

The effect of body and mind stress-releasing techniques on the breastfeeding of full-term babies; a critical analysis of published interventional studies

Catherine Fotiou, Tania Siahaniidou, Petros V. Vlastarakos MD, MSc, PhD, IDO-HNS (Eng.), Evangelia Filothei Tavoulari & George Chrousos

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Dr Catherine Fotiou

Email: fotiouk@hotmail.com

Affiliation 1:

“Helena Venizelou” Maternity Hospital, PICU, Athens, Greece

Professor Tania Siahaidou

Email: sihant@hotmail.com

Affiliation 1:

“Aghia Sophia” Children’s Hospital, 1st Dept. of Pediatrics, University of Athens, Athens, Greece

Dr Petros V. Vlastarakos MD, MSc, PhD, IDO-HNS (Eng.) (Corresponding Author)

Email: pevlast@hotmail.com

Affiliation 1:

Maieftirio Mitera, Otorhinolaryngology, 6 Erythrou Stavrou Str, Athens, 155 62 Greece

Dr Evangelia Filothei Tavoulari

Email: tavoul@yahoo.com

Affiliation 1:

Halkida District Hospital, Pediatrics, Athens, Greece

Professor George Chrousos

Email: chrouge@yahoo.com

Affiliation 1:

“Aghia Sophia” Children’s Hospital, 1st Dept. of Pediatrics, University of Athens, Athens, Greece

Abstract

Objective: To critically assess the effectiveness of complementary/alternative medicine modalities, comprising body/mind stress-releasing techniques, on the breastfeeding (BF) success of mothers of full-term newborns.

Methods: Literature review in Medline and other available database sources until December 2015, and critical analysis of pooled data. The study selection included randomized-controlled trials, case-control studies, and case-series.

Results: The total number of analyzed studies was 9. Among them, three represented level I, two level II, one level III, and three level IV evidence. The pooled maternal population was 2135. Interventions which could influence cognition management seem effective in improving BF initiation and duration (strength of recommendation B), manual relaxation techniques in promoting BF initiation (strength of recommendation B), and auditory-mediated mind guidance in promoting BF duration (strength of recommendation C). The implementation of environmental sensory stimulations improves maternal perception about breastfeeding practice (strength of recommendation C).

Conclusions: Certain methods of complementary and alternative medicine show positive effect on breastfeeding. Further studies with good quality evidence, dedicated follow up of the families after discharge, and strict definitions of breastfeeding and weaning are necessary to confirm the effectiveness of the identified interventions.

Keywords: newborn, mother, lactation, stress, cognition

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Introduction

Stress is a state in which the equilibrium of the organism (homeostasis) is actually or potentially threatened [1]. Homeostasis is physiologically re-established by a complex repertoire of behavioral and adaptive responses [1]. The regulation of the principle components of the human stress system is achieved by reciprocal interaction and self-controlled production of stress hormones [2, 3]. Any occurring imbalance in the stress system can be the result of several endogenous and exogenous stressors [4].

Although functional, or physiological, brain change and adaptation are parts of a lifelong process, the earliest phases of neuroendocrine system maturation during fetal – neonatal development and childhood are perhaps the most dramatic and important periods of increased sensitivity to stressors [5-8]. The regulation of responsiveness to stress in both mother and newborn is dependent upon a stable relationship between the mother-infant dyad, and there is also a bidirectional influence through feeding, temperature regulation and sensory stimulation [9, 10]. Indeed, the secretion of breastfeeding hormones (oxytocin – prolactin), as well as maternal diet, reduce the cortisol-releasing hormone of the mother (CRH), and have a favourable effect on anxiety and depression [9], whereas the maternal hormone leptin, which is present in breast milk, reduces the stress responses of the breastfed infant [10].

Despite the prophylactic effects of breastfeeding, it appears that various stressful events either antenatally or perinatally [11], may not only reduce the synthesis and secretion of breastmilk [12], but also cause psycho-emotional problems of the mother

to surface [13], thus negatively affecting the quality of parental care, as well as child behaviour [14, 15]. Furthermore, they may also incur increasing health care costs, in addition to problems in both the working and domestic environment [12, 16-18].

