

Breastfeeding and the Benefits of Lactation for Women's Health

Aleitamento materno e seus benefícios para a saúde da mulher

Luiz Antonio Del Ciampo¹ Ieda Regina Lopes Del Ciampo²

¹ Faculdade de Medicina de Ribeirão Preto da Universidade de São Paulo (FMRP-USP), São Paulo, SP, Brazil

² Universidade Federal de São Carlos, São Paulo, SP, Brazil

Address for correspondence: Luiz Antonio Del Ciampo, Faculdade de Medicina de Ribeirão Preto da Universidade de São Paulo (FMRP-USP), Avenida Bandeirantes, 3900, 14049-900, Ribeirão Preto, SP, Brazil (e-mail: delciamp@fmrp.usp.br).

Rev Bras Ginecol Obstet 2018;40:354–359.

Abstract

The offer of the maternal breast to the baby is an unquestionable right of mothers and their children, and all efforts should be made to promote, follow and maintain exclusive breastfeeding for up to 6 months and supplement it until the child completes 2 years of age. Many publications are available in the literature about the qualities of breast milk, its benefits and health repercussions, stimulating the practice of breastfeeding and supporting campaigns for its implementation. However, although it is widely known that breastfeeding is an important step in the reproductive process of women and its practice offers benefits to both mother and child, most of the available information highlights the benefits of breast milk for children, while mention of the effects of breastfeeding on the health of the mother is usually neglected. Thus, the objective of the present study is to highlight the multiple benefits of breastfeeding for the physical and emotional health of the nursing mother. The authors consulted articles published in the databases PubMed, Virtual Health Library and Web of Science using the keywords breastfeeding, breast milk, lactation and maternal health.

Keywords

- ▶ breastfeeding
- ▶ breast milk
- ▶ postpartum period

Resumo

A oferta do seio materno às crianças é um direito inquestionável das mães e de seus filhos, e todos os esforços devem ser feitos no sentido de promover, acompanhar e manter o aleitamento materno exclusivo até os 6 meses e complementado até que a criança complete 2 anos de idade. A literatura apresenta incontáveis publicações acerca das qualidades do leite materno, seus benefícios e repercussões para a saúde, estimulando a prática do aleitamento materno e embasando campanhas. Porém, mesmo sendo de conhecimento geral que a amamentação é uma importante etapa no processo reprodutivo da mulher e que sua prática oferece benefícios para mãe e filho, a grande maioria das informações destacam os benefícios que o leite materno oferece às crianças, esquecendo-se de mencionar todas as repercussões que o aleitamento materno traz para a saúde da mãe. Assim, o objetivo deste artigo é destacar os inúmeros benefícios que o aleitamento materno proporciona à saúde física e emocional da lactante. Para tanto, os autores consultaram artigos publicados nas bases de dados PubMed, Biblioteca Virtual de Saúde e *Web of Science* utilizando as palavras-chave aleitamento materno, leite materno, lactação e saúde materna.

Palavras-Chave

- ▶ aleitamento materno
- ▶ leite materno
- ▶ período pós-parto

received
August 31, 2017
accepted
January 24, 2018

DOI <https://doi.org/10.1055/s-0038-1657766>
ISSN 0100-7203.

Copyright © 2018 by Thieme Revinter Publicações Ltda, Rio de Janeiro, Brazil

License terms



Introduction

The offer of the mother's breast to her baby is a biologically and ethically unquestionable right of both mother and child and is of fundamental importance for the survival and quality of life of the nursing baby during its first years of life. Today, the benefits of breastfeeding are considered not to be limited to the duration of the practice, but to extend until adult life, with repercussions on the long-term quality of life.¹ Many publications are available in the literature about the qualities of breast milk, its benefits and health repercussions, stimulating the practice of breastfeeding and supporting campaigns such as the World Week of Breastfeeding. Even though it is widely known that breastfeeding is an important stage in the reproductive process of women and that its practice is beneficial for both mother and child, it can be seen that the information provided during prenatal care, puericulture practices or public health campaigns is directed at the benefits of breastfeeding for babies, while mention of all the effects of breastfeeding on the health of the mother is neglected.²

Lactation is a differential characteristic of mammals and both the synthesis and secretion of milk are complex biochemical and neuroendocrine processes that involve the sensitive terminals of the areole and the nipple and are under hormonal control. Thus, lactation is the direct and natural result of pregnancy and birth, like an integral part of reproductive process that benefits both mother and child simultaneously.³ The interaction of all of these factors will culminate with the production of milk and will definitely cause changes in the maternal organism by also favoring good physical and emotional health conditions for the nursing mother extending into her future life.^{4,5}

