

Main Biopsychosocial Factors Influencing Breastfeeding: a Systematic Review

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ABSTRACT

Background: Breastfeeding is important for an infant's development as well as the mother's recovery after birth. Breastfeeding is influenced by a variety of biopsychosocial variables. The purpose of this study was to conduct a comprehensive literature search and explore the relationship between any biopsychological component and breastfeeding duration and intensity.

Methods: The databases of PubMed and ScienceDirect were searched. The official website of World Health Organization (WHO) was also explored.

Results: The search identified 19 studies, reporting the main biopsychosocial factors affecting breastfeeding intention and duration, including maternal age, occupation, smoking, obesity, the feeding type that the women received, social support, birth complications, cesarean delivery, anxiety and self-efficacy.

Conclusion: This systematic review has confirmed that there are specific biopsychosocial factors influencing the breastfeeding process. It is proposed that current care and support should encourage mothers to breastfeed their newborns by providing corrective information and aid.

Keywords: breastfeeding AND predictors, psychological factors, social factors, biological factors.

INTRODUCTION

The life of a woman includes many stages, with her developmental stages involving pregnancy, childbirth and compatibility with the new baby. Each new mother is experiencing undesirable and strange states, including weakness, anxiety, helplessness, lack of happiness, sleepiness and disorder

on the desire of food, lack of assurance and feelings of inability as a new parent (1). The situation worsens throughout the postpartum period, since the mother loses her energy due to tiredness, pharmacological impacts, duration of pregnancy and issues grown during the childbirth and lactation processes. The growth and development of newborns is mainly affected by the appropriate nutrition particularly in the early

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stages of their life (2). Breast milk is the optimal source for an ideal development of a newborn. Breastfeeding is beneficial to the infant's health and the community as a whole (3). Infants should be fed completely by breast milk for the first six months of their life, according to the World Health Organization (WHO) and the National Health and Medical Research Council (NHMRC) (4). Infants who are breastfed exclusively for the first six months of their lives possessed important advantages compared to those who consumed breast milk for only three or four months (3). The short-term benefits of exclusive breastfeeding have been reported by WHO and refer to the decrease of neonatal mortality and morbidity from infectious diseases. On the other hand, the long-term advantages are associated with the effect of duration and intention of breastfeeding on infant IQ. For mothers, the long-term benefits of breastfeeding are linked with a lower incidence of premenopausal breast cancer as well as ovarian cancer (5). The investigation of factors associated with breastfeeding duration and intention could improve mothers' ability to exclusively breastfeed for longer periods of time (6). On average, less than 60% of newborns were fed exclusively with breast milk for two months after their birth, less than 40% for four months and about 17% for six months postpartum until the first three years of their lives (7). The ability of a woman to elect to feed her infant exclusively with breast milk is linked to a variety of psychosocial factors (8).

In light of these considerations, the current study was performed to determine the role of major biopsychosocial factors on breastfeeding among mothers. Socio-demographic factors, including age, occupation, psychological factors such as stress, self-efficacy, and personality features, as well as biological factors such as smoking, birth complications and cesarean section were all evaluated. The assumption of this study is that specific biopsychosocial traits differentiate women who decide to breastfeed from those who prefer to bottle-feed their infants. The present article aims to synthesize current knowledge about biopsychosocial factors that influence mothers' decision to breastfeed their newborns, as gleaned from a systematic review of the literature, in order to highlight potential recommendations that health care providers can make to help mothers breastfeed for longer periods of time. □

METHODOLOGY

Search strategy

A systematic literature review was performed from March 2022 to July 2022 to investigate predictive biopsychosocial factors that affect the intention and duration of breastfeeding. The search strategy involved reviewing articles published between 2000 and 2022. This analysis was conducted according to systematic reviews and meta-analyses guidelines (9). The searched databases included PubMed and ScienceDirect. The official website of the World Health Organization (WHO) was also explored. The key words and terms used are shown in Table 1.