Much debate on interventions to promote successful breastfeeding in mothers of full term babies has focused on milk expression methods, early “skin to skin” contact, or enhancing mother-infant privacy [19-22]. Nevertheless, maternal stress and/or anxiety management, by employing complementary and alternative medicine practices, was also reported to positively influence breastfeeding success [23-25].

The aim of the present study was to critically assess the effectiveness of complementary and alternative medicine modalities, comprising body and mind stress-releasing techniques, on the breastfeeding success of mothers of full-term newborns.

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Materials and Methods

An extensive search of the literature was performed in Medline and other available database sources until December 2015, having as primary end-point the assessment of breastfeeding success in mothers participating in body and mind stress/anxiety-releasing programs, taking into account that such programs aim to support and empower mothers to withstand the difficulties which accompany childbirth. This was approached by employing quantitative and qualitative parameters. The quantitative parameters included monitoring the breastfeeding initiation and duration rates, whilst the qualitative ones recorded the evaluation of maternal perceptions on breastfeeding success.

Articles reporting the effect of body and mind stress-release techniques on breastfeeding success in mothers of full-term newborns were included in the study. During the search the keywords “breastfeeding”, “lactation”, “stress release”, “empowerment”, “infant”, “relaxation techniques” were utilized. The keywords “lactation”, “relaxation”, and “infant” were considered primary, and were either combined to each of the other keywords individually, or used in groups of three. Reference lists from the retrieved articles were also manually searched.

Results

Twelve studies met the inclusion criteria and were initially included in study selection. Among them, one was a general review about the use of complementary and alternative medicine during the gestational and postpartum periods, which, however, only reported the related methods without any attempt of formal assessment. This study was, therefore, excluded from study selection [26]. Another study aimed to explore whether the integration of cognitive-behavioural therapy (CBT) in the routine breastfeeding counselling process of community health workers improves exclusive breastfeeding [27]. However, that study mainly assessed the community health workers' feedback regarding the aforementioned practise and not the effect of CBT on breastfeeding initiation and duration [27]. Finally, a third study aimed to quantitatively assess the secretory IgA (sIgA) levels in the breast milk of already breastfeeding mothers practising relaxation techniques [28]. However, as the aim of the study was to evaluate the composition of breast milk, rather than to assess the breastfeeding success, that study was also excluded from selection.

Nine studies were finally included in the present critical analysis. Among them, five represented randomized controlled trials, one was a quasi-experimental case-control study, and the remaining three were case-series. The total number of mothers was 2135. The demographic data of the mothers and their infants were carefully examined to avoid double-counting of cases. The stress-releasing programs were initiated postnatally in seven studies, and antenatally in two.

Using this framework of results, the respective studies were then critically appraised, according to evidence-based guidelines for the categorization of medical studies (Tables 1A & 1B). Unfortunately, despite the common objective of the included studies and the large total number of participants, the analysis of pooled data was difficult because of the existing heterogeneity [i.e. method of evaluation of breastfeeding efficacy (qualitative vs. quantitative), type of stress releasing program]. Hence, the studies were clustered in four groups composed of two to three comparable studies of body and mind practices (Figure 1).

Three studies examined the effect of auditory-mediated mind guidance on breastfeeding practice [24, 29, 30]. Among them, two represented level I and one level IV evidence. Autogenic training (level I study) was found successful in promoting breastfeeding duration up to the sixth postpartum month. Guided imagery (level IV study) showed a similar trend. On the contrary, self-hypnosis (level I study) failed to show any difference in breastfeeding rates between the intervention and the two control groups.

Two studies investigated the association between specific environmental sensory stimulations and breastfeeding success [23, 31]). Both the use of music therapy (level II study) and the combination of visual, tactile, auditory and olfactory stimulations within the context of a specially designed room (Snoezelen room-level IV study) seemed to improve maternal perception about breastfeeding practice.

Two studies assessed the effectiveness of interventions which could influence cognition management, with regard to breastfeeding success [32, 33]. Cognitive-behavioural counselling doubled the rates of exclusive breastfeeding initiation and significantly prolonged exclusive breastfeeding duration in a Level II study, whilst mindfulness-based intervention resulted in improved maternal well-being and perception of self-efficacy in a level I study.

