

1 *Supplementary Table S1. PRISMA 2009 checklist*

<i>Section/topic</i>	<i>#</i>	<i>Checklist item</i>	<i>Reported on page #</i>
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	2
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	2
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed	3-4

(e.g., Web address), and, if available, provide registration information including registration number.

Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	3
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	3
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	3
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	3
Data collection process	1 0	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	4
Data items	1 1	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	4

Risk of bias in individual studies	1	Describe methods used for assessing risk of bias of individual studies	5
	2	(including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	
<hr/>			
Summary measures	1	State the principal summary measures (e.g., risk ratio, difference in means).	5-6
	3		
<hr/>			
Synthesis of results	1	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	5-6
	4		
<hr/>			
Risk of bias across studies	1	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	5-6
	5		
<hr/>			
Additional analyses	1	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	-
	6		
<hr/>			
RESULTS			
<hr/>			
Study selection	1	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	5
	7		

Study characteristics	1	For each study, present characteristics for which data were extracted	5-6
	8	(e.g., study size, PICOS, follow-up period) and provide the citations.	
Risk of bias within studies	1	Present data on risk of bias of each study and, if available, any	6
	9	outcome level assessment (see item 12).	
Results of individual studies	2	For all outcomes considered (benefits or harms), present, for each	6-8
	0	study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	
Synthesis of results	2	Present results of each meta-analysis done, including confidence	6-8
	1	intervals and measures of consistency.	
Risk of bias across studies	2	Present results of any assessment of risk of bias across studies (see	-
	2	Item 15).	
Additional analysis	2	Give results of additional analyses, if done (e.g., sensitivity or	-
	3	subgroup analyses, meta-regression [see Item 16]).	
DISCUSSION			
Summary of evidence	2	Summarize the main findings including the strength of evidence for	7-8
	4	each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	
Limitations	2	Discuss limitations at study and outcome level (e.g., risk of bias), and	8-9

5 at review-level (e.g., incomplete retrieval of identified research,
reporting bias).

Conclusions

2 Provide a general interpretation of the results in the context of other 8-9

6 evidence, and implications for future research.

FUNDING

Funding

2 Describe sources of funding for the systematic review and other 9

7 support (e.g., supply of data); role of funders for the systematic
review.

2

3

4 *Supplementary Table 2. Detailed search strategy for nine database searches.*

<i>No.</i>	<i>Databases</i>	<i>Search Terms</i>	<i>Results</i>
	<i>(Total 9)</i>		<i>Total=1992</i>
1	PubMed	(concurrent or overlap or contemporaneous or overlapping or coexistent or coexisting or coextensive or coincident or coincidental or overlapped) AND (pregnancy or conception or gestation or pregnant or pregnancies) AND ((breast feeding) or breastfeeding or breastfed or (Breast Milk) or breastmilk or (human milk) or lactation or (mother milk) or (mother's milk) or (maternal milk) or suckling)	548
2	Scopus	(concurrent or overlap or contemporaneous or overlapping or coexistent or coexisting or coextensive or coincident or coincidental or overlapped) AND (pregnancy or conception or gestation or pregnant or pregnancies) AND ((breast feeding) or breastfeeding or breastfed or (Breast Milk) or breastmilk or (human milk) or lactation or (mother milk) or (mother's milk) or (maternal milk) or suckling)	715
3	ISI (WOS)	(concurrent or overlap or contemporaneous or overlapping or coexistent or coexisting or coextensive or coincident or coincidental or overlapped) AND (pregnancy or conception or gestation or pregnant or pregnancies) AND ((breast feeding) or breastfeeding or breastfed or (Breast Milk) or breastmilk or (human milk) or lactation or (mother milk) or (mother's milk) or (maternal milk) or suckling)	521
4	WHO GHIL	(concurrent or overlap or contemporaneous or overlapping or coexistent or coexisting or coextensive or coincident or coincidental or overlapped) AND (pregnancy or conception or gestation or pregnant or pregnancies) AND ((breast feeding) or breastfeeding or breastfed or (Breast Milk) or breastmilk or (human	78

