

The Neurological and Psychological Effects of Breastfeeding on Women

Abstract

Breastfeeding is the key element of infant feeding and has played a vital role in promoting infant health throughout history. It provides all the necessary nutrients for infants to grow and develop. The World Health Organization (WHO) recommends initiating breastfeeding right after birth and continuing with exclusive breastfeeding for the first 6 months, followed by complementary feeding up to 24 months of age. The WHO has also set targets to increase exclusive breastfeeding rates by 2025. As scientific research has advanced, the benefits of breastfeeding for infant health have become increasingly apparent, not only for metabolic diseases but also for cognitive health. As a result, researchers have started examining whether breastfeeding has any neurological or psychological effects on lactating mothers. In this review, we examined current research on the neurological and psychological effects of breastfeeding on women.

Keywords: Breastfeeding, maternal health, neuroscience

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Introduction

Breastfeeding has become an essential issue for infant nutrition over the years. The importance of breastfeeding for both mother and child has been known since prehistoric times.^[1] According to archaeological research, it is shown that mothers in prehistoric times breastfed their children until the 6th month after birth. Breastfeeding was considered sacred in ancient Egypt and Greece. Although it was neglected during the Renaissance, the importance of breastfeeding emerged with the development of medicine.^[1]

The World Health Organization (WHO) recommends that breastfeeding should be started 1 h after birth and continued for the first 6 months.^[2] Exclusive breastfeeding refers to feeding the infant only breast milk.^[3] After the first 6 months, the WHO recommends breastfeeding and complementary feeding until 24 months of age.^[2] The United Nations International Children's Emergency Fund released data on breastfeeding worldwide in 2021. While 47% of newborns started breastfeeding early, 67% were fed only with breast milk in the first 2 days after birth.^[4] By 2025, the WHO aims to increase the rate of exclusive

breastfeeding to at least 50% in the first 6 months.^[5]

Breast milk provides nutrients such as protein, vitamins, and minerals that ensure growth and development for babies. In addition, breast milk protects newborns against infections and reduces infant mortality.^[6] Studies show that breastfed newborns have a low risk of obesity and diabetes in childhood and adulthood.^[6,7] In addition, high intelligence and high cognitive performance may be associated with breastfeeding.^[6,8] Breastfeeding is not only beneficial for children. Breastfeeding women have a lower risk of certain metabolic diseases, cardiovascular diseases, breast, and ovarian cancers.^[6,9-13]

After all these studies and developments in neuroscience and psychology, scientists questioned the neurologic and psychological effects of breastfeeding on women. Most of the studies are focused on neurologic disease and breastfeeding, depression and anxiety, cognitive performance, hormonal changes, and their effects on women. In this review, we examine current studies about these effects.

Breastfeeding and Cognitive Functions

Some scientists have found that breastfeeding can affect cognitive

Received : 26-04-2023

Accepted : 17-11-2023

Published : 28-12-2023

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Ethics committee approval: There is no need for ethics committee approval.

How to cite this article: Tapırdamaz ŞN, Esencan TY. The neurological and psychological effects of breastfeeding on women. J Neurobehav Sci 2023;10:68-73.

Access this article online

Website: www.jnbsjournal.com

DOI: 10.4103/jnbs.jnbs_7_23

Quick Response Code:



performance in women, while others have found contrary evidence. For example, Fox *et al.*^[14] investigated the connection between cognitive functions and breastfeeding in 50-year-old and older women. The research assessed delayed recall, learning, executive functioning, and processing speed. After taking a reproductive history, a depression variable was included in the research. In the results, women who breastfed had better scores in every domain than those who did not breastfeed. Furthermore, in the nondepressed group, women had better scores in all four domains. In the depressed group, only executive functioning and processing speed scores were high. There was no significant difference between the duration of breastfeeding (1–12 months or >12 months). These results indicate that breastfeeding may protect the brain's cognitive health.^[14]