Finally, another two studies examined the effect of manual relaxation techniques on breastfeeding initiation [25, 34]. One level III study had employed back massage, and one level IV study reflexology to reduce maternal stress. Both studies showed the favourable effect of manual relaxation regarding the initiation of breastfeeding, but did not provide enough data on breastfeeding duration. Both studies showed a favourable effect of manual relaxation regarding the initiation of breastfeeding, but did not provide enough data on breastfeeding duration.

Discussion

Breastfeeding has been central to the survival of the human species and an emphatic symbol of motherhood. Nonetheless, it had transformed, in the previous century, from a physical activity to a lifestyle choice subjected to desires, obligations, and constraints in the context of a modern Western society [35].

Hence, modern mothers require active support for establishing and sustaining appropriate breastfeeding practices [36], and this had necessitated the “Innocenti Declaration on the Protection, Promotion, and Support of Breastfeeding” and the launch of the Baby-Friendly Hospital Initiative by WHO and UNICEF [37, 38], which were endorsed by individual governments and professional associations throughout the world (39, 40). Despite some improvements having been recorded in breastfeeding rates during the last decade, these continue to fall short of global recommendations both for exclusive and for any breastfeeding duration [41-43].

The lack in adhering to the 10 steps for successful breastfeeding, as well as various risk factors (i.e. increased maternal BMI gain during pregnancy, caesarean section, preterm birth, low socioeconomic status) and antenatal or perinatal stressful events, were shown to exert negative influence to either or both parts of the mother-infant dyad and affect breastfeeding initiation and duration. This, in turn, may cause medical and psycho-emotional problems either to the mother or the child, with potential impact in terms of public health [41, 43, 44-46].

Complementary and alternative medicine is followed by many women for several health reasons during pregnancy and after childbirth in an effort to avoid medications [26, 47]. A recent study in the United States revealed that as many as 36.6% of women during pregnancy and 27.8% during the postpartum period have resorted to these forms of medicine. One out of four of these women had used body and mind therapies as the most popular treatment modalities [26]. Despite the popularity of these practices, which in effect aim to reduce or prevent distress, anxiety, depressive symptoms and psychosomatic disorders by controlling the autonomous nervous system [48, 49], few studies in the literature have focused on their impact on breastfeeding success. In addition to the scarcity of studies investigating the effectiveness of body and mind stress-releasing techniques, employed in mothers of full-term newborns, on successful breastfeeding, there has not been an assessment of these studies according to the principles of evidence-based medicine. This was the aim of the present critical analysis.

Interventions influencing cognition management proved effective in improving breastfeeding practice [32, 33]. Based on the quality of evidence in support and the absence evidence opposing this outcome, the strength of the respective recommendation can be graded as B. Cognitive-behavioral counseling restructures beliefs and thoughts in the course of a learning process and guides mothers to replace the illogical and unreal beliefs with more precise and positive thoughts, thus resulting in a change of behaviors and habits [48]. The process of counseling does require, however, well-trained professionals to ensure the success of this method. In addition mindfulness-based interventions seem to reduce stress and anxiety in

breastfeeding mothers, thus improving maternal efficacy, which plays a major role in breastfeeding success [50].

In addition, manual relaxation techniques were effective in promoting successful breastfeeding initiation, despite the inherent differences in the manner of relaxation and well-being promotion between them. Based on the quality of evidence in support and the absence evidence opposing this outcome, the strength of the respective recommendation can be graded as B. Interestingly, manual relaxation techniques seem not only to improve quantitative breastfeeding parameters (i.e. initiation rate, volume of expressed milk, post-feed weight gain), but also qualitative ones (i.e. maternal satisfaction) [25, 34].