Benefits for the Mother

Breastfeeding (BF) seems to be related to good physical and emotional health for the mother during the puerperium, the lactation period and all her future life. Epidemiological studies have demonstrated that, compared with women who did not breastfeed, lactating women reported seeking for medical care less often, a lower frequency of respiratory, cardiocirculatory and gastrointestinal diseases, as well as fewer symptoms related to emotional problems.^{6,7} On this basis, it is possible to emphasize the benefits of breastfeeding for the lactating mother, as described in ► **Table 1**.

Table 1 Benefits of breastfeeding for the mother's health

Immediate	Long-term
Uterine involution Reduced bleeding Reduced infection Lactational amenorrhea Reduced adiposity and weight Reduced postpartum depression Reduced stress and anxiety Improved body image	Reduced: cancer (breast, ovarian, endometrium) endometriosis, diabetes, osteoporosis, blood pressure and cardiovascular diseases, metabolic syndrome, rheumatoid arthritis, Alzheimer disease and multiple sclerosis

1. Uterine involution and reduced bleeding

Early suckling of the areal-mammillary region is one of the most important stimuli for the production of oxytocin, which is also responsible for uterine contraction, accelerating the return of the organ to its normal size and reducing the possibility of the occurrence of postpartum hemorrhage and anemia. High levels of oxytocin can increase the pain threshold, reducing maternal discomfort and thus contributing to an increased feeling of love for the baby.⁸

2. Lactational amenorrhea

During the lactation period, both progesterone and estrogen are suppressed, with the occurrence of a period of infertility. While the mother exclusively breastfeeds, her protection against pregnancy can reach 96% during the first 6 months, thus ensuring spacing between pregnancies.^{9,10} To this end, the mother also must not have menstruated and should maintain exclusive breastfeeding on demand for at least eight times a day. Breastfeeding amenorrhea may be explained by the inhibition of ovarian activity resulting from high prolactin levels that lead to inhibition of the gonadotropin hormone and to the interruption of ovulation.¹¹ It has been estimated that, after the return of the menstrual cycles, the probability of conception is reduced by 7.4% for each additional month of breastfeeding.¹²

3. Weight and body image

During pregnancy, the body of a woman accumulates a weight of ~ 3 kg of fat that will be utilized throughout the first 6 months of breastfeeding, since this process consumes ~ 2,100 kJ/day.¹³ On this basis, there will be a more rapid weight loss and the return to pregestational conditions, with an average monthly reduction of 450 g in the maternal weight,¹⁴ since the released oxytocin also exerts its lipolytic and anorexigenic effects. A lower body mass index has been detected among mothers who breastfed for a period of 6–12 months, and those who exclusively breastfed were leaner than those who breastfed on a partial basis at the end of the first semester of life of the baby.^{15,16} A study conducted on 314 Mexican mothers revealed that those who exclusively breastfed for at least 3 months underwent a weight reduction of 4.1 kg compared with those who did not breastfeed.¹⁷ This observation confirmed the weight reducing capacity of breastfeeding, which provides a sensation of greater self-esteem and satisfaction with their body image among lactating women, reducing the possible occurrence of negative emotional factors that might interfere with milk production and with the practice of breastfeeding.

4. Postpartum depression

The birth of a child is usually a source of happiness and pleasure for the family. However, it is known that ~ 13% of all puerperae may develop signs and symptoms of depression within a period of 12 weeks after delivery.¹⁸ Among these women, oxytocin levels have been found to be lower than those of the other new mothers. Recent studies have shown that oxytocin is a fundamental element for the stimulation of

the bond between mother and child, triggering positive effects such as vocalization with the baby, looking into its eyes, encouraging touch and caresses. Mothers have reported that they feel calmer, less aggressive and stressed, in a better mood and more interested in socializing since the first postpartum days.¹⁹

Breastfeeding may also act on a mechanism of regulation of daytime cortisol secretion, with a stable concentration of the hormone possibly reducing the risk of postpartum depression.²⁰ Recent studies have demonstrated that women who do not start or maintain BF have a higher risk of depression during the postpartum period.²¹⁻²³ There is an inverse association between these phenomena due to the hormonal and psychological conditions that occur during the first 6-8 weeks of puerperium, since the lactogenic hormone, oxytocin and prolactin can have anxiolytic effects. This attenuates stress via neuroendocrine responses, since BF is associated with reduced adrenocorticotrophic hormone (ACTH) and cortisol levels. Suckling at the maternal breast preceded by skin to skin contact triggers this process and the longer the duration of this contact, the lower the cortisol levels.²⁴