In a study conducted with 5487 postmenopausal women in China showed that breastfeeding was helpful for cognitive health. While longer or shorter than 12 months of breastfeeding was linked with a higher risk for cognitive impairment, there was no significant difference.^[15] Some studies search for connections between reproductive health history, cognitive impairment, and breastfeeding as one of the variables in the research.^[16–19] In a study that was held in Japan, it was found that there was no connection between breastfeeding and cognitive impairment.^[16] Another study that was conducted with 1364 Swedish women's health history data supported this result.^[17] However, Harville *et al.*^[18] and Yoo *et al.*^[19] provide evidence for the relationship between less breastfeeding and better cognitive health. According to Yoo *et al.*,^[19] breastfeeding for <6 months was associated with a lower risk of dementia. If the duration of breastfeeding had been longer than 6 months, the risk for dementia increased. On the contrary, Harville *et al.*^[18] indicate that breastfeeding for more than 12 weeks is beneficial for women.

The reasons for the relationship between breastfeeding and cognitive health are still controversial. One of the possible reasons is estrogen and its effects on the neurological system. Estrogen hormone may have a role in the amyloid- β and Tau protein regulation, which are involved in the pathogenesis of Alzheimer's disease (AD).^[20,21] After the studies revealed that estrogen could be protective against AD, scientists searched for the reproductive history and duration of estrogen exposure and their impact on dementia and AD. The above-mentioned articles also discuss the effects of estrogen on cognitive health.^[15–19] However, the results are contradictory. Three of the studies revealed that estrogen had no impact on cognitive health, or its impact was unclear.^[15,17,18] On the other hand, according to another two studies, short estrogen exposure throughout life was linked with worse cognitive function in women.^[16,19] Another study that supports these results was conducted with 8222 Singaporean Chinese women.^[22]

Shimizu *et al.*^[16] indicate that longer estrogen exposure is related to less cognitive impairment. Nulliparity is generally separated from the never-breastfed group in studies.^[14,16,18] Yoo *et al.*^[19] and Harville *et al.*^[18] found that nulliparity and cognitive impairment were correlated. These results point out that the mechanism and effect of estrogen on cognitive health remain unknown.

Other than the estrogen hypothesis, cardiovascular, and metabolic diseases such as hypertension and diabetes may have a role in the development of dementia and AD.^[23–25] Harville *et al.*^[18] show that gestational diabetes correlates with cognitive impairment while hypertension does not.

Breastfeeding and Stroke

As adequate scientific evidence exists that breastfeeding affects the risk of cardiovascular diseases,^[9,10,26–30] some studies show breastfeeding reduces stroke risk in women.^[31,32] In a study, 80,191 women between 50 and 79 years old were investigated and it demonstrated that women who breastfed had less stroke risk than those who did not. The duration of breastfeeding was negatively correlated with stroke risk. The authors highlighted that this association was stronger for non-Hispanic Black women.^[31] Another cohort study from China supports the finding that breastfeeding reduces the risk of stroke in women who breastfeed. In addition, authors indicate that breastfeeding affects subtypes of stroke differently and the underlying mechanisms of every type can cause this difference.^[32] However, a recent study by Jeong *et al.*^[33] revealed that breastfeeding enhanced the risk for myocardial infarction, but not stroke in premenopausal women.

Breastfeeding and Multiple Sclerosis

The relationship between multiple sclerosis (MS) and breastfeeding is another research area for scientists. Some of the studies line up with the benefits of breastfeeding, while some of them do not support it. In a systematic review and meta-analysis of Krysko *et al.*,^[34] 24 studies were investigated. The study reveals that breastfeeding is beneficial for women with MS. Especially, women who breastfed exclusively for at least 2 months have fewer relapses than those who breastfed nonexclusively or did not breastfeed. In a study conducted with 466 women, breastfeeding exclusively was related to a reduced risk of relapses in the first 6 months postpartum.^[35] The researchers indicated that using disease-modifying treatment (DMT) did not impact the relapse rate in the 1st year postpartum. Furthermore, there was no connection between disease severity and breastfeeding preference.^[35]