		milk) or lactation or (mother milk) or (mother's milk) or (maternal milk) or suckling)	
		==> Excluding Medline database	
5	VHL	(concurrent or overlap or contemporaneous or overlapping or coexistent or coexisting or coextensive or coincident or coincidental or overlapped) AND (pregnancy or conception or gestation or pregnant or pregnancies) AND ((breast feeding) or breastfeeding or breastfed or (Breast Milk) or breastmilk or (human milk) or lactation or (mother milk) or (mother's milk) or (maternal milk) or suckling)	75
		==> Excluding Medline database	
6	POPLINE	(coexistent or coexisting or coextensive or coincident or coincidental or overlapped) AND (pregnancy or conception or gestation or pregnant or pregnancies) AND ((breast feeding) or breastfeeding or breastfed or (Breast Milk) or breastmilk or (human milk) or lactation or (mother milk) or (mother's milk) or (maternal milk) or suckling)	2
7	SIGLE	(coexistent or coexisting or coextensive or coincident or coincidental or overlapped) AND (pregnancy or conception or gestation or pregnant or pregnancies) AND ((breast feeding) or breastfeeding or breastfed or (Breast Milk) or breastmilk or (human milk) or lactation or (mother milk) or (mother's milk) or (maternal milk) or suckling)	0
8	NYAM	1) Pregnancy and breast feeding Pregnancy and breastfeeding Pregnancy and breastfed Pregnancy and Breast Milk	7

Pregnancy and breastmilk

Pregnancy and human milk

Pregnancy and lactation

Pregnancy and mother milk

Pregnancy and mother's milk

Pregnancy and maternal milk

Pregnancy and suckling

2) Conception and breast feeding

Conception and breastfeeding

Conception and breastfed

Conception and Breast Milk

Conception and breastmilk

Conception and human milk

Conception and lactation

Conception and mother milk

Conception and "mother's milk"

Conception and "maternal milk"

Conception and suckling

3) Gestation and breast feeding

Gestation and breastfeeding

Gestation and breastfed

Gestation and Breast Milk

Gestation and breastmilk

Gestation and human milk

Gestation and lactation

Gestation and mother milk

Gestation and mother's milk

Gestation and maternal milk

Gestation and suckling

4) Pregnant and breast feeding

Pregnant and breastfeeding

Pregnant and breastfed

Pregnant and Breast Milk

Pregnant and breastmilk

Pregnant and human milk

Pregnant and lactation

Pregnant and mother milk

Pregnant and mother's milk

Pregnant and maternal milk

Pregnant and suckling

5) Pregnancies and breast feeding

Pregnancies and breastfeeding

Pregnancies and breastfed

Pregnancies and Breast Milk

Pregnancies and breastmilk

Pregnancies and human milk

Pregnancies and lactation

Pregnancies and mother milk

Pregnancies and mother's milk

Pregnancies and maternal milk

Pregnancies and suckling

9	Cochrane	(concurrent or overlap or contemporaneous or overlapping or coexistent or coexisting or coextensive or coincident or coincidental or overlapped) AND (pregnancy or conception or gestation or pregnant or pregnancies) AND ((breast feeding) or breastfeeding or breastfed or (Breast Milk) or breastmilk or (human milk) or lactation or (mother milk) or (mother's milk) or (maternal milk) or suckling)	46
----------	-----------------	--	-----------

5

6

7

8 **Supplementary Table S3. Quality assessment of included studies**

No.	Author/Year/Country	Result of Quality assesment
Quantitative synthesis		
1	Shaaban/2015/Egypt[1]	Low
2	Merchant/1990/Guatemala[2]	High
3	Madarshabian/2012/Iran[3]	Moderate
4	Albadran/2013/Iraq[4]	High
5	Ishii/2009/Japan[5]	High
6	Pareja/2015/Peru[6]	High
7	Marquis/2002/Peru [7], λ	High
8	Marquis/2003/Peru[8], λ	High
9	Merchant/1990/Guatemala[9]	High
10	Ayrim/2014/Turkey[10]	High
11	Sengul/2013/Turkey[11]	High
Qualitative synthesis		
12	Hassanabadi/2013/Iran[12]	High
13	Shaaban/2008/Egypt[13]	Moderate
14	Bohler/1996[14]	Moderate
15	Merchant/1991[15]	High
16	Ismail/2009/Egypt[16]	Low
17	Moscone/1993/UK[17]	High
18	Pike/1999/Kenya[18]	High
19	Siega-Riz/1993/Philippines[19]	High
20	Molitoris/2019/USA[20]	High

10 *Supplementary Table 3. Association of lactation with different aspects of delivery (Cesarean section vs Vaginal / Antepartum vs postpartum Hge vs*
 11 *prolonged labor/Full-term vs Post-term vs preterm)*

