

Are There Any Cures for Sore Nipples?

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Sore nipples are the bane of breastfeeding mothers. Nipple pain and/or damage ranks in the first 2 or 3 reasons for the early abandonment of breastfeeding. There exists a plethora of suggested remedies, many of which have little or no high quality evidence to recommend their use. This article reviews approaches to managing sore nipples and suggests that more research be conducted to better remedy this ongoing problem.

Keywords: breastfeeding, sore nipples, treatments

Sore nipples are the bane of breastfeeding mothers. Some women experience nothing more than transient discomfort whereas others may suffer protracted excruciating pain. Sore nipples are a common complaint of breastfeeding mothers and rank in the top two or three reasons why mothers terminate breastfeeding early in the lactation experience (Murimi, Dodge, Pope, & Erickson, 2010). This is especially true for African American and low-income mothers (Alexander, Dowling, & Furman, 2010). The incidence of sore nipples varies among studies, with as many as 96% of mothers reporting nipple discomfort at some point during the first 6 weeks postpartum (Ziemer, Paone, Schupay, & Cole, 1990).

Antenatal Interventions

For decades, mothers were taught antenatal nipple conditioning techniques in the hope of preventing sore nipples (see Box 1). Prenatal nipple conditioning techniques have, for the most part, been abandoned because high-quality evidence of their effectiveness is lacking.

Box 1. Historical Nipple Preparation Techniques

- Nipple rolling
- Rubbing with terry cloth towel
- Hoffman's exercises (areolar stretching)
- Avoidance of soap on nipples
- Masse cream or other ointments
- Air exposure under clothing
- Breast shells
- Nipple stretching

Researchers have measured the length of women's nipples prenatally and compared this to the LATCH (Jensen, Wallace, & Kelsay, 1994) score of their newborn infants. A prenatal nipple length of 7mm was considered the cut-off point for nipple length that facilitated successful latching. Mothers with a nipple length of less than 7mm had infants who more frequently scored less than 8 on the LATCH assessment tool. The 7mm nipple length might be a possible screening indicator that would signal the clinician to provide more intensive breastfeeding monitoring and support postpartum should a mother's nipple measure less than this (Puapornpong, Raungrongmorakot, Paritakul, Ketsuwam, & Wongin, 2013).

Some mothers with very flat or inverted nipples identified during the antenatal period, use a device called the Niplette to mechanically stretch the shortened internal tissues. The concept of tissue expansion through continuous long-term application of suction is derived from the plastic and aesthetic surgery disciplines. The Niplette is a transparent thimble-like mold with a syringe port through which the air is evacuated after placement over the nipple. The syringe is detached while the device is worn for eight or more hours during the day for the first 6 months of the pregnancy. A small amount of Vaseline or other lubricant is placed around the base of the mold to improve the seal.

Building on the concept of mechanical stretching, a product called the Supple Cup has been used for prenatal eversion of flat nipples (Bouchet-Horwitz, 2011). Supple Cups are small thimble-like silicone cups that are squeezed to evacuate the air, placed over the nipple and released to create a vacuum that exerts traction on the nipple. They are worn under breast shells beginning at the 37th week of gestation.

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Flat and Inverted Nipples

Dewey, Nommsen-Rivers, Heinig, and Cohen (2003) demonstrated that suboptimal breastfeeding behaviors were significantly associated with flat or inverted nipples. Difficulty latching to the breast because of a nipple that cannot be elongated and placed properly in the infant's mouth can lead to not only sore nipples but also macerated/traumatized nipples that require more extensive interventions. Table 1 provides a summary of prenatal and postpartum interventions for flat or inverted nipples that may prevent or reduce pain and damage to nipples with these alterations.

There are many contributors to sore nipples, some of which include poor positioning, improper latch, dysfunctional or disorganized sucking, flat or inverted nipples, ankyloglossia, strong vacuum application by the infant (McClellan et al., 2008), *C. albicans*, eczema, Raynaud's phenomenon, vasospasm, nipple bleb, incorrect pump flange size, and bacterial infection. Interventions that address the source of the problem are the first line of action.