TABLE 1. Keywords and terms

Breastfeeding AND newborn	Cesarean delivery AND breastfeeding
Breastfeeding AND predictors	Delivery AND breastfeeding AND determinants
Psychological factors AND breastfeeding	Duration AND breastfeeding AND determinants
Psychosocial factors AND breastfeeding	Exclusive AND breastfeeding AND predictors
Breastfeeding AND maternal age	Breastfeeding AND smoking

Selection criteria

Papers were limited to articles published in the last 22 years. Another inclusion criterion was that the articles were written in English. Papers were limited to those which examined the predictive biopsychosocial factors that were influencing breastfeeding intention and duration, regardless of the length of breastfeeding, and including any of the following categories of participants: uniparous or multiparous women (women with one or more previous deliveries), who did or did not breastfeed their child previously. The search strategy did not focus on exclusive breastfeeding. The authors first screened the titles and abstracts of identified citations for potential eligibility, and then examined the full texts to determine eligibility for inclusion in the review. The present review included nineteen different studies.

Exclusion criteria

Studies were excluded from the review if they did not examine the influence of biopsychosocial factors on breastfeeding intention and duration. Papers focusing on other determinants affecting breastfeeding as well as those that focused on disadvantaged groups (e.g., teenage pregnancy, premature birth, gestational diabetes) were not included in our review. In addition, the authors excluded studies with unsuitable sample selection criteria – subjects who have been recently using

any medication affecting sleep, prescription drugs, or other drugs that in the opinion of the research team may interfere with the results of the present research. Studies that did not mention the control group were excluded. Also, papers that did not come to clear and defined results as well as those with no substantial outcome have not been included.

Quality assessment

The Critical Appraisal Skills Programme (CASP) Systematic Review Checklist 201725 was used to assess the quality of each publication. This method aids in verifying the reliability of research and, as a result, confirms that the chosen literature was appropriate for inclusion in the present review. Critical Appraisal Checklists were used as a guide and aide memoire in order to carefully and systematically examine researches to judge their trustworthiness, value and relevance in a particular context (10).

Selection process

The search strategy yielded 670 results; after the exclusion of duplicates (n=40), 630 papers were screened by the authors. Records with irrelevant title or abstract were rejected. Then, 130 full-text articles were assessed for eligibility, of which only 19 were considered relevant and valid for the

present review. Among the full-text articles that were excluded (n=111), the majority (n=51) did not focus on biopsychosocial factors and their influence to breastfeeding. When critically appraising each publication using CASP, 20 articles were excluded due to their low quality. Also, articles that had unsuitable sample selection criteria or no clear outcome, those which were not written in English or lacked a control group were also excluded. The remaining 19 studies were considered eligible and were included in the review. Figure 1 outlines the PRISMA flow diagram of studies included in the present review (9). □

RESULTS

Study characteristics

All included studies aimed to present biopsychosocial factors that were associated with breastfeeding intention and duration. The majority of the selected published reports were conducted in Europe (n=8). Specifically, five of the elected studies were done in the UK, one in Finland, one in Italy and one in Greece. In addition, four studies were performed in Australia, three in the USA, two in Canada, one in Hong Kong and one in West Africa (Ghana). Only four of all included studies were published between 2000–2009, with the majority (n=15) being published during the last decade. Breastfeeding was assessed by cohort (n=7) and cross sectional (n=4) studies, regression models (n=4), exploratory factor analyses (n=1) and national survey (n=1). Maternal age as well as employment was examined as a correlate of breastfeeding in four studies. In four studies, obesity (n=2) and smoking (n=2) were found to have a negative influence on the breastfeeding process. Psychological factors, more specifically maternal personality (n=1), self-efficacy (n=1) and social support (n=1), were examined in three studies. Personal and familial experiences were explored in one study. Four papers examined cesarean delivery and birth complications and their association with breastfeeding.

Data from all selected studies were first collated and synthesized manually, then placed into tables to allow for the comparison of study aims, investigated biopsychosocial factors, sample, methodology, and findings. Table 2 delineates the characteristics of the 19 studies selected for this review. The impact of biopsychosocial factors on