Variable	No. of study	Heterogeneity		Model	Delivery	
		p-value	I^2		p-value	Odds ratio (95% CI)
Mode of delivery						
<i>Cesarean section</i>	1	1.000	0	Fixed	0.001	1.80 (1.26-2.58)
Vaginal	1	1.000	0	Fixed	0.001	0.55 (0.39-079)
Overall mode of delivery (1036 patients)	1	0.000	95.24	Random	1.000	1.00 (0.78-1.29)
Delivery complications						
Ante-partum Hge	1	1.000	0	Fixed	0.070	2.92 (0.92-9.29)
Post-partum Hge	1	1.000	0	Fixed	0.173	1.85 (0.763-4.49)
Prolonged labor	2	0.228	31.21	Fixed	0.174	1.41 (0.86-2.31)
Overall delivery complications (651 patients)	2	0.416	0	Fixed	0.017	1.93 (1.12-3.31)
Threatened abortion						
Overall (165 patients)	1	1.000	0.00	Fixed	0.172	2.38 (0.69-8.21)
Time of delivery						
Full-term	5	0.295	18.80	Fixed	0.217	1.86 (0.90-1.55)
Post-term	1	1.000	0.00	Fixed	0.773	0.92 (0.54-1.59)

Preterm	4	0.663	0.00	Fixed	0.570	1.22 (0.61-2.46)
Preterm labor	2	0.045	78.09	Random	0.677	1.28 (0.40-4.04)
Overall time of delivery (2443 patients)	6	0.370	7.71	Fixed	0.420	1.09 (0.89-1.33)

12

Hemorrhage: Hge

Supplementary Table S4. Effect of lactation on different aspects of pregnant mothers

<i>Outcome</i>	<i>No. of study</i>	<i>Heterogeneity</i>		<i>Model used</i>	<i>Pregnancy</i>		
		<i>p-value</i>	<i>I²</i>		<i>p-value</i>	<i>Effect size</i>	<i>Effect size (95% CI)</i>
Prevalence of anemia in lactating Vs non-lactating							
Overall (540 patients)	1	1.000	0.00	fixed	0.000	OR	2.65 (1.87-3.77)
Hemoglobin (g/dl) level in lactating Vs non-lactating							
Overall (165 patients)	1	1.000	0.00	Fixed	0.000	MD	-2.6 (-3.13- -2.07)
Pregnancy problems							
Eclampsia	1	1.000	0.00	Fixed	0.172	OR	1.75 (0.79-3.89)
Elevated BP	1	1.000	0.00	Fixed	0.264	OR	0.76 (0.46-1.24)
Elevated BS	1	1.000	0.00	Fixed	0.853	OR	1.07 (0.51-14.34)
Hyperemesis	1	1.000	0.00	Fixed	0.220	OR	2.79 (0.54-14.34)
Multiple	2	0.060	71.70	Random	0.161	OR	1.76 (0.80-3.83)
Placental separation	1	1.000	0.00	Fixed	0.009	OR	3.79 (1.39-10.35)
Vaginal bleeding	1	1.000	0.00	Fixed	0.014	OR	3.56 (1.30-9.80)
Overall pregnancy problems (1025 patients)	3	0.002	68.45	Random	0.033	OR	1.38 (1.03-1.85)

Supplementary Table S5. Factors was revealed in one study or several studies that cannot be extracted

Factors	Association with breastfeeding on pregnancy
Fetal growth[9]·[21]	Negative association
Weight[9]	Negative association
Short reproductive intervals (<6 months)	
Reduction in fat stores[21] and higher supplement intake[9]·[21]	Positive association
Second day postpartum	
Increasing the value of lactose and lysozyme components[22]	Positive association
Decreasing the value of lactoferrin[22]	Positive association
One month postpartum	
Decreasing the immunoglobulin A concentration[22]	Positive association
More susceptible to develop cough, for at least seven days[22]	Positive association

