum: an Australian observational study. *International breastfeeding journal*. 2013 Dec;8(1):18.
34. Lee YH, Chang GL, Chang HY. Effects of education and support groups organized by IBCLCs in early postpartum on breastfeeding. *Midwifery*. 2019 1 August;75:5-11.
35. Ip WY, Gao LL, Choi KC, Chau JP, Xiao Y. The short form of the breastfeeding self-efficacy scale as a prognostic factor of exclusive breastfeeding among mandarin-speaking Chinese mothers. *Journal of Human Lactation*. 2016 Nov;32(4):711-20.
36. de Jager E, Broadbent J, Fuller-Tyszkiewicz M, Nagle C, McPhie S, Skouteris H. A longitudinal study of the effect of psychosocial factors on exclusive breastfeeding duration. *Midwifery*. 2015 1 January;31(1):103-11.
37. Loke AY, Chan LK. Maternal breastfeeding self-efficacy and the breastfeeding behaviors of newborns in the practice of exclusive breastfeeding. *Journal of Obstetric, Gynecologic & Neonatal Nursing*. 2013 Nov 1;42(6):672-84.
38. Faridvand F, Mirghafourvand M, Mohammad-Alizadeh-Charandabi S, Malakouti J. Breastfeeding performance in Iranian women. *International journal of nursing practice*. 2018 Aug;24(4):e12659.
39. Gerçek E, Sarıkaya Karabudak S, Ardiç Çelik N, Saruhan A. The relationship between breastfeeding self-efficacy and LATCH scores and affecting factors. *Journal of clinical nursing*. 2017 Apr;26(7-8):994-1004.
40. Mirghafourvand M, Kamalifard M, Ranjbar F, Gordani N. Relationship of breastfeeding self-efficacy with quality of life in Iranian breastfeeding mothers. *The Journal of Maternal-Fetal & Neonatal Medicine*. 2018 18 October;31(20):2721-8.
41. Khresheh RM, Ahmed NM. Breastfeeding self efficacy among pregnant women in Saudi Arabia. *Saudi medical journal*. 2018;39(11):1116.
42. Araban M, Karimian Z, Kakolaki ZK, McQueen KA, Dennis CL. Randomized controlled trial of a prenatal breastfeeding self-efficacy intervention in primiparous women in Iran. *Journal of Obstetric, Gynecologic & Neonatal Nursing*. 2018 Mar 1;47(2):173-83.
43. Chan MY, Ip WY, Choi KC. The effect of a self-efficacy-based educational programme on maternal breast feeding self-efficacy, breast feeding duration and exclusive breast feeding

- rates: A longitudinal study. *Midwifery*. 2016 1 May;36:92-8.
44. Ansari S, Abedi P, Hasanpoor S, Bani S. The effect of interventional program on breastfeeding self-efficacy and duration of exclusive breastfeeding in pregnant women in Ahvaz, Iran. *International scholarly research notices*. 2014;2014. <http://dx.doi.org/10.1155/2014/510793>
45. Nichols J, Schutte NS, Brown RF, Dennis CL, Price I. The impact of a self-efficacy intervention on short-term breastfeeding outcomes. *Health Education & Behavior*. 2009 Apr;36(2):250-8.
46. Wu DS, Hu J, McCoy TP, Efir JT. The effects of a breastfeeding self-efficacy intervention on short-term breastfeeding outcomes among primiparous mothers in Wuhan, China. *Journal of Advanced Nursing*. 2014 Aug;70(8):1867-79.
47. Thorpe K, Jansen E, Cromack C, Gallegos D. Can a call make a difference? Measured change in women's breastfeeding self-efficacy across call interactions on a telephone helpline. *Maternal and child health journal*. 2018 Dec 1;22(12):1761-70.
48. Abuidhail J, Mrayan L, Jaradat D. Evaluating effects of prenatal web-based breastfeeding education for pregnant mothers in their third trimester of pregnancy: prospective randomized control trial. *Midwifery*. 2019 Feb 1;69:143-9.
49. Mizrak B, Ozerdogan N, Colak E. The effect of antenatal education on breastfeeding self-efficacy: Primiparous women in Turkey. *International Journal of Caring Sciences*. 2017 1 January;10(1):503.
50. Awano M, Shimada K. Development and evaluation of a self care program on breastfeeding in Japan: A quasi-experimental study. *International breastfeeding journal*. 2010 Aug 1;5(1):9.
51. Karbandi S, Hosseini SM, Hosseini SA, Sadeghi F, Hesari M, Masoudi R. Evaluating the effectiveness of using a progressive muscle relaxation technique on the self-efficacy of breastfeeding in mothers with preterm infants. *journal of nursing research*. 2017 1 August;25(4):283-8.
52. Aghdas K, Talat K, Sepideh B. Effect of immediate and continuous mother-infant skin-to-skin contact on breastfeeding self-efficacy of primiparous women: A randomised control trial. *Women and birth*. 2014 Mar 1;27(1):37-40.
53. İlhan G, Atmaca FV, Çümen A, Zebitay AG, Güngör ES, Karasu AF. Effects of daytime versus night-time cesarean deliveries on Stage II lactogenesis. *Journal of Obstetrics and Gynaecology Research*. 2018 Apr;44(4):717-22.
54. İsik Y, Dag ZO, Tulmac OB, Pek E. Early postpartum lactation effects of cesarean and vaginal birth. *Ginekologia polska*. 2016;87(6):426-30
55. Zia MT, Golombek S, Lemon L, Nitkowski Kever S, Paudel U. The influence of time of birth and seasonal variations on weight loss in breastfeeding neonates. *Journal of neonatal-perinatal medicine*. 2019 1 January;12(2):189-94.
56. Amir LH, Bearzatto A. Overcoming challenges faced by breastfeeding mothers. *Australian family physician*. 2016 Aug;45(8):552.
57. Ali M, Jaghbir M, Salam M, Al-Kadamany G, Damsees R, Al-Rawashdeh N. Testing baby bottles for the presence of residual and migrated bisphenol A. *Environmental monitoring and assessment*. 2019 1 January;191(1):7.
58. Chen XX, Xia B, Ge LH, Yuan JW. Effects of breastfeeding duration, bottle-feeding duration and oral habits on the occlusal characteristics of primary dentition. *Beijing da xue xue bao. Yi xue ban= Journal of Peking University. Health sciences*. 2016 Dec;48(6):1060-6.