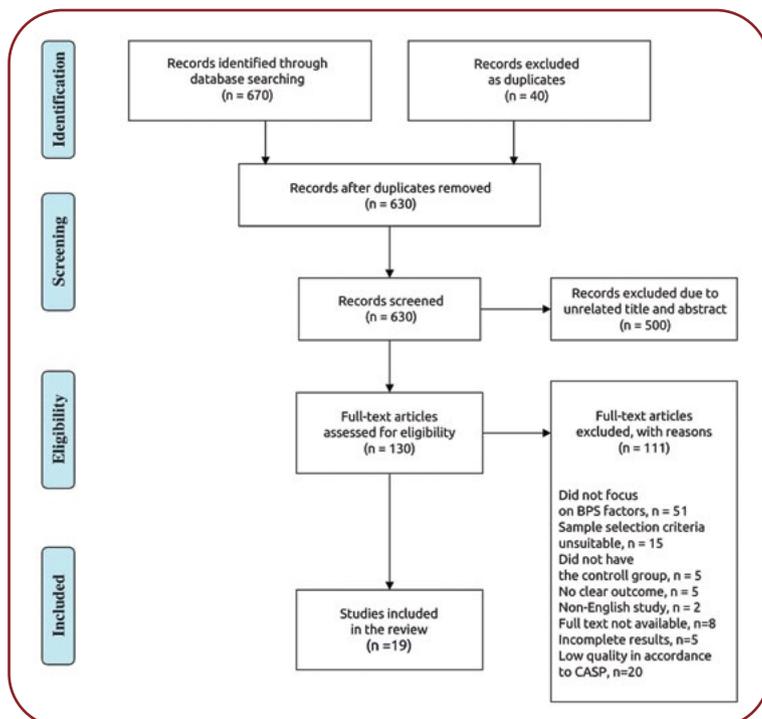


FIGURE 1. Flow diagram of studies included in the present review

TABLE 2. Characteristics of 19 studies describing the major biopsychosocial factors that affect breastfeeding

First author	Sample/Method	Factor(s)	Positive association with BF	Negative association with BF	Positive association with intention
Biro <i>et al</i> (2014)	N=110/Multivariable logistic regression	Maternal age	✓		✓
Britten <i>et al</i> (2001)	N=1.792/Cohort study	Maternal age	✓		✓
Lutsiv <i>et al</i> (2013)	N=92.364/Cohort study	Maternal age			✓
Di Mattei <i>et al</i> (2016)	N=160/Cohort study	Maternal age			✓
		Formula fed		✓	
Tarrant <i>et al</i> (2010)	N=1417/Cohort study	Occupation		✓	
Attanasio <i>et al</i> (2013)	N=1573/National survey	Occupation		✓	
Skafida (2012)	N= 5.217/Cohort study	Occupation		✓	
Nkrumah (2016)	N=225/Cross sectional study	Occupation		✓	
Verret–Chalifour <i>et al</i> (2015)	N=6.592/Cohort study	Obesity		✓	
Makela <i>et al</i> (2014)	N=848/Cohort study	Obesity		✓	
Clifford <i>et al</i> (2006)	N=856/Proportional hazards regression analysis	Smoking		✓	
Liu <i>et al</i> (2006)	N=3047/Logistic regression models	Smoking		✓	
Hauck <i>et al</i> (2011)	N=2,472/Cross sectional survey	CS delivery		✓	
Ayton <i>et al</i> (2015)	N=22.202/Cross-sectional survey	CS delivery		✓	
Brown <i>et al</i> (2013)	N=284/Exploratory factor analysis	Birth complications		✓	
Oakley <i>et al</i> (2014)	N=3840/Logistic regression analysis	Birth complications		✓	
		CS delivery		✓	
		BF support	✓		
Brown A (2014)	N=602/Exploratory cross-sectional survey	Extraversion	✓		
		Emotional stability	✓		
		Conscientiousness	✓		
DeJager <i>et al</i> (2014)	N=174/Correlational analyses	Self-efficacy	✓		✓
Iliadou <i>et al</i> (2020)	N=173/Exploratory factor analysis	Self-efficacy	✓		

BF=breastfeeding; CS=cesarean section

breastfeeding duration and intention is shown in Table 3.