SUPPLEMENTARY REFERENCES

1. O. M. Shaaban, A. M. Abbas, H. A. Abdel Hafiz, A. S. Abdelrahman, M. Rashwan, and E. R. Othman, "Effect of pregnancy-lactation overlap on the current pregnancy outcome in women with substandard nutrition: a prospective cohort study," *Facts, views & vision in ObGyn*, vol. 7, no. 4, pp. 213-221, 2015.
2. K. Merchant, R. Martorell, and J. Haas, "Maternal and fetal responses to the stresses of lactation concurrent with pregnancy and of short recuperative intervals," *Am J Clin Nutr*, vol. 52, no. 2, pp. 280-288, 1990.
3. F. Madarshahian, and M. Hassanabadi, "A comparative study of breastfeeding during pregnancy: impact on maternal and newborn outcomes," *J Nurs Res*, vol. 20, no. 1, pp. 74-80, 2012.
4. M. M. Albadran, "Effect of breastfeeding during pregnancy on the occurrence of miscarriage and preterm labour," *Iraq J of Med Sci.*, vol. 11, pp. 285-289, 2013.
5. H. Ishii, "Does breastfeeding induce spontaneous abortion?," *J Obstet Gynaecol Res*, vol. 35, no. 5, pp. 864-8, 2009.
6. R. G. Pareja, G. S. Marquis, M. E. Penny, and P. M. Dixon, "A case-control study to examine the association between breastfeeding during late pregnancy and risk of a small-for-gestational-age birth in Lima, Peru," *Matern Child Nutr*, vol. 11, no. 2, pp. 190-201, 2015.
7. G. S. Marquis, M. E. Penny, J. M. Diaz, and R. M. Marin, "Postpartum consequences of an overlap of breastfeeding and pregnancy: reduced breast milk intake and growth during early infancy," *Pediatrics*, vol. 109, no. 4, pp. e56-e56, 2002.
8. G. S. Marquis, M. E. Penny, J. P. Zimmer, J. M. Díaz, and R. M. Marín, "An overlap of breastfeeding during late pregnancy is associated with subsequent changes in colostrum composition and morbidity rates among Peruvian infants and their mothers," *J Nutr*, vol. 133, no. 8, pp. 2585-91, 2003.

9. K. Merchant, R. Martorell, and J. D. Haas, "Consequences for maternal nutrition of reproductive stress across consecutive pregnancies," *Am J Clin Nutr*, vol. 52, no. 4, pp. 616-20, 1990.
10. A. Ayrim, S. Gunduz, B. Akcal, and H. Kafali, "Breastfeeding throughout pregnancy in Turkish women," *Breastfeed Med*, vol. 9, no. 3, pp. 157-60, 2014.
11. Ö. Şengül, A. A. Sivaslioğlu, M. K. Kokanali, I. Üstüner, and A. F. Avşar, "The outcomes of the pregnancies of lactating women," *Turkish Journal of Medical Sciences*, vol. 43, no. 2, pp. 251-254, 2013.
12. M. Hassanabadi, and F. Madarshahian, "Effect of previous child lactation during pregnancy on the pregnancy outcome and newborns birth sizes," *The Horizon of Medical Sciences*, vol. 18, no. 4, pp. 197-202, 2013.
13. O. M. Shaaban, and A. F. Glasier, "Pregnancy during breastfeeding in rural Egypt," *Contraception*, vol. 77, no. 5, pp. 350-4, 2008.
14. E. Bøhler, and S. Bergström, "Child Growth During Weaning Depends on Whether Mother is Pregnant Again," *Journal of Tropical Pediatrics*, vol. 42, no. 2, pp. 104-109, 1996.
15. K. Merchant, R. Martorell, and J. Haas, "Nutritional adjustments in response to reproductive stresses within Guatemalan women," *Journal of tropical pediatrics*, vol. 37, pp. 11-14, 1991.
16. S. Ismail, M. Abd-Ellah, A. A. El-Khair, and E. Tamman, "Study of probable effects of a new pregnancy on some milk constituents in lactating women," *Research Journal of Medicine and Medical Sciences*, vol. 4, no. 1, pp. 49-54, 2009.
17. S. R. Moscone, and M. J. Moore, "Breastfeeding during pregnancy," *Journal of Human Lactation*, vol. 9, no. 2, pp. 83-88, 1993.
18. I. L. Pike, "Age, reproductive history, seasonality, and maternal body composition during pregnancy for nomadic Turkana of Kenya," *American Journal of Human Biology: The Official Journal of the Human Biology Association*, vol. 11, no. 5, pp. 658-672, 1999.
19. A. M. Siega-Riz, and L. S. Adair, "Biological determinants of pregnancy weight gain in a Filipino population," *Am J Clin Nutr*, vol. 57, no. 3, pp. 365-372, 1993.

20. J. Molitoris, "Breast-feeding During Pregnancy and the Risk of Miscarriage," *Perspectives on sexual and reproductive health*, vol. 51, no. 3, pp. 153-163, 2019.
21. K. Merchant, R. Martorell, and J. Haas, "Maternal and fetal responses to the stresses of lactation concurrent with pregnancy and of short recuperative intervals," *Am J Clin Nutr*, vol. 52, no. 2, pp. 280-8, 1990.
22. G. S. Marquis, M. E. Penny, J. P. Zimmer, J. M. Diaz, and R. M. Marin, "An overlap of breastfeeding during late pregnancy is associated with subsequent changes in colostrum composition and morbidity rates among Peruvian infants and their mothers," *J Nutr*, vol. 133, no. 8, pp. 2585-91, 2003.