

Prevention of Nipple Cracks with Peppermint Water versus Breast Milk in Lactating Primiparous Women

Hala A. Thabet⁽¹⁾ Manal A. Mourad⁽²⁾, Abdulrahman M. Alahadal⁽³⁾, Samira Alsenany⁽⁴⁾, Amer Alsaif⁽⁵⁾.

Faculty of Nursing, El-Mansoura University⁽¹⁾ Medicine College King Abdul Aziz University⁽²⁾ Faculty of Pharmacy King Abdulaziz university⁽³⁾ Faculty of Nursing, Public Health Department, King Abdulaziz University⁽⁴⁾ Physical Therapy, Physical Therapy Department, Faculty of Applied Medical sciences, King Abdulaziz University⁽⁵⁾.

ABSTRACT: Introduction: Sore nipples associated with breast-feeding are a common problem, with an incidence ranging from 11% to 96%, and may lead to premature weaning. (1, 2) This frequently occurs due to suction trauma to the nipple secondary to incorrect positioning at the breast. (3, 8) **Objective:** To formulate peppermint water and to evaluate the efficacy of peppermint water versus breast milk application in the prevention of nipple cracks associated with breast-feeding. **Setting & Design:** Experimental research design was utilized in this study to compare the above formulation with expressed breast milk. This study was carried out in post partum wards in the Maternity and Child Health Hospital and the Azazia Maternity Hospital, Jeddah. **Material/Methods:** One hundred fifty primiparous participants were assigned randomly to three experimental groups. Group 1, the peppermint water group, was instructed to put soaked gauze with peppermint water on and around the nipples and areola after washing the nipples with water following every breastfeed from day 1 to day 14 and washing before the next feed. The same instruction was given to Group 2, the expressed breast milk group, with the difference that breast milk was used to soak nipples. Group 3 did nothing but keep their nipples clean and dry. Each woman was followed for up to 3 visits or telephone calls within 15 days and then by telephone call at 30 days postpartum. The rate of nipple and areola crack and pain was evaluated. **Results:** In the present study, the application of peppermint water was found to be an effective method to prevent nipple cracks. The relative risk of overall nipple and areola cracks in the control group (48% & 56%) and expressed breast milk group (32% & 32%) was higher than in the peppermint water group (4% & 2%) at 15 and 30-day post partum. ($p < 0.001$). In addition, at 15 and 30 days, it was observed that women in the peppermint water group were less likely to report no cracks ($n = 2$) than women in the expressed breast milk group ($n = 6$ & 8) and control group ($n = 24$ & 28). Women in the peppermint water group experienced mostly no pain (92% & 96% respectively) compared to those in the expressed breast milk group and the control group (64% & 68%, 44% & 40% respectively) ($p < 0.001$). **Conclusions:** Peppermint water in breastfeeding lactating women is associated with fewer nipple cracks and is more effective than expressed breast milk. It could be recommended, along with teaching better breastfeeding technique at the initiation of breastfeeding, for preventing nipple cracks.

[Hala A. Thabet, Manal A. Mourad, Abdulrahman M. Alahadal, Samira Alsenany, Amer Alsaif. **Prevention of Nipple Cracks with Peppermint Water versus Breast Milk in Lactating Primiparous Women.** *Life Sci J* 2013;10(4):2010-2017]. (ISSN:1097-8135). <http://www.lifesciencesite.com>. 266

Key words: breastfeeding, nipple crack, peppermint water

1. Introduction

Sore nipples associated with breast-feeding are a common problem, with an incidence ranging from 11% to 96%, and may lead to premature weaning. [1-2] This frequently occurs from suction trauma to the nipple secondary to incorrect positioning at the breast. [3-4]

Positioning of the baby's body is important for good attachment and successful breastfeeding. Most difficulties can be avoided altogether if good attachment and positioning are achieved at the first and early feeds.[4] An effective sucking technique is considered important to establish breastfeeding, to ensure milk transfer, and to prevent breastfeeding problems. [5,6]

It is a dream for most mothers to have comfort in breast feeding, but sore nipples are still a common problem and pain or cracks frequently occur after

breast feeding. [7-8] When the nipples hurt, breast-feeding is in jeopardy. It is estimated that 80 to 90% of breast feeding women experience some nipple soreness, with 26% progressing to cracks and extreme nipple pain. [9-10] Up to be one third of the mothers who experience these symptoms may change to alternate methods of infant nutrition within the first six postnatal weeks. [11-12] However, very sore, cracked, blistered or bleeding nipples are not normal. (7)