Auditory-mediated mind guidance seemed also to be an effective stress-releasing technique in promoting breastfeeding duration. Based on the quality of evidence in support and taking into account the quality of the evidence which did not confirm this outcome, the strength of the respective recommendation can be graded as C. This mainly involved autogenic training, which takes advantage of the anxiolytic effect of using visual imagination and verbal cues and making the body feel warm and relaxed [30]. The success of this technique is based on a psycho-physiologically determined relaxation response, which is elicited after the mother is familiar with a set of directives and exercises that guide the body to relax and control breathing, blood pressure, heartbeat, and body temperature, thus alleviating stress [48]. On the contrary, self-hypnosis failed to demonstrate clear benefits on breastfeeding practice, compared either to relaxation techniques, or no relaxation at all [29].

Finally, the implementation of environmental sensory stimulations resulted in improved maternal perception about breastfeeding practice [23, 31]. Indeed, this type of relaxation seems to promote maternal well-being, satisfaction, and self-perception regarding the breastfeeding experience, and induce a positive emotional response, which serve as an indirect qualitative marker of breastfeeding success. Based on the quality of evidence in support and the absence evidence opposing this outcome, the strength of the respective recommendation can be graded as C.

It has been demonstrated that emotional stimuli could affect the limbic as well as the peripheral neural system [51]. On the other hand, the positive impact of stress-releasing techniques on the central nervous system has been depicted in EEG recordings as predominate θ or α waveforms, indicating a decreased activity of the central nervous system similar to stage I of sleep, and may result in saving or restoring energy [52, 53]. It appears that the effects of relaxation techniques in both the central and peripheral nervous system result from the afferent and efferent neurotransmitters mediating sensory stimuli from the mesencephalon, and the emotion and decision centers to the target organs and vice versa [54].

Therefore, given the interaction between the reproductive and stress systems [1], further research on the neurobiological level could further elaborate the impact of relaxation techniques on lactation.

Limitations of the present critical review include the scarcity of studies investigating the effect of alternative mind and body stress-releasing programs on breastfeeding

practice, which reduces the strength of the respective recommendations to some extent, due to the difficulty in obtaining pooled data. Nevertheless, the studies included in the present analysis were assessed according to the principles of evidence-based medicine, thus avoiding the introduction of bias in the interpretation of the respective findings.

Conclusions

Breastfeeding is as much a natural act, as it is also a learned behaviour. Interventions which could influence cognition management seem effective in improving breastfeeding initiation and duration (strength of recommendation B), manual relaxation techniques in promoting breastfeeding initiation (strength of recommendation B), and auditory-mediated mind guidance in promoting breastfeeding duration (strength of recommendation C). Finally, the implementation of environmental sensory stimulations improves maternal perception about breastfeeding practice (strength of recommendation C).

Complementary and alternative medicine is followed by women for various health reasons during pregnancy and after childbirth. Although the positive effect of some of these methods on breastfeeding has been demonstrated in the present critical analysis, further studies with good quality evidence are necessary to confirm the effectiveness of the identified interventions. This would presuppose dedicated follow up of the families after discharge, and strict definitions of breastfeeding and weaning.

Conflict of interest

The authors report no conflicts of interest.

References

1. Chrousos GP. Stress and disorders of the stress system. *Nat Rev Endocrinol.* 2009; 5: 374-381.
2. Mastorakos G, Pavlatou M, Diamanti-Kandarakis E, Chrousos, GP. Exercise and the stress system. *Hormones.* 2005; 4: 73-89.
3. Blackburn Munro G, Blackburn Munro RE. Chronic pain, chronic stress and depression: coincidence or consequence? *J Neuroendocrinol.* 2001; 13: 1009-1023.
4. Liu RT. Stress generation: Future directions and clinical implications. *Clin Psychol Rev.* 2013; 33: 406-416.
5. Carini LM, Benjamin CN. Effects of early life social stress on endocrinology, maternal behavior, and lactation in rats. *Hormones Behav.* 2013; 64: 634-641.
6. Erhuma AM Glucocorticoids: Biochemical Group That Play Key Role in Fetal Programming of Adult Disease. *Glucocorticoids - New Recognition of Our*

Familiar Friend. INTECH Open Access Publisher. 2012; 451-478. Available from: <http://www.intechopen.com>

7. Buss C, Davis EP, Muftuler LT, Head K, Sandman CA. High pregnancy anxiety during mid-gestation is associated with decreased gray matter density in 6–9-year-old children. *Psychoneuroendocrinol*. 2010; 35: 141-153.