5. Maternal stress

Several factors can be identified as sources of stress for the puerpera. The physical task of baby care together with other household activities, the few hours of sleep, changes in body image, reduced sexual activity and the emotional pressure of trying to be a good mother and to fulfill all the expectations represent an overload that is often incompatible with the personality and ability of a woman to carry out her role as a mother. In this situation, BF may act by reducing stress levels because of its effect on the reduction of cortisol and ACTH levels, consequently reducing the levels of anxiety.²⁵ In addition, the strengthening of the mother-child bond is a potent stimulus for BF maintenance for the longest possible time, closing a virtuous cycle that tends to benefit both mother and child.

6. Adiposity

The visceral or intra-abdominal fatty tissue accumulated by a woman during pregnancy is metabolically more active than the fat deposited in other areas and is related to cardiocirculatory diseases. However, these deposits can be mobilized during the lactation period, a process that continues to occur in parallel to BF, reducing the maternal weight and risk of type 2 diabetes mellitus.^{11,26}

7. Breast cancer

Mammary neoplasia is the most common gynecological cancer, quite prevalent after the fourth decade of life, although it can also occur before 40 years of age at frequencies ranging from 17-36%.²⁷ Several studies have pointed out the benefits of BF time and its consequent protective effect against the risk of breast cancer, since the reduction of estrogen levels during the lactation period reduces the rates of cell proliferation and differentiation. Tissue exfoliation and epithelial apoptosis at the end of the BF period may

contribute to the reduction of the probability of cells with mutation arising in mammary tissues.²⁸⁻³⁰ It is estimated that the risk of breast cancer can be reduced by more than 4% for each year of BF.^{27,31-33} According to UNICEF, a 16% increase in the proportion of mothers who breastfeed for 6 months can reduce the expected prevalence of breast cancer by 1.6% per year.³⁴

8. Ovarian cancer

Cancer of the ovarian epithelium is one of the neoplasias that most affect women and is usually diagnosed late, with a consequent reduction of survival prognosis. Some theories have indicated that its causes may be related to cell proliferation and uninterrupted ovulation traumas. On the other hand, the suppression of gonadotropins (luteinizing hormone in particular), the low concentration of estrogens and the consequent anovulation and amenorrhea caused by BF have been considered to be protective factors.^{35,36} The relative risk of developing ovarian cancer is estimated to be reduced by 2% for each month of BF.³⁷ Meta-analysis studies have observed an inverse relationship between these events and have reported that protection is greater when the time of BF is longer than 10 months.^{38,39} An analysis of prospective cohort and case-control studies has shown that women who have never breastfed had a probability of more than 30% of developing cancer of the ovarian epithelium.^{35,40} In addition to offering a lower risk of development of ovarian cancer among lactating women, BF can also increase the life-expectancy of women who have already developed the disease.⁴¹

9. Cancer of the endometrium

Over the last few years, several epidemiological studies have pointed out some relationship between cancer of the endometrium and BF and have shown that long periods of BF are associated with a reduced risk of this type of neoplasia.⁴²⁻⁴⁴

10. Endometriosis

Endometriosis is a common gynecological disease that affects more than 10% of reproductive-aged women. Common symptoms include dysmenorrhea, dyspareunia and infertility, and women who suffer from this chronic condition may experience a wide variety of symptoms, ranging from mild pain to extremely debilitating disease.⁴⁵ According to Farland et al,⁴⁵ the duration of total and exclusive BF was significantly associated with a decreased risk of endometriosis. For every additional 3 months of total BF per pregnancy, women experienced an 8% lower risk of endometriosis, and women who breastfed for ≥ 36 months in total across their reproductive lifetime had a 40% reduced risk of endometriosis compared with women who never breastfed.⁴⁶

11. Diabetes

The prevalence of type 2 diabetes mellitus has been increasing all over the world in parallel with the dietary changes, sedentarism and obesity that affect large part of the population. In this respect, it is opportune to emphasize an important action of oxytocin, which is a reduction of insulin

resistance. Meta-analysis studies have detected a statistically significant inverse association between BF duration and risk of type 2 diabetes.^{47,48} An important review study conducted by Perrine et al⁴⁸ detected an inverse and dose-dependent association between BF and type 2 diabetes, with a reduction of 4–12% of the risk of developing type 2 diabetes with each additional year of lactation. In contrast, among women who never breastfed, the risk was 50% higher compared with those who breastfed even for short periods of time ranging from 1–3 months.^{49,50}

