

# Breastfeeding During Pregnancy: A Systematic Review of the Literature

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## ABSTRACT

**Objectives:** Breastfeeding during pregnancy has unintended repercussions that have yet to be determined. Previous research employed various approaches and reached varied outcomes, with some emphasizing on advantages and others focusing on hazards. With this study we aim at shedding light on the effects of breastfeeding during pregnancy on the outcome of pregnancy and the risk of miscarriage.

**Materials and methods:** We conducted a systematic review of relevant papers which have been published in English between 2014 and 2022 by using the PubMed, Scopus and Google Scholar search engines. Databases identified 257 records, which were checked for their relatedness to the topic (title and abstract), and compliance with the selection criteria. Only 10 records met all requirements and were included in the present review.

**Results:** The results revealed that breastfeeding during pregnancy appeared to be unrelated to pregnancy outcome and miscarriage risk, notwithstanding the need for caution in women at risk of preterm birth and high-risk pregnancies.

**Conclusions:** All studies recognized the high nutritional requirements of lactating pregnant women as well as the importance of proper nutrition for a safe breastfeeding for both the mother and child (children). Further research, with larger samples and adequate methodology, is expected to lead to safer conclusions for breastfeeding during pregnancy.

**Keywords:** breastfeeding, breastfeeding during pregnancy, miscarriage, pregnancy, lactation.

## INTRODUCTION

According to the World Health Organisation (WHO) and the United Nations Children's Fund (UNICEF), breastfeeding is the ideal form of nutrition that promotes child health and

survival (1-2). Breastfeeding has many short- and long-term health benefits for infants and their mothers (2-6). Recommendations support starting nursing within one hour after delivery, exclusive breastfeeding for six months, and breastfeeding until at least two years after birth, supplemented with other foods (7). However,

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less than half of newborns in low- and middle-income countries are optimally nursed according to these guidelines (8).

There are mothers who breastfeed throughout their second pregnancy. This practice is known as breastfeeding during pregnancy (BDP) (9-10). In this case, mothers have to decide about weaning their breastfed child or continue breastfeeding (11-12). In either Europe or the United States, mothers do not frequently engage in this practice (9). When nursing coincides with pregnancy, there is frequently a significant cultural taboo and many women wean their infants when they become pregnant again (14-16). Besides, because of expected criticism, this practice may not be discussed with health professionals (17-18).

There are considerable factors which may discourage mothers from attempting BDP (19-23). Mothers and health care professionals worry about the impact of breastfeeding on premature birth, miscarriage or low birth weight (24). Additionally, mothers usually wonder whether breastfeeding is going to affect their energy reserves or the nutrition of the fetus (25-26). According to previous studies, pregnant women who are properly nourished can support their body, the nursing child and the fetus (27). On the other hand, some studies showed that malnourishment could negatively affect the development of the fetus and the nutrients he/she needs for a smooth development (28).

There is much consideration about milk quality and quantity for the breastfeeding child. Although mother's milk remains beneficial (29), it changes in taste and quantity (30-31). This is usually the reason why most children who are breastfed by their pregnant mother stop breastfeeding on their own (26). Additionally, health care professionals seem to worry about the impact of BDP on infant nutrition, since the newborns needs are more important (32). Because of this fact and its potential impact on pregnancy outcomes, health experts do not suggest or prevent BDP in pregnant women. There is no doubt that BDP promotes mother-child attachment (29, 33-35), while it also facilitates the adjustment of the toddler to the new infant. The breastfed child does not need to be weaned abruptly, while he/she receives the valuable components of mother's milk (36). As long as the mother experiences a low-risk pregnancy and is

healthy, she has the opportunity to remain in this close relationship with her child, as his/her sibling grows inside her. Some of the benefits of BDP for the mother comprise the acquisition of self-respect, self-satisfaction and confidence in her offering. Therefore, BDP can maintain the pregnant woman's calmness and emotional relaxation (37).

Since the available studies have focused on isolated aspects of BDP, the consequences of BDP have not been clearly determined yet (38-39). This systematic review sheds light on the effects of BDP on the outcome of pregnancy and the risk of miscarriage. Our objective was to compile and synthesize the available evidence in order to determine whether BDP can lead to premature birth, miscarriage or low birth weight.