8. Dy J, Guan H, Sampath-Kumar R, Richardson BS, Yang K. Placental 11 β -hydroxysteroid dehydrogenase type 2 is reduced in pregnancies complicated with idiopathic intrauterine growth restriction: evidence that this is associated with an attenuated ratio of cortisone to cortisol in the umbilical artery. *Placenta*. 2008; 29: 193-200.

9. Slattery DA, Neumann ID. No stress please! Mechanisms of stress hyporesponsiveness of the maternal brain. *J Physiol*. 2008; 586: 377-385.

10. Walker CD, Deschamps S, Proulx K, et al. Mother to infant or infant to mother? Reciprocal regulation of responsiveness to stress in rodents and the implications for humans. *J Psychiatr Neurosci*. 2004; 29: 364.

11. O'Brien M. I think I can: exploring the influence of psychological factors on breastfeeding duration. [Dissertation]. USQ e-prints: University of Southern Queensland; 2007.

12. Lau C. Effects of stress on lactation. *Pediatr Clin North Am*. 2001; 48: 221-234.

13. Giakoumaki O, Vasilaki K, Lili L, Skouroliahou M, Liosis, G. The role of maternal anxiety in the early postpartum period: screening for anxiety and depressive symptomatology in Greece. *J Psychosom Obstet Gynecol*. 2009; 30: 21-28.

14. Adedinsewo DA, Fleming AS, Steiner M, Meaney MJ, Girard AW. Maternal anxiety and breastfeeding findings from the MAVAN (Maternal Adversity, Vulnerability and Neurodevelopment) study. *J Hum Lact.* 2014; 30: 102-109.
15. Feder A, Nestler EJ, Charney DS. Psychobiology and molecular genetics of resilience. *Nat Rev Neurosci.* 2009; 10: 446-457.
16. Murgatroyd CA, Nephew BC. Effects of early life social stress on maternal behavior and neuroendocrinology. *Psychoneuroendocrinol.* 2013; 38: 219-228.
17. Stuebe AM, Stuebe AM, Grewen K, Pedersen CA, Propper C, Meltzer-Brody S. Failed lactation and perinatal depression: common problems with shared neuroendocrine mechanisms? *J Women's Health.* 2012; 21: 264-272.
18. Dennis CL, McQueen K. The relationship between infant-feeding outcomes and postpartum depression: a qualitative systematic review. *Pediatrics.* 2009; 123: e736-e751.
19. Albert J, Heinrichs Breen J. An evaluation of a breastfeeding privacy sign to prevent interruptions and promote successful breastfeeding. *J Obstet Gynecol Neonat Nurs.* 2011; 40: 274-280.
20. Becker GE, McCormick FM, Renfrew MJ. Methods of milk expression for lactating women. *Cochrane Database Syst Rev.* 2008; 4.
21. Lonstein JS. Regulation of anxiety during the postpartum period. *Frontiers Neuroendocrinol.* 2007; 28: 115-141.
22. Moore ER, Anderson GC, Bergman N. Early skin-to-skin contact for mothers and their healthy newborn infants. *Cochrane Database Syst Rev.* 2007; 3.

23. Hauck YL, Summers L, White E, Jones C. A qualitative study of Western Australian women's perceptions of using a Snoezelen room for breastfeeding during their postpartum hospital stay. *Int Breastfeed J.* 2008; 3: 20.
24. Cowley KC. Psychogenic and pharmacologic induction of the let-down reflex can facilitate breastfeeding by tetraplegic women: a report of 3 cases. *Arch Phys Med Rehabil.* 2005; 86: 1261-1264.
25. Tipping L, Mackereth PA. A concept analysis: the effect of reflexology on homeostasis to establish and maintain lactation. *Complement Ther Nurs Midwifery.* 2000; 6: 189-198.
26. Birdee GS, Kemper KJ, Rothman R, Gardiner P. Use of Complementary and Alternative Medicine During Pregnancy and the Postpartum Period: An Analysis of the National Health Interview Survey. *J Women's Health.* 2014; 23: 824-829.
27. Rahman A, Haq Z, Sikander S, Ahmad I, Ahmad M, Hafeez A. Using cognitive behavioural techniques to improve exclusive breastfeeding in a low literacy disadvantaged population. *Matern Child Nutr.* 2012; 8: 57-71.
28. O'Connor ME, Schmidt W, Carroll-Pankhurst C, Olness KN. Relaxation training and breast milk secretory IgA. *Arch Pediatr Adolesc Med.* 1998; 152: 1065-1070.
29. Werner A, Uldbjerg N, Zachariae R, Nohr EA. Effect of self-hypnosis on duration of labor and maternal and neonatal outcomes: a randomized controlled trial. *Acta Obstet Gynecol Scand.* 2013; 92: 816-823.