12. Osteoporosis

Breastfeeding can contribute to the reduction of the risk of osteoporosis in future life since it has been demonstrated that lactating women have a bone mass with higher mineral density. Although the organism of women loses calcium during the BF period (with the production of 800 ml/day milk a woman can transfer as much as 200 mg calcium daily, which are recovered after weaning and with the return of menstruation), there are compensatory mechanisms that increase the intestinal and renal absorption of calcium and its mobilization from the bones, thus reestablishing bone mineral density.^{51–53} During the lactation period there is a 4–7% bone loss, especially in the lumbar spine and femoral head, which is reversed about 1 year after weaning.⁵⁴ The protective effect of this mechanism of bone demineralization is directly proportional to the duration of BF.⁵⁵

13. Blood pressure

Studies correlating BF with blood pressure have detected lower levels of both systolic and diastolic pressure among nursing mothers during the BF period, with the observation of a long-lasting dose–response effect, even though this effect may not persist until old age.^{56–61}

14. Cardiovascular diseases

Vascular changes, such as atherosclerotic plaque, increased wall thickness and reduced arterial lumen, increase the risk of cardiovascular diseases, a fact that has raised the interest of some investigators in the study of a possible association between lactation and these vascular changes.⁵⁰ Women who breastfeed for long periods of time, 7–12 months after the first delivery, have a 28% lower risk to develop vascular diseases compared with women who never breastfed.^{50,62} These findings are also associated with the weight loss and metabolic work to which the maternal organism is submitted for the daily production of milk, which may persist even after weaning, contributing to a beneficial effect on the maternal organism. Women with a total BF time of more than 2 years had a 23% lower probability of developing coronary diseases than women who never breastfed.²⁸ An inverse association has also been described between BF duration and atherosclerosis, after other confounding factors, such as smoking and obesity, are excluded, as determined by the thickness of carotid artery walls.⁶²

15. Metabolic syndrome

Metabolic syndrome (MS) is the result of several changes that include central obesity, arterial hypertension, dyslipi-

demia and insulin resistance, which, when associated, involve severe complications and high mortality rates. It is known that women who breastfeed for prolonged periods of time have a lower risk of the incidence of MS, after other factors, such as body mass index and parity, for example, are adjusted. One of the most important mechanisms involved in this occurrence is the reduced insulin resistance provided by BF, since a 12% reduction in the risk of MS development has been observed for each year of lactation.^{28,63,64}

16. Rheumatoid arthritis

A recent meta-analysis study by Chen et al⁶⁵ demonstrated that BF is associated with a lower risk of the onset of rheumatoid arthritis among nursing women, whether or not the duration of BF is longer than 12 months.

17. Alzheimer disease

Fox et al⁶⁶ studied a cohort of elderly English women and observed that the risk of developing Alzheimer disease was lower among those who had breastfed, possibly owing to the hormonal effects of estrogens on brain receptors and of insulin sensitivity triggered by BF.

18. Multiple sclerosis

Multiple sclerosis is a chronic autoimmune disease with a susceptibility and disease course that are influenced by reproductive factors, affects predominantly women during their childbearing years and the risk relapses is significantly diminished during pregnancy and exclusive BF. Among women who had live births, a cumulative duration of BF for ≥ 15 months was associated with a reduced risk of multiple sclerosis compared with 0–4 months of breastfeeding.⁶⁷

Conclusion

The benefits of BF for children have been known and reported for a long time, although the prevalence of this practice and the dissemination of its benefits for the nursing mother have been found not to be satisfactory in various parts of the world. Despite that great knowledge, relatively little progress has been made in improving BF outcomes, such as early initiation and exclusive breastfeeding for 6 months.³

Due to its individual and collective importance, the access to BF protection and support has also been framed as a human right with issues of social justice and equity becoming superlative.⁶⁸ Lactation plays an important role in maternal recovery from pregnancy, and can determine multiple aspects of maternal health in later life.⁶⁹ Therefore, informing pregnant women of the maternal health effects of lactation would strengthen their intentions to breastfeed. However, it is necessary to respect the wishes and rights of the mother, who must have autonomy to decide how to feed her child. The mother, in consultation with other family members, should be the one who decides how the child is to be fed, and in making this decision, the mother must be supported and aided by family, employers, health professionals and society.³ It is also the duty of health professionals to identify the knowledge, previous experience and social

and family context of women since the prenatal period to promote educational actions directed at the introduction and maintenance of BF when she so decides.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