- Correction of positioning and latch is generally the first approach to eliminating sore nipples, with remediation often seen by the simple improvement of the infant's latch (Blair, Cadwell, Turner-Maffei, & Brimdyr, 2003; Darmangeat, 2011).
- Interventions are undertaken when sucking skills are compromised (Watson Genna, 2013).
- Ankyloglossia (tongue-tie) is generally improved by frenotomy (Buryk, Bloom, & Shope, 2011; Dollberg, Botzer, Grunis, & Mimouni, 2006).
- *C. albicans* should be identified and treated either topically and/or systemically (Morrill, Heinig, Pappagianis, & Dewey, 2004; Panjaitan, Amir, Costs, Rudland, & Tabrizi, 2008; Porter & Schach, 2004).
- Eczema usually responds to removal of an irritant or allergen and/or the application of topical corticosteroids (Amir, 1993; Barankin & Gross, 2004).
- Raynaud's phenomenon may respond to the application of warmth and avoidance of cold exposure, the discontinuation of vasoconstricting drugs such as caffeine and nicotine, and/or the use of nifedipine (Anderson, Held, & Wright, 2004; Lawlor-Smith & Lawlor-Smith, 1996; O'Sullivan & Keith, 2011; Wu, Chason, & Wong, 2012).
- In a study by O'Hara (2012), nipple bleb histology showed the lack of bacteria or fungi and the presence of immune cells when the rubbery white nipple pore blockages were removed and studied microscopically. Blebs resistant to conventional treatments were removed by O'Hara using a punch biopsy tool that resolved the pain and symptoms. The presence of immune cells indicated a tissue reaction to milk that had leaked from the nipple pore and infiltrated into the surrounding tissue. Based on these findings, O'Hara recommended a short daily course of a very thin layer of a mid-potency steroid under an occlusive dressing to enhance penetration of the steroid into the inflamed and fibrotic tissue. Nipple blebs appeared to be an inflammatory response to nipple trauma in some women.
- An incorrect pump flange size has been identified as a source of nipple pain for some mothers expressing their milk. Nipples swell during pumping (Wilson-Clay & Hoover, 2008) and some mothers may require a larger flange size to prevent or remain free of pain (Meier, Motyhowski, & Zuleger, 2004). Some mothers may even need a different size flange for each breast, or that as lactation progresses they may actually require a smaller shield (Jones & Hilton, 2009). If mothers cannot achieve a comfortable fit by changing flange sizes, they may find relief by using a product called Pumpin Pal. This is an angled flange that may better accommodate some breasts (Walker, 2010).
- Once the integrity of the nipple skin has been breached, it becomes highly susceptible to colonization and infection by bacteria such as *S. aureus*. This can lead to prolonged nipple pain, delayed healing, complications, and the need for more aggressive interventions (see Box 2).

There is an association between severe nipple soreness and colonization and infection of the nipple by *S. aureus*, so careful washing of the nipple with soap and water and the application of mupirocin 2% ointment (Bactroban) may be effective in the early stages of the infection (Livingstone, Willis, & Berkowitz, 1996). Bacteria can grow in colonies and protect the colony with a shield or coating called a biofilm. These biofilms protect the bacteria from antibiotic therapy and the mother's immune system. To disrupt this protective biofilm, the nipple wound should be washed with soap and water once a day, followed by a coating of mupirocin. Once the biofilm has been disrupted or broken down, the topical antibiotic can reach the affected area, promote wound healing, and prevent progression to a florid infection (Ryan, 2007).