Main results based on the research question

1. Socio-demographic factors

Maternal age – Significant differences between women’s age and the breastfeeding process have been found in the literature. Di Mattei *et al* (2016) used the Iowa Infant Feeding Attitude Scale (IIFAS) to assess mothers’ intention and attitudes toward infant feeding. It consists of 17 attitude questions on a five-point Likert scale ranging from 5 “strongly agree” to 1 “strongly disagree”. Questions were divided so that half were favorable to breastfeeding and the other half to formula feeding. Items that favored formula feeding were reverse scored and a total score was obtained. IIFAS scores could range from 17 to 85, with higher scores indicating a more positive attitude toward breastfeeding. IIFAS scores of 65 or above indicate that women are likely to breastfeed. From the multivariate

analysis, the significant role of age (ranging from 19 to 45 years) emerged as promoter of breastfeeding attitudes. In particular, older women resulted in a substantially higher IIFAS score (positive sign of age coefficient in the regression model) (11). Biro *et al* (2014) came to the conclusion that while younger women were just as likely to initiate breastfeeding as older women and had almost twice the odds of not breastfeeding at six months (12). Lutsiv *et al* (2013) revealed that older mothers had a higher intention to exclusively breastfeed their infants compared to younger ones (13). Britten *et al* also determined positive impacts of maternal age on the duration of the breastfeeding process, where younger mothers had negative effects on the breastfeeding intention and duration (14).

Occupation – Attanasio *et al* (2013) revealed the role of employment in the duration of the breastfeeding process. The early end of the breastfeeding process is associated with full-time em-

TABLE 3. Impact of biopsychosocial factors on breastfeeding duration and intention

Maternal age	Biro et al, 2014: Duration: (AdjOR 1.76, 95% CI 1.34–2.33), Intention: (AdjOR 1.13, 95% CI 0.63–2.05) Britten et al, 2001: Duration: (OR 8.44, 95% CI 1.68–2.88), Intention: (OR 9.92, 95% CI 4.87–18.78) Lutsiv et al, 2013: Intention: (AdjOR 3.64, 95% CI 3.13–4.23) Di Mattei et al, 2016: Intention: ($p = 0.02$)	Cesarean delivery	Hauck et al, 2011: Duration: (HR 1.86, 95% CI 1.69–20.6) Ayton et al, 2015: Duration: (HR 1.29, 95% CI 1.24–1.35) Oakley et al, 2014: Duration: (OR 1.50, 95% CI 1.09–2.07)
		Maternal personality	Brown A (2014): Duration: extraversion (Spearman's rho = -0.112 , $P = 0.037$), emotional stability (Spearman's rho = -0.120 , $P = 0.028$), conscientiousness (Spearman's rho = -0.109 , $P = 0.041$)
Occupation	Tarrant et al, 2010: Duration: (AdjOR 2.06, 95% CI 1.33–3.18) Attanasio et al, 2013: Duration: (AdjOR 0.48, 95% CI 0.25–0.92; $P = 0.28$) Skafida, 2012: Duration: [full-time (HR 1.6) or part-time (HR 1.3)] Nkrumah, 2016: Duration: ($p = 0.020$)	Birth complications	Brown et al, 2013: Duration: fetal distress [$F(1,255) = 11.373$, $P = 0.001$, $d = 0.9$], failure to progress [$F(1, 255) = 4.616$, $P = 0.03$, $d = 0.6$], and postpartum hemorrhage [$F(1,255) = 4.51$, $P = 0.03$, $d = 0.6$] Oakley et al, 2014: Duration: [long labour duration (OR 0.89, 95% CI 0.66,1.22), long length of postnatal stay (OR 1.39, 95% CI 0.59,3.24)]
Obesity	Verret–Chalifour et al, 2015: Duration: (Rradj 1.26, 95% CI 1.08–1.46) Makela et al, 2014: Duration: ($P = 0.02$)	Self-efficacy	DeJager et al, 2014: Duration: ($p < .001$), Intention: ($p < .01$) Iliadou et al, 2020: Self-efficacy: ($p < 0.001$) for women who had exclusive breastfeeding at six months (109/173, 63%) [mean (SD): 50.1 (11.9)]
Smoking	Clifford et al, 2006: Duration: (OR 1.50, 95% CI 1.09–2.07) Liu et al, 2006: Duration: (95% CI 1.52–2.97)	Formula fed	Di Mattei et al, 2016: Duration: ($p < 0.001$)
		Breastfeeding support	Oakley et al (2014): from non-professionals (OR 1.58, 95% CI 1.03–2.41) from professionals (OR 2.22, 95% CI 1.59–3.11)

ployment. On the other hand, self-employed mothers were prone to breastfeeding their children for a longer period of time (15). Skafida (2012) revealed that part-time working women were more inclined to continue the exclusive breastfeeding of their infants for six or more months than full-time employed mothers (16). Tarrant *et al* evaluated the correlation between returning to work and ending breastfeeding process before the completion of the first three months of the infant's life (17). Nkrumah (2016) revealed that mothers who returned to work at an early stage during the postpartum period were more probable to use infant formula, ending the exclusive breastfeeding (18).