30. Vidas M, Folnegović-Šmalc V, Čatipović M, Kisić M. The Application of Autogenic Training in Counseling Center for Mother and Child in Order to Promote Breastfeeding. *Coll Antropol.* 2011; 35: 723-731.
31. Procelli DE. The Effects of Music Therapy and Relaxation Prior to Breastfeeding on the Anxiety of New Mothers and the Behavior State of Their Infants During Feeding [dissertation]. Tallahassee, FL: Florida State University; 2005.
32. Sikander S, Maselko J, Zafar S, et al. Cognitive-Behavioral Counseling for Exclusive Breastfeeding in Rural Pediatrics: A Cluster RCT. *Pediatrics.* 2015; 135: e424-e431.
33. Perez-Blasco J, Viguer P, Rodrigo MF. Effects of a mindfulness-based intervention on psychological distress, well-being, and maternal self-efficacy in breast-feeding mothers: results of a pilot study. *Arch Women's Ment Health.* 2013; 16: 227-236.
34. Patel U, Gedam DS. Effect Of Back Massage On Lactation Among Postnatal Mother. *Int J Med Res.* 2013; 1: 5-13.
35. Zimmerman DR, Guttman, N. Breast is best: Knowledge among low-income mothers is not enough. *J Hum Lact.* 2001; 17: 14-19.
36. Tavoulari EF, Benetou V, Vlastarakos PV, Andriopoulou E, Kreatsas G, Linos A. Factors affecting breast-feeding initiation in Greece: What is important? *Midwifery.* 2015; 31: 323-331.
37. Naylor AJ. Baby-Friendly Hospital Initiative: Protecting, promoting, and supporting breastfeeding in the twenty-first century. *Pediatr Clin North Am.* 2001; 48: 475-83.

38. World Health Organization. Evidence for the ten steps to successful breastfeeding. Geneva, Switzerland. 1998; 48: 475-483.
39. Yngve A, Sjöström M. Breastfeeding determinants and a suggested framework for action in Europe. *Public Health Nutr.* 2001; 4: 729-739.
40. Yngve A, Sjöström M. Breastfeeding in countries of the European Union and EFTA: current and proposed recommendations, rationale, prevalence, duration and trends. *Public Health Nutr.* 2001; 4: 631-645.
41. Office of disease prevention and Health promotion. ODPHP website. Increase the proportion of infants who are breastfed. <https://www.healthypeople.gov/2020/topics-objectives>. Accessed January 20, 2016.
42. Skouteris H, Nagle C, Fowler M, Kent B, Sahota P, Morris H. Interventions designed to promote exclusive breastfeeding in high-income countries: A systematic review. *Breastfeed Med.* 2014; 9: 113-127.
43. Nickel NC, Labbok MH, Hudgens MG, Daniels JL. The extent that noncompliance with the ten steps to successful breastfeeding influences breastfeeding duration. *J Hum Lact.* 2013; 29: 59-70.
44. Centers for Disease Control and Prevention (CDC) The CDC guide to strategies to support breastfeeding mothers and babies. <http://www.cdc.gov/breastfeeding>. Accessed January 20, 2016.
45. Feldman-Winter L. Evidence-based interventions to support breastfeeding. *Pediatr Clin North Am.* 2013; 60: 169-187.
46. Zhu P, Hao J, Jiang X, Huang K, Tao F. New insight into onset of lactation: mediating the negative effect of multiple perinatal biopsychosocial stress on breastfeeding duration. *Breastfeed Med.* 2013; 8: 151-158.