Numerous methods of healing sore and cracked nipples have been used, including the application of human breast milk, tea bags, Masse's cream, A & D ointment, lanolin cream, and breast shells. A common therapeutic approach to sore nipples [4, 13-14] presently consists of dried-on human milk, modified lanolin (medical grade), and the wearing of breast shells (hard plastic devices that provide an air barrier

to protect the skin from friction and/or pressure from overlying clothing and other contact). In none of the published studies, [15-16] however, has any method been completely efficacious, and sore nipples remain a frustrating clinical dilemma. This prompted us to investigate alternative treatment methods and to test their safety and efficacy.

Nurses are often the first providers who interact with the mother during the perinatal period and are best positioned to guide mothers through the prevention and solving of breast-feeding problems. Although many problems may be "common", failure to remedy conditions that cause pain, frustration, and anxiety can lead to premature weaning and the avoidance of breast-feeding of subsequent children. [17]

With the resurgence of interest in breast feeding, there is increasing demand for natural remedies for minor problems that accompany nursing, yet the efficiency of these remedies is insufficiently documented. Despite the large number of preparations found to be effective, there is still a continuous search for finding additional preparations with increasing specificity. [18] It is important to do something about nipple soreness before it gets worse and nipples develop painful cracks. In a previous study, we found that simple self-administered natural remedies, such as peppermint water, are effective in the prevention of sore nipples. [19]

Peppermint (*Mentha piperita*), which is used as a popular flavoring for gum, toothpaste, and tea, has a calming and numbing effect and has been used to relieve skin irritations. [20] It also has an antiseptic effect and increases tissue flexibility, making tissues resistant to cracks. [21] In this study, peppermint water was formulated, and its effects on the prevention of nipple cracks associated with breastfeeding were compared with those breastmilk.

Methods

Study design (Descriptions of Tools)

An experimental research design was carried out in this study to compare the effect of two methods to prevent the nipple cracks. The data were collected from Sept. 2009. to Jan. 2010, at the Maternity and Child Health Hospital and the Azazia Maternity Hospital, Jeddah. The sample of this study constituted only mothers with healthy term infants. Cases discharged before the interview or who had preterm delivery, postpartum fever, breast infection, nipple abnormalities, had twins, took medications at night, did not have a telephone line or were illiterate or less than 18 years of age, were excluded. In addition, infants that were fed infant formula or used a pacifier, or who had a mouth infection were excluded from the study sample.

Data were collected regarding participants' personal characteristics and to ensure their suitability to the research purpose. All selected candidates received a comprehensive hospital breastfeeding education before the infant began breastfeeding. After taking the mother's history, the researcher carried out a physical examination of the infant and the mother's breasts and assessed the breastfeeding technique for all candidates. After giving informed consent, all participant groups were given adequate written and verbal instructions on breastfeeding. The intervention groups were asked to perform their allocated intervention with peppermint water or expressed breast milk four times a day after breastfeeding. Outcomes were assessed on days 1 through to 7.

The study sample consisted of 150 primiparous women with normal nipples who were breast-feeding after a vaginal delivery at 38 or more weeks of gestation; they were randomized into three experimental groups. Group 1, the peppermint water group, was instructed to put gauze soaked with peppermint water on and around the nipples and areola after washing the nipples with water following every breastfeed from day 1 to day 14. The same instruction was given to Group 2 regarding using expressed breast milk to soak the nipples. Group 3 did nothing but keep their nipples clean and dry. Each woman was followed for up to 3 visits or telephone calls within 14 days and then by telephone call at week 6 postpartum.

Ethics approval

The Medical Ethics Committee of the Ministry of Health at Jeddah approved the research study; all participants were given adequate information, and consent was obtained from each participant.

Data collection

Demographic and peripartum information was abstracted from the medical records. An interview was conducted during the postnatal stay. The follow-up telephone interviews were conducted by a trained midwife at days 4, 8 and 14 postnatal. All mothers were asked about the frequency and duration of breastfeeding at 24 hours, and the data were recorded. A follow-up visit was arranged for both groups one week after recruitment (day eight) or at any time during the trial course in the case of nipple cracks or pain. A telephone interview was conducted with all mothers at week 6. A questionnaire was used to determine the presence and severity of nipple damage and pain. Each mother scored her own pain during breastfeeding. Rating scales were used to determine the level of pain as follows: no pain, mild (discomforting), moderate (distressing), and severe (excruciating). [10] The main outcome measures

include responses to questions about nipple pain at week 6 and objective findings from the physical examination at each visit. An opinionnaire was designed to assess mothers' acceptance for measures to prevent cracked nipples.