Table 1. Summary of Interventions for Flat or Inverted Nipples

Intervention	Pros	Cons
ANTENATAL		
Prenatal correction techniques	Familiarizes mothers with handling their breasts	Is generally ineffective and is seldom recommended
Prenatal mechanical stretching with Niplette	Is an effective tissue expander	Has the potential for pain and bleeding if too much suction is applied
Prenatal mechanical stretching with Supple Cup	Gradually everts nipples	May experience some discomfort and/or scant bleeding
Prenatal surgical correction	Is very effective in correcting inverted nipples	Has a high potential for severing ducts within the nipple and impeding breastfeeding; generally not recommended
POSTBIRTH		
Cold compress prior to feeding	Will cause contraction of erector muscles	May not be sufficient to affect an inverted nipple or provide enough graspable tissue for some infants
Pull and roll nipple prior to feeding	Is a fast and easy method to evert a nipple	May not stay everted long enough for some infants or provide sufficient graspable tissue
Pop out nipple prior to feeding by fingertip pressure behind the nipple	Is a fast and easy method to evert a nipple	May not be effective with inverted nipples or nipples tightly tethered to underlying tissue
Breast pump	Extends nipple away from areola, stretching it into nipple tunnel	Distributes vacuum over a large area; causes nipple swelling; nipples may not stay everted very long
A 10-ml modified syringe used prior to each feeding (Kesaree, Banapurmath, Banapurmath, & Shamanur, 1993)	Is easy, inexpensive, effective method to evert nipple	May not be allowed by some hospitals that restrict the use of non-FDA approved devices
Evert-It Nipple Enhancer	Is an FDA approved device for everting flat nipples	Have little data about its effectiveness
Latch Assist	Is an FDA approved device for everting flat nipples	Have little data about its effectiveness
Supple Cups	Can be worn in between or just prior to feedings	There is only one small study demonstrating their effectiveness
Breast shells	May help reduce areolar edema surrounding nipple	May cause tissue damage if areolar edema is present and shells are worn for extended periods
Reverse pressure softening (Cotterman, 2004)	Helps reveal nipple enveloped by edematous areola	May not expose enough of the nipple for infant to grasp
Teacup hold	May provide sufficient tissue for a good latch	Is not effective on an engorged breast or edematous areola
Dimple ring	Is a simple device to hold open a dimpled nipple for air drying	May be difficult to locate
Nipple shield	Is useful if no other techniques or devices are effective in facilitating a good latch	May be difficult for some infants to learn to latch without the shield
Niplette	Is effective in stretching the nipple	Loses suction if milk gets into the mold

Source: Walker, M. (2010). *The nipple and areola in breastfeeding and lactation*. Amarillo, TX: Hale Publishing.

Box 2. Potential Sequelae of Cracked Nipples

- *S. aureus* as a resident bacteria on the nipple skin.
- Nipple trauma and cracks breach nipple skin integrity.
- *S. aureus* strains penetrate superficial layers of broken epidermis.
- Toxins produced cause inflammation, epidermal separation, and blisters.
- Blisters open causing erosions that become covered by a yellow, crusted exudate.
- Pain occurs that could be sufficient to inhibit letdown or reduce milk transfer leading to milk stasis.
- Infection might occur in ascending lactiferous ducts.
- Mastitis could develop if infection is not treated.
- Abscess may develop if mastitis is not treated.

Source: Walker, M. (2010). *The nipple and areola in breastfeeding and lactation*. Amarillo, TX: Hale Publishing.

Much of a mother's nipple pain may stem from inflammation. Low- to medium-strength steroids applied as a thin coat to the nipples might provide pain relief (Huggins & Billon, 1993). If clinicians see exudate from the nipple wound, if erythema (redness) increases, or dry scabs do not form, then systemic antibiotics may be necessary. If the painful nipples persist, this could be a combination of yeast and bacterial infection, in which case clinicians may wish to use miconazole 2% as the antifungal preparation along with mupirocin and a topical steroid (Porter & Schach, 2004). Eglash and Proctor (2007) reported on a set of signs and symptoms (nipple cracks that did not heal despite systemic antibiotics, dull throbbing of the breasts, sharp shooting pains, breast pain on palpation), whose laboratory findings of the cultured milk were typical of infections caused by small colony variants (SCVs) of staphylococci. SCVs cause persistent, antibiotic-resistant, refractory infections that can take many weeks of antibiotics to clear (von Eiff, Peters, & Becker, 2006). Treatment options for cracked or damaged nipples appear in Box 3.

No matter what the cause of sore nipples, mothers and clinicians often want an additional treatment that will

Box 3. Treatment Options for Cracked or Damaged Nipples

Correct positioning and latch.

If there is a break in the nipple skin:

Wash nipple with soap and water once each day.

Apply topical mupirocin.

Avoid pacifier use or wash pacifiers thoroughly with soap and water.

Apply topical low strength steroids for inflammation.

If exudate is seen, erythema increases, or dry scab is absent:

Add systemic antibiotics.

If *C. albicans* is suspected, add topical 2% miconazole.

If infection is recurrent or persistent:

Treat infant with nasal mupirocin because the infant may be a carrier of *S. aureus* and infect or reinfect the mother's nipple (Amir, Garland, & Lumley, 2006).