## MATERIALS AND METHODS

### Study design

We conducted a systematic literature review to find all data related to BDP and the consequences it has for the outcome of pregnancy. Information about BDP benefits and risks was collected and analyzed from the available publications, following the PRISMA guidelines for reporting the review (40). Articles identified via the PubMed, Scopus and Google Scholar search engines had to be published in English between 2014 and 2022.

We used the following search terms using multiple combinations: "breastfeeding OR lactation" AND "pregnancy OR gestation" AND "Breastfeeding During Pregnancy OR Breastfeeding While Pregnant AND "benefits OR profits OR advantages" AND "risks OR drawbacks OR miscarriage" AND "mother OR toddler OR infant".

### Inclusion and exclusion criteria

We selected articles published in internationally recognized scientific journals. All cohort cross-sectional studies and position papers that investigated the effects of breastfeeding during pregnancy were evaluated. The research outcomes had to address the topic of pregnancy outcomes, including the number of preterm births (babies delivered alive before week 37 of pregnancy) and spontaneous abortions (the loss of an embryo or fetus before week 22 of pregnancy) as well as infant's weight at birth. We

excluded studies that (a) were not quantitative, including editorial letters and review papers (whether systematic or not); (b) focused exclusively on either breastfeeding or the pregnancy period; and (c) did not report any effect or finding that could justify their selection.

### Study selection

All articles that emerged from the initial search were screened based on their titles and abstracts. First, we removed duplicate articles and then we applied exclusion criteria as mentioned above. We used the same exclusion criteria for the full-text screening of papers. Data extracted included the authors' names and publication year, the title of the article in English, the study design, and research aims, outcome measures and main findings. In order to process the data and findings, we used the method of narrative analysis due to the heterogeneity of studies that emerged from the systematic review in terms of design and method, results and form of each study (9, 25, 27).

### Quality assessment of the articles

Critical appraisal is the process of carefully and systematically assessing the outcome of scientific research to judge its trustworthiness, value and relevance. The Critical Appraisal Skills Program (CASP) Systematic Review Checklist 201725 was used to assess the quality of each publication (41) (Table 1). The ten criteria are classified as "yes", "no" or "can't tell".

## RESULTS

### Search outcomes

Two hundred fifty-seven records came from databases: 135 from Google Scholar, 66 from PubMed and 56 from Scopus. A total of 220 records, which remained after deduplication, were screened; 92 records not related to the subject were excluded during the initial screening based on their title and abstract. We excluded 15 more records for not having full text availability. Finally, we included 113 records in the data extraction and data analysis phase: full-text articles were assessed for full reading. Only five studies met the inclusion criteria and their full text was reviewed for further assessment.

Selected studies referred to breastfeeding during pregnancy and focused on pregnancy

outcome and risk of miscarriage. They compared the effects of BDP on pregnant lactating women with pregnant women who did not breastfeed their toddler.

### PRISMA diagram

The detailed selection process with the flow of information during the search and screening phases is illustrated in Figure 1.

### BDP effects on the outcome of the pregnancy

Most studies did not find any correlation between BDP and pregnancy outcome, pointing out that there was insufficient data. Ayrim (37) conducted a study by classifying two groups of women (subjects who became pregnant while breastfeeding and others who became pregnant after discontinuation of lactation). During pregnancy, all participants in the nursing group maintained breastfeeding. Members of the lactating group gained less weight during pregnancy than those of the non-lactating group, and this difference was statistically significant. Even though adverse pregnancy outcomes such as hyperemesis gravidarum, threatened abortion, preterm labor, and delivery were found to be higher in the lactating group than in the non-lactating one, this was not statistically significant, most likely due to the small number of subjects in each group.

Also, according to Cetin (25), there is not enough research to suggest that women of reproductive age who continue to breastfeed while pregnant have an increased risk of miscarriage or premature birth in the wider population as a whole. It is also improbable that the pregnancy-breastfeeding overlap would result in considerable intrauterine growth restriction, especially in healthy and properly nourished women from prosperous countries. Cetin pointed out that more research was needed in order to better understand the physiological and pathological consequence when a new pregnancy overlapped with breastfeeding.