References

- Rollins NC, Bhandari N, Hajeerbhoy N, et al; Lancet Breastfeeding Series Group. Why invest, and what it will take to improve breastfeeding practices? *Lancet* 2016;387(10017):491–504. Doi: 10.1016/S0140-6736(15)01044-2
- Spiro A. The public health benefits of breastfeeding. *Perspect Public Health* 2017;137(06):307–308. Doi: 10.1177/1757913917734139
- Kent G. Child feeding and human rights. *Int Breastfeed J* 2006; 1:27. Doi: 10.1186/1746-4358-1-27
- Mezzacappa ES, Guethlein W, Katkin ES. Breast-feeding and maternal health in online mothers. *Ann Behav Med* 2002;24(04):299–309. Doi: 10.1207/S15324796ABM2404_06
- Bosch OJ. Maternal nurturing is dependent on her innate anxiety: the behavioral roles of brain oxytocin and vasopressin. *Horm Behav* 2011;59(02):202–212. Doi: 10.1016/j.yhbeh.2010.11.012
- Gertosio C, Meazza C, Pagani S, Bozzola M. Breastfeeding and its gamut of benefits. *Minerva Pediatr* 2016;68(03):201–212
- Turck D, Vidailhet M, Bocquet A, et al; Comité de nutrition de la Société française de pédiatrie. Breastfeeding: health benefits for child and mother. *Arch Pediatr* 2013;20(Suppl 2):S29–S48. Doi: 10.1016/S0929-693X(13)72251-6
- Gremmo-Féger G. [An update on lactation physiology and breastfeeding]. *Arch Pediatr* 2013;20(09):1016–1021. Doi: 10.1016/j.arcped.2013.06.011
- Victora CG, Bahl R, Barros AJD, et al; Lancet Breastfeeding Series Group. Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelength effect. *Lancet* 2016;387(10017):475–490. Doi: 10.1016/S0140-6736(15)01024-7
- Van der Wijden C, Manion C. Lactational amenorrhoea method for family planning. *Cochrane Database Syst Rev* 2015;(10):CD001329. Doi: 10.1002/14651858.CD001329.pub2
- Chowdhury R, Sinha B, Sankar MJ, et al. Breastfeeding and maternal health outcomes: a systematic review and meta-analysis. *Acta Paediatr* 2015;104(467):96–113. Doi: 10.1111/apa.13102
- Labbok MH. Postpartum sexuality and the lactational amenorrhoea method for contraception. *Clin Obstet Gynecol* 2015;58(04):915–927. Doi: 10.1097/GRF.0000000000000154
- Lovelady C. Balancing exercise and food intake with lactation to promote post-partum weight loss. *Proc Nutr Soc* 2011;70(02):181–184. Doi: 10.1017/S002966511100005X
- Toma TS, Rea MF. [Benefits of breastfeeding for maternal and child health: an essay on the scientific evidence]. *Cad Saude Publica* 2008;24(Suppl 2):S235–S246. Doi: 10.1590/S0102-311 × 2008001400009
- Krause KM, Lovelady CA, Peterson BL, Chowdhury N, Østbye T. Effect of breast-feeding on weight retention at 3 and 6 months postpartum: data from the North Carolina WIC Programme. *Public Health Nutr* 2010;13(12):2019–2026. Doi: 10.1017/S1368980010001503
- Brandhagen M, Lissner L, Brantsaeter AL, et al. Breast-feeding in relation to weight retention up to 36 months postpartum in the Norwegian Mother and Child Cohort Study: modification by socio-economic status? *Public Health Nutr* 2014;17(07):1514–1523. Doi: 10.1017/S1368980013001869
- López-Olmedo N, Hernández-Cordero S, Neufeld LM, García-Guerra A, Mejía-Rodríguez F, Méndez Gómez-Humarán I. The associations of maternal weight change with breastfeeding, diet and physical activity during the postpartum period. *Matern Child Health J* 2016;20(02):270–280. Doi: 10.1007/s10995-015-1826-7
- Skrundz M, Bolten M, Nast I, Hellhammer DH, Meinschmidt G. Plasma oxytocin concentration during pregnancy is associated with development of postpartum depression. *Neuropsychopharmacology* 2011;36(09):1886–1893. Doi: 10.1038/npp.2011.74