47. Marc I, Toureche N, Ernst E, et al. Mind body interventions during pregnancy for preventing or treating women's anxiety. *The Cochrane Library*. 2011; 6.
48. Varvogli L, Darviri C. Stress Management Techniques: evidence-based procedures that reduce stress and promote health. *Health Sci J*. 2011; 5: 74-89.
49. Tang YY, Ma Y, Fan Y, et al. Central and autonomic nervous system interaction is altered by short-term meditation. *Proc Nat Acad Sci*. 2009; 106: 8865-8870.
50. Pollard D, Guill M. The relationship between baseline self-efficacy and breastfeeding duration. *Southern Online J Nurs Res*. 2009; 9: 8.
51. Douglas AJ. Baby love? Oxytocin-dopamine interactions in mother-infant bonding. *Endocrinol*. 2010; 151: 1978-1980.
52. Mikicin M, Kowalczyk M. Audio-Visual and Autogenic Relaxation Alter Amplitude of Alpha EEG Band, Causing Improvements in Mental Work Performance in Athletes. *Applied Psychophysiol Biofeedback*. 2015; 1-9.
53. Jacobs GD, Friedman R. EEG spectral analysis of relaxation techniques. *Applied Psychophysiol Biofeedback*. 2004; 29: 245-254.
54. Stefano GB, Fricchione GL, Esch T. Relaxation: Molecular and physiological significance. *Med Sci Monit*. 2006; 12: HY21-HY31.

Tables

Table 1

Levels of evidence regarding the primary research question in studies that investigate the results of a treatment (<http://www.cebm.net/index.aspx?o=1025>)

Category of evidence	Study design
Level I	<ul style="list-style-type: none">• high quality randomized trial with statistically significant difference, or no statistically significant difference but narrow confidence intervals• systematic review of Level I randomized control trials (and study results were homogenous)
Level II	<ul style="list-style-type: none">• lesser quality randomized control trial (e.g. < 80% follow up, no blinding, or improper randomization)• individual cohort study• systematic review of Level II studies or Level 1 studies with inconsistent results
Level III	<ul style="list-style-type: none">• case control study• systematic review of Level III studies
Level IV	<ul style="list-style-type: none">• case series• lesser quality cohort or case control study
Level V	<ul style="list-style-type: none">• expert opinion

Table 2

Strength of recommendation by category of evidence for guideline development

(<http://www.cebm.net/index.aspx?o=1025>)

Strength of recommendation	Category of evidence
A	consistent level I studies
B	consistent level II or III studies or extrapolations from level I studies
C	level IV studies or extrapolations from level II or III studies
D	level V evidence or troublingly inconsistent or inconclusive studies of any level

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Table 3

Effect of relaxation techniques on breastfeeding initiation and/or duration

Authors	Type of study	Evidence level	Intervention	N° of cases	Follow up	Outcome of interest	p	Remarks
Sikander et al, 2015	RCT	II	CBT	224 IG/ 228 CG	6/12	EBF duration	<.001	the intervention doubled the rates and significantly prolonged EBF duration
Werner, et al, 2013 [49]	RCT	I	Self-Hypnosis	497 IG/ 495 CG1/ 230 CG2	4/12	Any BF duration	.52	no difference in lactation success was seen across the groups
Vidas et al, 2011	RCT	I	Autogenic training	50 IG/ 50 CG	6/12	EBF duration	.05	a) significantly higher rate of BF infants up to 6 months of life b) autogenic training demonstrated anxiolytic effect in BF mothers
Patel et al, 2013	case-control study	III	Back massage	100 IG / 120 CG	3/7	baby-related lactation parameters	.05	all parameters of lactation related to the baby (post-feed weight gain, quality of sleep, quantity of stools and urine) were improved
Cowley, 2005	case series	IV	Guided imagery	3 tetraplegic mothers	3-18/12	BF initiation and duration	n/a	active mental imaging and relaxation could trigger the milk expression reflex
Tipping & Mackereth, 2000	case series	IV	Reflexology	3 mothers having a complicated term delivery	4/7	BF initiation	n/a	successful BF initiation in all cases