Test for SCV; ask for culture and sensitivity laboratory testing.

If SCV are present, switch to macrolide therapy.

Be watchful for an ascending infection (mastitis).

Correct anemia.

Source: Walker, M. (2010). *The nipple and areola in breastfeeding and lactation*. Amarillo, TX: Hale Publishing.

reduce the pain and hasten the healing of traumatized tissue. Remedies for sore nipples have been seen in the medical literature since the 17th century, with all manners of plasters, poultices, and ointments applied topically as comfort measures. In spite of the plethora of treatments for sore nipples that have been recommended over the years (Table 2), no single treatment agent has been shown to be clearly superior to all others (Morland-Schultz & Hill, 2005).

Research studies on sore nipple interventions use differing methodologies, are inconclusive, and often inconsistent or contradictory in outcomes. When

Table 2. Some Treatments for Sore Nipples Over the Years

Warm-water compresses	Lanolin	Saline soaks
Wet tea bags	Vitamin E oil	Hydrogel dressings
Triple antibiotic	Herbal and botanical preparations	Olive oil
All-purpose nipple ointment	Homeopathic preparations	Peppermint water
Peppermint gel	Commercial nipple creams	Expressed breast milk
Virgin coconut oil	A & D ointment	Lotrimin AF
LED phototherapy	Bacitracin	Bactroban
Micatin	Monistat	Medihoney
Systemic antibiotics	Gentian violet	Nifedipine
Soft-laser therapy	Systemic antibiotics	Topical lecithin

Note. LED = light-emitting diode.

comparing treatments, some agents yield better results than others (see Table 3).

Recommendations for sore-nipple therapies do not always have high level research to support their use or may extrapolate approaches used in other disciplines. Plant extracts are often the base of topical wound treatments because many produce flavonoid compounds with phenolic components. These phytochemicals are highly reactive and act to neutralize the effects of free radicals or initiate biological effects.

Green Tea Bags

Green tea includes a class of polyphenol compounds called catechins that enhance natural wound healing (Hsu, 2005). At certain concentrations, green tea polyphenols have the ability to stimulate aged keratinocytes (epidermal cells that synthesize keratin—the cornified [horny] layer of skin that is a protective layer to mechanical injury, microbial invasion, and water loss) and reduce healing time of epidermal wounds (Hsu et al., 2003). Mothers may find some relief from abraded, sore nipples by the use of green tea bags soaked in warm water.

Peppermint

Peppermint (*Mentha piperita*) has been shown to have a calming and numbing effect on skin irritations (Blumenthal, Goldberg, & Brinckmann, 2000); increase tissue flexibility and improve its resistance to cracking (Schelz, Molnar, & Hohmann, 2006); demonstrate strong antibacterial and anti-inflammatory activity; and possess both fungistatic and fungicidal activities (Mimica-Dukic & Božin, 2008; Mimica-Dukić, Božin, Soković, Mihajlović, &

Matavulj, 2003). In a study on the prophylactic use of peppermint gel on nipples, mothers in three groups were instructed to either rub peppermint gel on their nipples following each feeding, rub lanolin on their nipples after feedings, or use a placebo following feedings. The rate of cracked nipples was 22.6% in the placebo group, 6.9% in the lanolin group, and 3.8% in the peppermint gel group (Melli et al., 2007). Although the use of peppermint gel was more effective on the prevention of cracked nipples, Sayyah and colleagues (2007) found that even peppermint water used prophylactically on nipples was three times more effective in preventing nipple cracks than expressed breast milk (27% expressed breast milk compare with 9% peppermint water).

Olive Oil

Hydrophilic phenols are the most abundant antioxidants in virgin olive oil with both antioxidant and anti-inflammatory attributes. Olive oil contains significant amounts of squalene, the main component of skin surface polyunsaturated lipids. As an emollient, squalene is easily absorbed deep into the skin helping to restore suppleness and flexibility (two positive attributes of nipple skin that helps resist cracking and damage). Ozonated olive oil was effective in animal models for accelerating wound repair (Kim et al., 2009; Sakazaki et al., 2007). Olive oil is treated with gaseous ozone to produce a product to which bacteria cannot mount resistance. Ozonated olive oil possesses a wide range of activities that operate during all phases of the wound healing process. Ozonated olive oil is available commercially but no studies have been found that discussed using the preparation for healing damaged nipples.