- Jonas W, Woodside B. Physiological mechanisms, behavioral and psychological factors influencing the transfer of milk from mothers to their young. *Horm Behav* 2016;77:167–181. Doi: 10.1016/j.yhbeh.2015.07.018
- Dias CC, Figueiredo B. Breastfeeding and depression: a systematic review of the literature. *J Affect Disord* 2015;171:142–154. Doi: 10.1016/j.jad.2014.09.022
- Figueiredo B, Dias CC, Brandão S, Canário C, Nunes-Costa R. Breastfeeding and postpartum depression: state of the art review. *J Pediatr (Rio J)* 2013;89(04):332–338. Doi: 10.1016/j.jpmed.2012.12.002
- Binns C, Lee M, Low WY. The long-term public health benefits of breastfeeding. *Asia Pac J Public Health* 2016;28(01):7–14. Doi: 10.1177/1010539515624964
- Sipsma HL, Ruiz E, Jones K, Magriples U, Kershaw T. Effect of breastfeeding on postpartum depressive symptoms among adolescent and young adult mothers. *J Matern Fetal Neonatal Med* 2018;31(11):1442–1447
- Handlin L, Jonas W, Petersson M, et al. Effects of sucking and skin-to-skin contact on maternal ACTH and cortisol levels during the second day postpartum-influence of epidural analgesia and oxytocin in the perinatal period. *Breastfeed Med* 2009;4(04):207–220. Doi: 10.1089/bfm.2009.0001
- Benjamin Neelon SE, Stroo M, Mayhew M, Maselko J, Hoyo C. Correlation between maternal and infant cortisol varies by breastfeeding status. *Infant Behav Dev* 2015;40:252–258. Doi: 10.1016/j.infbeh.2015.06.005
- McClure CK, Catov J, Ness R, Schwarz EB. Maternal visceral adiposity by consistency of lactation. *Matern Child Health J* 2012;16(02):316–321. Doi: 10.1007/s10995-011-0758-0
- Zhou Y, Chen J, Li Q, Huang W, Lan H, Jiang H. Association between breastfeeding and breast cancer risk: evidence from a meta-analysis. *Breastfeed Med* 2015;10(03):175–182. Doi: 10.1089/bfm.2014.0141
- Stuebe AM, Willett WC, Xue F, Michels KB. Lactation and incidence of premenopausal breast cancer: a longitudinal study. *Arch Intern Med* 2009;169(15):1364–1371. Doi: 10.1001/archinternmed.2009.231
- González-Jiménez E, García PA, Aguilar MJ, Padilla CA, Álvarez J. Breastfeeding and the prevention of breast cancer: a retrospective review of clinical histories. *J Clin Nurs* 2014;23(17-18):2397–2403. Doi: 10.1111/jocn.12368
- Salone LR, Vann WF Jr, Dee DL. Breastfeeding: an overview of oral and general health benefits. *J Am Dent Assoc* 2013;144(02):143–151. Doi: 10.14219/jada.archive.2013.0093
- De Silva M, Senarath U, Gunatilake M, Lokuhetty D. Prolonged breastfeeding reduces risk of breast cancer in Sri Lankan women: a case-control study. *Cancer Epidemiol* 2010;34(03):267–273. Doi: 10.1016/j.canep.2010.02.012
- do Carmo França-Botelho A, Ferreira MC, França JL, França EL, Honório-França AC. Breastfeeding and its relationship with reduction of breast cancer: a review. *Asian Pac J Cancer Prev* 2012;13(11):5327–5332
- Islami F, Liu Y, Jemal A, et al. Breastfeeding and breast cancer risk by receptor status—a systematic review and meta-analysis. *Ann Oncol* 2015;26(12):2398–2407. Doi: 10.1093/annonc/mdv379
- Scocciati C, Key TJ, Anderson AS, et al. European Code against Cancer 4th Edition: breastfeeding and cancer. *Cancer Epidemiol* 2015;39:S101–106. Doi: 10.1016/j.canep.2014.12.007
- Luan NN, Wu QJ, Gong TT, Vogtmann E, Wang YL, Lin B. Breastfeeding and ovarian cancer risk: a meta-analysis of epidemiologic studies. *Am J Clin Nutr* 2013;98(04):1020–1031. Doi: 10.3945/ajcn.113.062794
- Sung HK, Ma SH, Choi JY, et al. The effect of breastfeeding duration and parity on the risk of epithelial ovarian cancer: a systematic