A study from Turkey supports the benefits of breastfeeding. One hundred and two pregnancies from women who have relapsing-remitting MS were examined. Women who breastfed for <3 months or who never breastfed had more relapses in the postpartum period. Moreover, using DMT

during pregnancy and problems with the fetus were not associated.^[36] In a study by Hradilek *et al.*^[37] which 1533 pregnancies were investigated, breastfeeding for <3 months was related to having a higher risk for relapses. In another study that compared pregnant women with nonpregnant women, Expanded Disability Status Scale (EDSS) scores were lower between 4 and 6 months postpartum in the pregnant and lactating groups.^[38] In a study by Ostrem *et al.*,^[39] 74 women with an EDSS score higher than three were evaluated for DMT use, magnetic resonance imaging, and breastfeeding. Breastfeeding for at least 3 months reduced the risk of postpartum relapses. However, it is important to emphasize that breastfeeding here defines both exclusive and nonexclusive breastfeeding.^[39] Lorefice *et al.*^[40] found that breastfeeding for more than 6 months was connected to lower white matter volume in the postpartum period. On the contrary, Zuluaga *et al.*^[41] investigated the effects of menarche, pregnancy, and breastfeeding on MS. The risk of clinically definite MS, McDonald 2010, and the EDSS 3.0 and 6.0 were evaluated for participants. The results revealed that breastfeeding did not affect the risk of MS or clinically isolated syndrome.

It is noteworthy that in some of the studies, it was found that women with higher disease activity tend to breastfeed less than women with lower disease activity and these women are more likely to receive DMTs after labor.^[34,36,38,40] Effects of DMTs during pregnancy are still unknown and more information is needed. According to Capone *et al.*,^[42] the choice between using DMT or breastfeeding a baby should be specific to every case so that the pros and cons can be discussed. Furthermore, in some studies, breastfeeding is approached as exclusive breastfeeding^[35,38,40] and in others just as “breastfeeding.”^[36,39,41] Hence, it is controversial how any breastfeeding or exclusive breastfeeding influences the results.

Breastfeeding and Mood Disorders

There is much research that investigates the relationship between mood disorders and breastfeeding. The prevalence of postpartum depression was found at 17.22% worldwide.^[43] According to some research, breastfeeding affects disorders such as postpartum depression and anxiety. In addition, breastfeeding and maternal bonding may be connected. In a study conducted in Portugal, women were examined from pregnancy to the 3rd month of postpartum. Women who exclusively breastfeed in the first 3 months of postpartum had fewer depression symptoms in the 3rd and 6th months of postpartum. Furthermore, women who had depression symptoms at the beginning of pregnancy breastfed less.^[44]

A recent meta-analysis reveals that women who breastfeed have a lower risk of postpartum depression. Moreover, according to this meta-analysis, exclusive breastfeeding and nonexclusive breastfeeding do not show the same effect.^[45] In a study from Bangladesh, the risk for

postpartum depression rises for women who do not breastfeed.^[46] Research from Croatia supports this finding. The researchers found that mothers who did not breastfeed were more depressed.^[47] In another study conducted with 511 mothers in Turkey, the connection between breastfeeding and postpartum depression was examined with the Edinburgh Postpartum Depression Scale (EPDS) and the Breastfeeding Self-Efficacy Scale (BSES). The results show that mothers who breastfed more had lower scores on the EPDS and higher scores on the BSES. Furthermore, the study indicates that results could be bidirectional. Mothers with depression breastfeed their babies less.^[48] There is research that supports this finding. For instance, in a study by Wallenborn *et al.*,^[49] women with depression before pregnancy breastfed their babies less. However, according to Woldeyohannes *et al.*^[50] postpartum depression has no impact on exclusive breastfeeding.