2. Psychological factors

Self-efficacy – De Jager *et al* (2014) developed a model that correlated psychological factors with the duration of exclusive breastfeeding. According to their findings, self-efficacy was an independent factor that could predict the duration of exclusive breastfeeding. Other important factors included the maternal approach during the pregnancy period, psychological adaptation and potential difficulties during the breastfeeding process, which were also proved to have a significant impact on the duration and intention of exclusive breastfeeding (8). Additionally, Iliadou *et al* (2020)

explored the association of self-efficacy with breastfeeding; specifically, higher levels of self-efficacy three days postpartum were strongly related to exclusive breastfeeding at six months (19).

Feeding type received by women in their infancy – Another factor that seems to have a significant impact on the breastfeeding process is the feeding type received by women when they were infants. Di Mattei *et al* revealed that women who had been breastfed were more likely to breast-feed their children compared to formula-fed mothers (11).

Breastfeeding support – Another factor that seems to significantly influence the breastfeeding process is represented by breastfeeding advice or support. According to Oakley *et al*, women who did not receive feeding advice or support from a parent/peer group or voluntary organization were more likely to stop breastfeeding by 10 days after birth. In addition, compared to women who reported that midwives 'always' gave active support and encouragement regarding feeding, those who claimed this support was not given at all were more likely to have stopped breastfeeding 10 days after birth (20).

Maternal personality – Brown A. focused on the relationship between maternal personality and the decision to breastfeed a newborn. Personality is conceptualized as five main features

based on the Five-factor model (FFM): Agreeableness, Extraversion, Conscientiousness, Openness to experience and Emotional stability. Among these features, emotional stability, extraversion, and conscientiousness proved to be inversely associated with ceasing breastfeeding (21).

3. Biological factors

Smoking – Liu *et al* reported that smoking during the breastfeeding period was correlated to elevated rates of early ending of the breastfeeding process, associated with a negative impact of nicotine on the produced volume of breast milk and sleeping patterns of infants (22). Clifford *et al* (2006) reported that only 23% of mothers who smoke breastfed exclusively their child for six months postpartum (23).

Obesity – Obesity has been linked to a higher risk of limited breastfeeding length and intention. Verret – Chalifour *et al* revealed that obese women were less likely to initiate breastfeeding compared to normal weight ones in the immediate post-partum period (24). Mäkelä *et al* (2013) suggested that women who were overweight or obese before pregnancy breastfed fully and totally for a shorter time (25).

Cesarean delivery – Hauck *et al* came to the conclusion that mothers who gave birth with cesarean section breastfed exclusively their newborns for a limited period of time (26). Specifically, Oakley *et al* found that planned cesarean was significantly associated with increased cessation between 10 days and six weeks (20). According to Ayton *et al*, more than 50% of mothers who gave birth with cesarean section exclusively breastfed their newborns for only two months postpartum (27).

Birth complications – Brown *et al* linked fetal distress, failure to progress and postpartum hemorrhage to shorter breastfeeding duration. Women who had complications related to their birth achieved to breastfeed for a limited time than those who did not face any birth difficulties (28). Additionally, Oakley *et al* reported that breastfeeding cessation at 10 days was significantly associated with long labour duration and long length of postnatal stay (20). □

DISCUSSION

The present review outlines the results of studies that have examined biopsychosocial

factors and their association with breastfeeding intention and duration. The reported findings suggest that the initiation and duration of breastfeeding is determined by a combination of biopsychosocial factors either supporting or inhibiting a woman's ability to breastfeed her newborn.

What biopsychosocial factors have been found to influence a mothers' decision to breastfeed her newborn(s)?

In the present review, a combination of biological, psychological and social factors has been shown to influence breastfeeding. Particularly, the physiological functions of a human, including breastfeeding, are influenced by disorders like depression and stress. The production of milk and its letdown can be affected by maternal anxiety (29). The entire evaluation of a breastfeeding mother's health quality, particularly the issue of postpartum mental health, is a crucial sign (30).