Table 3. Comparison of Topical Agents for Treatment or Prevention of Nipple Pain

Agent	Positive Results	Equivalent Results	Negative Results
Expressed mother's milk (EMM)	Superior to lanolin (Mohammadzadeh, Farhat, & Esmaeily, 2005)	Equivalent to lanolin (Hewat & Ellis, 1987)	Inferior to warm-water compresses (Buchko et al, 1994; Pugh et al., 1996) Inferior to keeping nipples dry and clean (Akkuzu & Taskin, 2000) Inferior to lanolin (Coca & Abrao, 2008) Inferior to peppermint water (Sayyah et al., 2007) Inferior to lanolin (Abou-Dakn, Fluhr, Gensch, & Wockel, 2011)
Tea bag compress		Equivalent to lanolin in neither preventing nor reducing soreness (Riordan, 1985) Equivalent to warm-water compress (Lavergne, 1997)	Inferior to warm-water compresses (Buchko et al., 1994)
Warm-water compress	Superior to tea bags or EMM (Buchko et al., 1994) Superior to lanolin and EMM (Pugh et al., 1996)	Equivalent to tea bags (Lavergne, 1997)	Inferior to keeping nipples dry and clean (Akkuzu & Taskin, 2000)
Lanolin	Superior to no treatment after 5 days (Spangler & Hildebrandt, 1993) Superior to EMM (Coca & Abrao, 2008) Superior to EMM (Abou-Dakn et al., 2011)	Equivalent to EMM (Hewat & Ellis, 1987) Equivalent to tea bags in neither preventing nor reducing soreness (Riordan, 1985) Not more effective than all-purpose nipple ointment in healing sore nipples (Dennis, Schottle, Hodnett, & McQueen, 2012)	Inferior to warm water compresses (Pugh et al., 1996) Inferior to hydrogel dressings (Dodd & Chalmers, 2003) Inferior to EMM (Mohammadzadeh et al., 2005) Inferior to peppermint gel (Melli et al, 2007)
Hydrogel dressing	Superior to lanolin (Dodd & Chalmers, 2003)		
Peppermint gel	Superior to lanolin (Melli et al., 2007)		
Peppermint water	Superior to EMM (Sayyah et al, 2007)		
All-purpose nipple ointment		Not more effective than lanolin in healing sore nipples (Dennis et al., 2012)	
LED phototherapy	Superior to standard treatment of proper positioning and latch, frequency and length of feedings, and general breastfeeding education (Chaves, Araújo, Santos, Pinotti, & Oliveira, 2012)		

Note. LED = light-emitting diode.

Source: Lochner, J. E., Livingston, C. J., & Judkins, D. Z. (2009). Clinical inquiries: Which interventions are best for alleviating nipple pain in nursing mothers? *Journal of Family Practice*, 58(11), 612a-612c.

Virgin Coconut Oil

Virgin coconut oil has long been used in tropical countries, and Ayurvedic medicine for skin disorders and wound healing. Lactation consultants have anecdotally reported positive outcomes on sore nipples from the use of virgin coconut oil, but no studies could be located that used virgin coconut oil on sore or damaged nipples. In an animal study, Nevin and Rajamohan (2010) found that wounds treated with virgin coconut oil healed much faster than untreated wounds, most likely because of the variety of biologically active ingredients in coconut oil that serve to hasten steps in the wound healing process. Virgin coconut oil was found to be superior to olive oil in a study that compared their ability to eliminate *S. aureus* from adult skin with atopic dermatitis. Virgin coconut oil demonstrated broad spectrum activity against *S. aureus*, fungi, and viruses (Verallo-Rowell, Dillaque, & Syah-Tjundawan, 2008).

Honey

Honey has been shown to have wound healing and antibacterial properties (Moore et al., 2001) but seems dependent on the type of honey, geographical location, and flower from which the final product is derived. Medical-grade honey (Medihoney) is an effective wound healing agent and antibacterial preparation (Robson, Dodd, & Thomas, 2009). Merckoll, Jonassen, Vad, Jeansson, and Melby (2009) reported that Medihoney was bactericidal against multiple species of bacteria, including methicillin resistant *Staphylococcus aureus* (MRSA). Medihoney is effective against antibiotic resistant organisms, with a low likelihood of bacteria becoming resistant to it. Furthermore, Medihoney has the ability to penetrate biofilms, a property that is important in infected wounds that are not healing (Merckoll et al., 2009). Medihoney is treated to eliminate botulism spores and has been used anecdotally by many clinicians to help heal damaged nipples.