Two studies highlighted some risks related to BDP (28, 38). Molitoris concluded that there was a positive association during the first five months of pregnancy and that the miscarriage rate was higher when mothers exclusively breastfed during pregnancy. In addition, Molitoris pointed out that the risk of miscarriage in case of subsequent pregnancy was heightened and it was relatively large compared to that attributed to other

TABLE 1. Methodological quality of studies according to the Critical Appraisal Skills Program (CASP)

Author(s), year (reference)	Did the review address a clearly focused question?	Did the authors look for the right type of papers?	Do you think all important relevant studies were included?	Did the review's authors do enough to assess the quality of the included studies?	If the results of the review have been combined, was it reasonable to do so?	What are the overall results of the review?	How precise are the results?	Can the results be applied to the local population?	Were all important outcomes considered?	Are the benefits worth the harms and costs?
Ayrim, 2014 (19)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Cetin <i>et al</i> , 2014 (9)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Shaaban <i>et al</i> , 2015 (11)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Molitoris, 2018 (12)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Molitoris, 2019 (20)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Notes: The first two questions are screening questions that may be quickly answered. If both answers are "yes," it is worthwhile to proceed with the subsequent questions. There is some overlap between questions, and it is required to record a "yes," "no," or "can't tell" response to the majority of them.

TABLE 2. Possible effect of breastfeeding during pregnancy on the outcome of pregnancy

Author(s), year (reference)	Positive correlation	Negative correlation	Comments
Ayrim, 2014 (37)		√	Insufficient data
Cetin <i>et al</i> , 2014 (25)		√	
Molitoris, 2018 (28)	√		
Molitoris, 2019 (38)	√		
Shaaban <i>et al</i> , 2015 (27)	√		

characteristics with known associations. However, no increased risk was found with complementary breastfeeding, but more research is necessary in order to associate the benefits from breastfeeding for both the mother and toddler with the estimated risk of miscarriage. The intensity of breast-feeding should also be considered as an important factor in the association between BDP and miscarriage risk, since breastfeeding duration differs between mothers, as well as the quantity of milk expressed. Finally, Shaaban *et al* (27) concluded that BDP was not related to a substantial rise in miscarriage rates but it was associated with an increased risk of maternal anemia, delayed fetal growth, extended labor, low birth weight, and lastly, a greater likelihood of having a caesarian section. When previous miscarriages were concerned, the risk of a miscarriage was increased. Table 2 illustrates the possible effect of DBF on pregnancy outcome, as pointed out by the relevant studies.

DISCUSSION

The findings of this review provide an overview of the most recent conclusions about BDP, since most selected articles are dated within the last eight years. In most cases, BDP does not pose a risk to the pregnancy and the fetus, especially if the pregnancy is normal. It cannot be considered that BDP is contraindicated, since there is not enough scientific data on the safety of BDF to support this reasoning (9, 25, 37).

Research questions were answered relating to the effect that BDP can have on the fetus and the outcome of the pregnancy itself. Given the nu-