De Jager *et al* (2013) evaluated the role of psychological factors in the ability of mothers to exclusively breastfeed four and six months after the birth of their infants. The main psychological factors included postnatal depression, self-efficacy, stress, breastfeeding intention, mental outlook towards the breastfeeding process and social approval. These factors were related to the ability of mothers to feed their infants exclusively with breast milk for more than four months postpartum (31).

Simultaneously, breastfed mothers are more likely to breastfeed their children (11). This is in line with previous research that found that breastfeeding mothers were more likely to have been breastfed themselves (32). Regardless of socio-demographic differences, mothers' prior personal experiences had an impact on their breastfeeding practices. The knowledge of having been breastfed could bring a degree of familiarity with breastfeeding that mothers who were formula-fed do not have (32).

Our results suggest that breastfeeding support delivered by non-health professionals (peer support, voluntary organization) and specialist support such as breastfeeding clinics may have an important role in preventing breastfeeding cessations in the first few weeks (20). These results are consistent with the IFS which have linked breastfeeding support to increases in breastfeeding continuation particularly in the early weeks (33).

Reviews proved that older mothers were more likely to breastfeed their children for an extended period of time (11-14). A possible explanation could be that older mothers are self-confident in having higher experience and knowledge in terms of breastfeeding and therefore have a higher intention to breastfeed their newborns than the younger ones (34).

Skafida (2012) revealed that part-time working women were more inclined to continue the exclusive breastfeeding of their infants for six or more months than full-time employed mothers. This might be attributed to the fact that the combination of dealing with work-related tasks and the breastfeeding process was more easily achieved by self-employed mothers since they could also work from home. Healthcare providers could inform mothers who intend to return to their workplace about how they could continue the breastfeeding process (16).

Concerning the negative relation between obesity and breastfeeding intention, the results of the present review are in accordance with those of another systematic review, indicating that mothers with a BMI ≥ 30 kg/m⁻² were less likely to exclusively breastfeed or to breastfeed for a longer period of time compared to those with a BMI ≤ 30 kg/m⁻² (35). Poor body image and lacking belief in breast milk's nutritional adequacy and sufficiency may partly explain the discrepancy between planned and actual breastfeeding duration in women with a BMI ≥ 30 (35).

For maternal smoking, the present review supports the negative association of smoking and breastfeeding (22, 23). Results of a recent meta-analysis were also relatively consistent in showing increased breastfeeding initiation and continuation for non-smokers compared with smokers (36).

Complications during labour may have a negative impact on breastfeeding. Explanations include adverse reactions to medication, delayed breastfeeding initiation and disruption of the normal endocrinology of childbirth. However, reasons for breastfeeding cessation linked to birth experience have not been fully examined. Mothers who experienced complications were more likely to discontinue breastfeeding due to pain and difficulty than those who did not experience complications (28).

Additionally, the negative association between cesarean section and early breastfeeding cessa-

tion is confirmed by another systematic review (37). It is significant that if breastfeeding is initiated, the mode of delivery has no apparent effect on the number of mothers still breastfeeding six months after birth (37).

Implications for future research

The present research indicates that there is a plurality of current evidence concerning the association between breastfeeding and biopsychosocial factors. Despite methodological differences between the included studies (e.g., differences in study designs and breastfeeding definitions), an association between breastfeeding and various biopsychosocial factors is suggested.

All selected studies have an imprecise definition of breastfeeding. To specifically address exclusive breastfeeding for at least six months, according to the standards, is a specific recommendation.

Moreover, current evidence is insufficient to clearly establish the implications of cesarean delivery and specific birth complications on the breastfeeding process. A further area to explore is the psychological impact of birth experience on breastfeeding duration. Birth complications and cesarean delivery increases risks of low breastfeeding rates (20). Although it appears that birth complications are associated with physical rather than psychological influences on breastfeeding cessation (28), the two may be interlinked. □

CONCLUSION

Based on the results of the current study, midwives should screen pregnant women for anxiety, depression, socio-demographic variables, including maternal age, occupation status, type of feeding received as a child. Midwives should build a trusting relationship with women and provide psychological support. Women and midwives should be aware of the negative association between cesarean section and breastfeeding and choose this delivery method only when necessary. Monitoring the new mothers before and after their birth could improve breastfeeding behaviors. □

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