Abbreviations: RCT= randomized control trial, CBT= cognitive behavioural treatment, IG= intervention group, CG= control group, EBF=exclusive breastfeeding, BF=breastfeeding, n/a= not applicable

Table 4

Maternal perceptions of breastfeeding success after employing relaxation techniques

Authors	Type of study	Evidence level	Intervention	N° of cases	Follow up	Outcome for interest	p	Remarks
Perez-Blasco et al, 2013	RCT	I	Mindfulness-based intervention	13 IG /13 CG	8/52	perception: a) of maternal self-efficacy b) of self-kindness, c) of stress	a) .004 b) .002 c) .006	A mindfulness-based intervention effectively improves maternal well-being and self-efficacy, and reduces psychological distress
Hauck et al, 2008	Case series	IV	Snoezelen room relaxation	11 mothers with their babies	6/52	the effectiveness of Snoezelen room on BF	n/a	a) multiple sensory stimulations inside a quiet homelike environment promote mother-infant dyad relaxation and improve the perception of BF success b) perception of BF duration until 4-6/12 was 100% and >6/12 was 72%
Procelli, 2005	RCT	II	PMR	30 IG / 30 CG	7/7	a) maternal comfort and relaxation in BF b) infant behaviour during BF	a) <.001 b) >.05	a) positive emotional response on BF efficacy in mothers who used music relaxation during breastfeeding b) no significant difference regarding the behavioural scores of breastfed babies

Abbreviations: RCT= randomized control trial, IG= intervention group, CG= control group, EBF=exclusive breastfeeding, BF=breastfeeding, n/a= not applicable, PMR= music along with relaxation

Figures

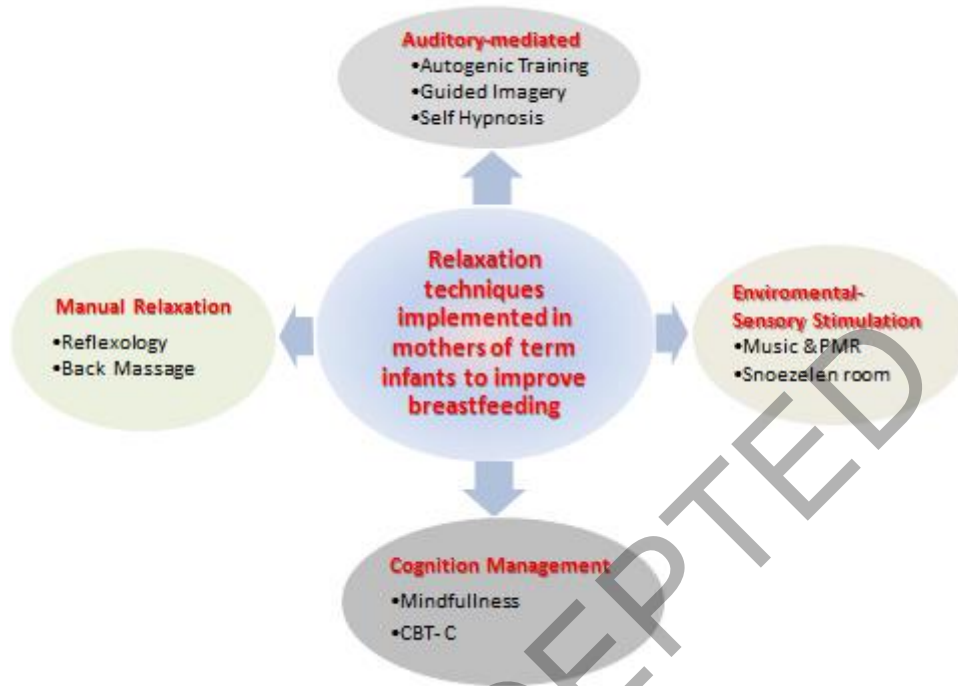


Figure 1

Body and mind stress relief relaxation techniques

(Abbreviations: CBT-c : cognitive behavioural therapy-counselling, PMR: progressive muscle relaxation)