- review and meta-analysis. *J Prev Med Public Health* 2016;49(06): 349–366. Doi: 10.3961/jpmp.16.066
- 37 Danforth KN, Tworoger SS, Hecht JL, Rosner BA, Colditz GA, Hankinson SE. Breastfeeding and risk of ovarian cancer in two prospective cohorts. *Cancer Causes Control* 2007;18(05): 517–523. Doi: 10.1007/s10552-007-0130-2
- 38 Li DP, Du C, Zhang ZM, et al. Breastfeeding and ovarian cancer risk: a systematic review and meta-analysis of 40 epidemiological studies. *Asian Pac J Cancer Prev* 2014;15(12):4829–4837. Doi: 10.7314/APJCP.2014.15.12.4829
- 39 Feng LP, Chen HL, Shen MY. Breastfeeding and the risk of ovarian cancer: a meta-analysis. *J Midwifery Womens Health* 2014;59(04):428–437. Doi: 10.1111/jmwh.12085
- 40 Jordan SJ, Cushing-Haugen KL, Wicklund KG, Doherty JA, Rossing MA. Breast-feeding and risk of epithelial ovarian cancer. *Cancer Causes Control* 2012;23(06):919–927. Doi: 10.1007/s10552-012-9963-4
- 41 Zhan B, Liu X, Li F, Zhang D. Breastfeeding and the incidence of endometrial cancer: A meta-analysis. *Oncotarget* 2015;6(35): 38398–38409. Doi: 10.18632/oncotarget.5049
- 42 Wang L, Li J, Shi Z. Association between breastfeeding and endometrial cancer risk: evidence from a systematic review and meta-analysis. *Nutrients* 2015;7(07):5697–5711. Doi: 10.3390/nu7075248
- 43 Ma X, Zhao LG, Sun JW, et al. Association between breastfeeding and risk of endometrial cancer: a meta-analysis of epidemiological studies. *Eur J Cancer Prev* 2018;27(02): 144–151
- 44 Ameratunga D, Flemming T, Angstetra D, Ng SK, Sneddon A. Exploring the impact of endometriosis on partners. *J Obstet Gynaecol Res* 2017;43(06):1048–1053. Doi: 10.1111/jog.13325
- 45 Farland LV, Eliassen AH, Tamimi RM, Spiegelman D, Michels KB, Missmer SA. History of breast feeding and risk of incident endometriosis: prospective cohort study. *BMJ* 2017;358:j3778. Doi: 10.1136/bmj.j3778
- 46 Aune D, Norat T, Romundstad P, Vatten LJ. Breastfeeding and the maternal risk of type 2 diabetes: a systematic review and dose-response meta-analysis of cohort studies. *Nutr Metab Cardiovasc Dis* 2014;24(02):107–115. Doi: 10.1016/j.numecd.2013.10.028
- 47 Jäger S, Jacobs S, Kröger J, et al. Breast-feeding and maternal risk of type 2 diabetes: a prospective study and meta-analysis. *Diabetologia* 2014;57(07):1355–1365. Doi: 10.1007/s00125-014-3247-3
- 48 Perrine CG, Nelson JM, Corbelli J, Scanlon KS. Lactation and maternal cardio-metabolic health. *Annu Rev Nutr* 2016; 36:627–645. Doi: 10.1146/annurev-nutr-071715-051213
- 49 Schwarz EB, Brown JS, Creasman JM, et al. Lactation and maternal risk of type 2 diabetes: a population-based study. *Am J Med* 2010; 123(09):863.e1–863.e6. Doi: 10.1016/j.amjmed.2010.03.016
- 50 Melton LJ III, Bryant SC, Wahner HW, et al. Influence of breastfeeding and other reproductive factors on bone mass later in life. *Osteoporos Int* 1993;3(02):76–83. Doi: 10.1007/BF01623377
- 51 Kovacs CS. Maternal mineral and bone metabolism during pregnancy, lactation, and post-weaning recovery. *Physiol Rev* 2016;96(02):449–547. Doi: 10.1152/physrev.00027.2015
- 52 Lenora J, Lekomwasam S, Karlsson MK. Effects of multiparity and prolonged breast-feeding on maternal bone mineral density: a community-based cross-sectional study. *BMC Womens Health* 2009;9:19. Doi: 10.1186/1472-6874-9-19