Warm-Water Compresses

Simple warm-water compresses promote comfort, enhance blood flow to wounded tissues, and aid in the removal of cellular waste products. Mothers can add one-fourth to one-half teaspoon of salt per quart of warm water and apply the saline soak for 10 min.

Commercial Nipple Creams

Commercial nipple creams contain multiple ingredients, not all of which have been shown to be safe or effective. The Food and Drug Administration (FDA) issued a warning in 2008 regarding the potential hazards of using

a certain nipple cream because of the potential harm its ingredients could cause to both mother and infant.

Numerous other preparations are used on sore or traumatized nipples, with many having little evidence for their safety and effectiveness. A sample intervention plan for sore nipples appears in Box 4. Although mothers

Box 4. Sample Intervention Plans for Sore Nipples

Preventive Strategies

- Use optimal positioning. Assess latch, suck, and swallowing and correct positioning if necessary.
- Use a modified syringe, nipple rolling, or tea cup hold to assist with latch if nipples are flat.
- Check to make sure the infant's mouth is open to 160° angle, with lips flared outward, and neck slightly extended.
- If pumping, assure the flange is large enough to prevent nipple strangulation in the flange's tunnel.
- Provide relief from engorgement.
- Avoid pacifiers until breastfeeding is well established.
- Correct ankyloglossia if present.
- Apply peppermint water or peppermint gel to nipples after each early feeding.

When Nipples Are Already Sore

In addition to the aforementioned measures, the following preparations may be tried for soothing, pain relief, and healing:

Warm-water compresses

Warm green tea bag compresses

Peppermint water or gel

Olive oil

Coconut oil

Medihoney

Hydrogel dressing

Nipple shield, if nothing else is working and the mother verbalizes her desire to stop breastfeeding

Source: Walker, M. (2010). *The nipple and areola in breastfeeding and lactation*. Amarillo, TX: Hale Publishing.

may be able to achieve normal milk production in the face of experiencing sore nipples (McClellan, Hepworth, Kent, et al., 2012), nipple pain (even without visible trauma) negatively interferes not only with breastfeeding itself but also with a mother's mood, general activity, and sleep (McClellan, Hepworth, Garbin, et al., 2012). Additional research is essential for providing high quality evidence to delineate the best options in treating sore and damaged nipples.

Hydrogel Dressings

Hydrogel dressings for healing sore, traumatized, or macerated nipples is a therapy adapted from wound healing interventions on other parts of the body. These dressings are water based and often a combination of water and glycerin in a polymer matrix. Their value lies in their ability to maintain moisture, inhibit scab or crust formation, reduce pain, and enhance epithelial migration for wound repair. Researchers have noted that mothers frequently find significant relief from pain when using hydrogel dressings between feedings (Cable, Stewart, & Davis, 1997; Dodd & Chalmers, 2003; Cadwell, Turner-Maffei, Blair, Brimdyr, & McInerney, 2004). Hydrogel dressings may be a possible option in the treatment of nipples with open sores or cracks with exudate. The dressing absorbs wound discharge and prevents the nipple skin from adhering to the mother's bra. Clinicians should choose a hydrogel dressing that does not require adhesives to stick to the breast, as some mothers have complained that hydrogel dressings with adhesive backings irritate the skin when removed. When the dressing is removed for a feeding, there should be no residue or small pieces of the dressing that adhere to the nipples. Mothers may also find additional relief from pain by chilling the hydrogel dressing in the refrigerator prior to application.

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WHO Releases Findings From its Breastfeeding Policy Study

World Health Organization released findings from its recent study. [*Breastfeeding policy: A globally comparative analysis*](#) explores the extent to which national policies guaranteeing breastfeeding breaks to working women may facilitate breastfeeding. In multivariate models, the guarantee of paid breastfeeding breaks for at least six months was associated with an 8.86 percent increase in the rate of exclusive breastfeeding. .

Source: USBC