Moreover, early weaning from breastfeeding is more common in depressed or anxious mothers.^[51-55] A study demonstrates depressed mothers have problems with the initiation of breastfeeding.^[56] However, according to van der Zee-van den Berg *et al.*,^[57] not initiating breastfeeding reduces the risk of depression. Furthermore, researchers indicate that if you are still breastfeeding after 3 weeks of postpartum, the risk of depression decreases.

A recent study by Park and Choi^[58] reveals that breastfeeding might be advantageous later in life. 1372 women in the postmenopausal period were examined and it was found that an increase in the number of breastfed babies and breastfeeding time reduces the risk of depression. Some research shows breastfeeding can impact maternal bonding between mother and child positively.^[59-61] In response to this, there are studies claiming that other factors, besides breastfeeding, might affect maternal bonding, or that there is no connection with feeding style.^[62-64]

Taken together, the results of postpartum depression or anxiety and breastfeeding are still controversial. Some studies highlight that the education and age of the mother, social support, and problems with breastfeeding can affect mood or anxiety disorders in mothers.^[46,48,49,65] Furthermore, hormones such as oxytocin and prolactin are thought to have a role in mood and attachment. For instance, Matsunaga *et al.*^[66] found that oxytocin was related to positive emotions in mothers. Furthermore, oxytocin was found to relate to stress reduction and a better mood.^[67] However, Whitley *et al.*^[68] demonstrated oxytocin levels did not differ between depressed or anxious women and the control group. In a study conducted with breastfeeding mothers and bottle-feeding mothers, breastfeeding mothers were more sensitive to their babies. In addition, mothers with high levels of prolactin hormone were to be more sensitive. However, there was no significant difference in prolactin levels between breastfeeding mothers and bottle-feeding mothers.^[69]

Conclusion and Recommendations

It is shown that breastfeeding has a potential effect against some metabolic disorders in mothers. The causes of many diseases and human behaviors are revealed with the increase in studies to understand the brain and nervous system together with neuroscience, which is a developing field in recent years. Thus, neuroscience has included studies on the causes and consequences of maternal and breastfeeding behaviors and revealed that breastfeeding has not only metabolic but also neurological and psychological effects on mothers.

Considering the studies, the effects of breastfeeding on cognitive performance in old age are controversial. Based on the research, there may be a relationship between AD and hormones, which was also emphasized in previous studies. Therefore, studies are being done on the cognitive performance of the estrogen hormone in women and the development of dementia. Breastfeeding is also included in these studies as a period of hormonal change. While some studies have indicated that breastfeeding may protect the mother against dementia and AD in later life, others have not found any link. Further research is needed to elucidate these effects.

Researchers are working to ensure that pregnant and lactating women with an MS diagnosis can get through these periods in the most comfortable way and without disability for both themselves and their babies. For this reason, we focused on breastfeeding, which is thought to be a natural preventive method in addition to drug treatments. Considering the results of the research, it can be said that breastfeeding for the first 6 months may be protective for women who have less frequent attacks before delivery. Therefore, women can be encouraged to breastfeed their babies. For women with more progressive diseases, the necessity of drug therapy combined with breastfeeding should be questioned for the optimum health of the mother and baby.

The effects of breastfeeding on postpartum anxiety have been revealed by research. For this reason, mothers should be encouraged to breastfeed by both their relatives and health professionals. In this way, the mother can establish a positive bond with her baby. Mothers who cannot breastfeed for various reasons should not feel guilty for not being able to breastfeed.

Patient informed consent

There is no need for patient informed consent.

Ethics committee approval

There is no need for ethics committee approval.

Financial support and sponsorship

No funding was received.

Conflict of Interest

There is no conflict of interest to declare.

Author Contributions subject and rate

- Şeyda Nur Tapırdamaz (60%): Literature search, manuscript writing and editing.
- Tuğba Yılmaz Esencan (40%): Contributed with manuscript organization and editing.

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