- 53 Salari P, Abdollahi M. The influence of pregnancy and lactation on maternal bone health: a systematic review. *J Family Reprod Health* 2014;8(04):135–148
- 54 Wiklund PK, Xu L, Wang Q, et al. Lactation is associated with greater maternal bone size and bone strength later in life. *Osteoporos Int* 2012;23(07):1939–1945. Doi: 10.1007/s00198-011-1790-z
- 55 Jonas W, Nissen E, Ransjö-Arvidson AB, Wiklund I, Henriksson P, Uvnäs-Moberg K. Short- and long-term decrease of blood pressure in women during breastfeeding. *Breastfeed Med* 2008;3(02): 103–109. Doi: 10.1089/bfm.2007.0031
- 56 Ebina S, Kashiwakura I. Influence of breastfeeding on maternal blood pressure at one month postpartum. *Int J Womens Health* 2012;4:333–339. Doi: 10.2147/IJWH.S33379
- 57 Groer MW, Jevitt CM, Sahebzamani F, Beckstead JW, Keefe DL. Breastfeeding status and maternal cardiovascular variables across the postpartum. *J Womens Health (Larchmt)* 2013;22(05): 453–459. Doi: 10.1089/jwh.2012.3981
- 58 Lupton SJ, Chiu CL, Lujic S, Hennessy A, Lind JM. Association between parity and breastfeeding with maternal high blood pressure. *Am J Obstet Gynecol* 2013;208(06):454.e1–454.e7. Doi: 10.1016/j.ajog.2013.02.014
- 59 Schwarz EB, Ray RM, Stuebe AM, et al. Duration of lactation and risk factors for maternal cardiovascular disease. *Obstet Gynecol* 2009; 113(05):974–982. Doi: 10.1097/01.AOG.0000346884.67796.ca
- 60 Zhang BZ, Zhang HY, Liu HH, Li HJ, Wang JS. Breastfeeding and maternal hypertension and diabetes: a population-based cross-sectional study. *Breastfeed Med* 2015;10(03):163–167. Doi: 10.1089/bfm.2014.0116
- 61 Kelly KM, Chopra I, Dolly B. Breastfeeding: an unknown factor to reduce heart disease risk among breastfeeding women. *Breastfeed Med* 2015;10(09):442–447. Doi: 10.1089/bfm.2015.0082
- 62 Gunderson EP, Quesenberry CP Jr, Ning X, et al. Lactation duration and midlife atherosclerosis. *Obstet Gynecol* 2015;126(02): 381–390. Doi: 10.1097/AOG.0000000000000919
- 63 Choi SR, Kim YM, Cho MS, Kim SH, Shim YS. Association between duration of breast feeding and metabolic syndrome: The Korean National Health and Nutrition Examination Surveys. *J Womens Health (Larchmt)* 2017;26(04):361–367. Doi: 10.1089/jwh.2016.6036
- 64 Aguilar Cordero MJ, Madrid Baños N, Baena Garcia L, Mur Villar N, Guisado Barrilao R, Sánchez López MA. [Breastfeeding as a method to prevent cardiovascular diseases in the mother and the child]. *Nutr Hosp* 2015;31:1936–1946
- 65 Chen H, Wang J, Zhou W, Yin H, Wang M. Breastfeeding and risk of rheumatoid arthritis: a systematic review and metaanalysis. *J Rheumatol* 2015;42(09):1563–1569. Doi: 10.3899/jrheum.150195
- 66 Fox M, Berzuini C, Knapp LA. Maternal breastfeeding history and Alzheimer's disease risk. *J Alzheimers Dis* 2013;37(04):809–821. Doi: 10.3233/JAD-130152
- 67 Langer-Gould A, Smith JB, Hellwig K, et al. Breastfeeding, ovulatory years, and risk of multiple sclerosis. *Neurology* 2017;89(06): 563–569. Doi: 10.1212/WNL.0000000000004207
- 68 Ross-Cowdery M, Lewis CA, Papic M, Corbelli J, Schwarz EB. Counseling about the maternal health benefits of breastfeeding and mothers' intentions to breastfeed. *Matern Child Health J* 2017;21(02):234–241. Doi: 10.1007/s10995-016-2130-x
- 69 Pérez-Escamilla R, Sellen D. Equity in breastfeeding: where do we go from here? *J Hum Lact* 2015;31(01):12–14. Doi: 10.1177/0890334414561062