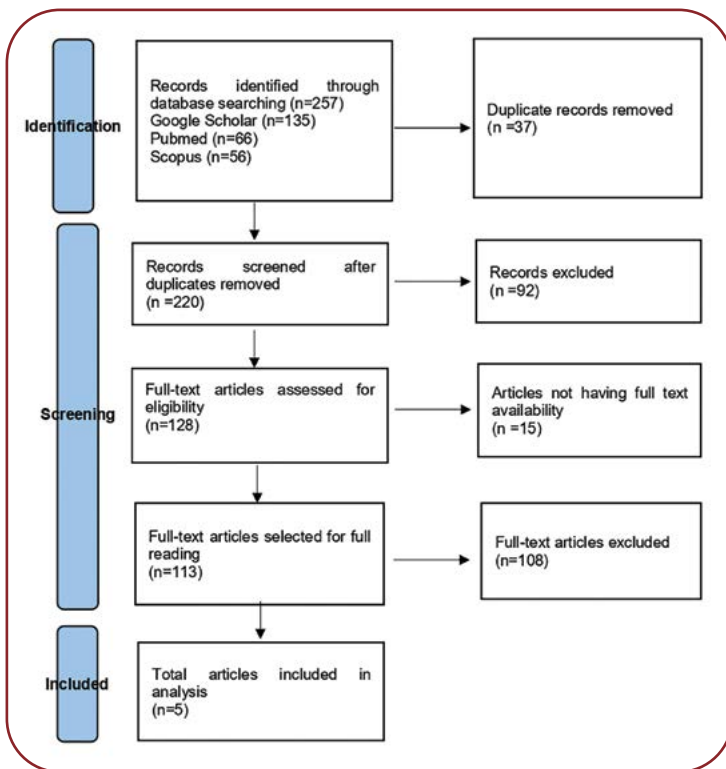


FIGURE 1. Flow diagram: structure search strategy



merous benefits of breastfeeding, the scarcity of research on the effect of BDP on fetal and newborn growth, and the fact that the most recent studies show no association or negative effect, BDP is recommended, but with the caveat that more research will be conducted. The risk of miscarriage is pointed out in case of a high-risk pregnancy (28, 38). Mothers who experience BDP need to be consistent with an adequate diet, enriched in vitamins and nutrients, sleep more hours and seek the advice and guidance of their gynecologist.

Additionally, literature does not justify stopping breastfeeding when the mother becomes pregnant again, since there is no correlation of BDP with the reduced fetal and neonatal weight and growth. The continued contact with the mother, the companionship of the newborn sibling, the joint experience of breastfeeding will strengthen the emotional and family bonds, while offering the nursing child all the benefits of breastfeeding. Provided that breastfeeding is complementary and the breastfed child is properly fed, there is no risk to its development. Nevertheless, further research is expected to lead to safer conclusions (9, 25, 42).

Breastfeeding during pregnancy could not have negative effects on the outcome of pregnancy under physiological conditions (9, 33, 43-44), and therefore the present study highlights the importance and necessity of the practice of BDP based on the desire of the mother, the safe state of the pregnancy and the numerous positive effects on both the breastfeeding mother and child (children) (45).

In case of a high-risk pregnancy, individual advice may differ, and healthcare professionals might decide to discourage breastfeeding in pregnant women with an insufficient nutrition, severe intrauterine growth restriction, or a history of recurrent miscarriage or a threat of premature delivery, to prevent a potential higher likelihood of uterine contractions (25). Mothers and health care professionals should cooperate in order to decide whether the mother is safe to breastfeed while pregnant. In addition, given the nutritional and energy requirements of both lactation and pregnancy, nursing mothers should be properly informed about the indicative diet they should follow. It remains a pious desire to properly inform and train health professionals so that they will be able to support lactating preg-

nant women by providing them with information, advice and breastfeeding techniques (46-47).

It is encouraged that nursing be supported during pregnancy, particularly during the first and second trimesters, by advising an adequate diet and nutrition to mothers who choose to continue breastfeeding. Breastfeeding is also considered safe in the third trimester of pregnancy, unless there is a risk of preterm birth (4).

The need of increasing new parents' understanding of BDP is undeniable in order to normalize it in the social context, acknowledge its usefulness, and recognize the consequent and significant contribution of the mothers who practice it (48).

## CONCLUSIONS

**B**reastfeeding during pregnancy appears to be unrelated to pregnancy outcome and miscarriage risk, notwithstanding the need for caution in women at risk of preterm birth and high-risk pregnancies. All studies recognized the high nutritional requirements and the importance of proper nutrition of the lactating pregnant woman, for a safe breastfeeding, for both the mother and child (children). Health care providers who offer pregnancy screening and breastfeeding support are required to be able to counsel women regarding BDP and give professional advice supported by scientific data. Most studies included in the present research support BDP provided that the mother is consistent with an adequate diet and she is willing and supported to continue breastfeeding. The studies also stress the fact that mothers could breastfeed during the third trimester of pregnancy unless there is a risk of premature delivery.

Undoubtedly, more research is needed using well-designed observational prospective studies which will compare mothers who experience BDP with others that do not, in order to clarify the outcome for the mother and the fetus. Further research, with larger samples and adequate methodology, is expected to lead to safer conclusions for BDP. □

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