Operational design:-

A pilot study was conducted on five mothers from each group to evaluate the validity and reliability of tools according to the statistical analysis of the pilot results. The necessary modifications were made (included in sample).

Administrative design:-

A letter of a proposal was written and presented to the Chairman of the Obstetrics and Gynecology Department to obtain his approval to conduct this study.

Results

Part (A) Characteristics of the study sample

Table (1) Shows that most woman in all interventions (using expressed breast milk & peppermint water)& control groups were age matched (20 to 29 years, respectively) difference between groups as a regard educational status, employment & marital status were not statistically significant($p=0.055$, $p=0.13$, $p=0.55$ respectively).

Table (I) Frequency distribution of women's general characteristics among interventions (using expressed breast milk & peppermint water) and control group.

Characters	Intervention Groups			χ^2	p value
	Breast milk (n=50)	Peppermint water (n = 50)	Control group (n = 50)		
Maternal age				0.60	0.74
20 to 29 years	28 (56%)	29 (58%)	22(44%)		
30 to 34 years	15 (30%)	12 (24%)	20(40%)		
35 years & more	7 (14%)	9 (18%)	8 (16%)		
Education				10.78	0.055
Illiterate	4(8%)	8(16%)	11(22%)		
Primary	10(20%)	13(26%)	14(28%)		
Preparatory	3(6%)	9(18%)	12(24%)		
secondary	16(32%)	7(14%)	3(6%)		
College diploma	11(22%)	5(10%)	8(16%)		
University	6 (12%)	8(16%)	2(4%)		
Employment				2.25	0.13
Housewife	43(86%)	37(74%)	35(70%)		
Working	7(14%)	13(26%)	15(30%)		
Marital status				0.34	0.55
Married	48(96%)	49 (98%)	46(92%)		
Divorced	2 (4%)	1 (2%)	4 (8%)		

Part(B) knowledge of women regarding breast feeding

Table (II) Shows that knowledge of women in intervention groups (using expressed breast milk & peppermint water) & control group was mostly satisfactory (88%,90% and 76%,respectively).However, their knowledge about breast feeding positions mostly satisfactory in an expressed breast milk group than other groups (peppermint group & control group)were statically significant ($P=0.015^*$) respectively. The difference between intervention group & control group regard the knowledge about causes of cracked nipple were not statistically significant ($p=0.12$) All women (100%) in the group of breast milk had unsatisfactory knowledge about options will help to resolve the cracked nipple. Difference between groups as a regard these items of knowledge was statically significant ($P=.002$ respectively).

Table (II) Frequency distribution of the study sample according to their knowledge regarding breast feeding among intervention (using expressed breast milk & peppermint water) & control groups.(Comparison)

Knowledge	Intervention Groups			χ^2	p value
	Breast milk (n=50)	Peppermint water (n = 50)	Control group (n = 50)		
Health benefits of breast feeding for baby				0.83	0.36
Correct	35 (70%)	39 (78%)	36(72%)		
Incorrect	15(30%)	11 (22%)	14(18%)		
Health benefits of breast feeding for mother				0.10	0.74
Correct	44(88%)	45 (90%)	38(76%)		
Incorrect	6(12%)	5 (10%)	12(24%)		
Breastfeeding positions				5.84	.015*
Correct	34 (68%)	22(44%)	27(54%)		
Incorrect	16(32%)	28 (56%)	23(46%)		
Causes of cracked nipple				2.38	0.12
Correct	11(22%)	18 (36%)	8(16%)		
Incorrect	39 (78%)	32 (64%)	42 (84%)		
options will help to resolve the cracked nipple				13	.002**
correct	0(0%)	12(24%)	2 (4%)		
Incorrect	50(100%)	38(76%)	48 (96%)		

*Less value less than 0.05 significant; ** p value less than 0.01 highly significant

Table (III) Comparison of the severity of nipple and areola cracks in women in the intervention (using peppermint water and expressed breast milk) &control groups at 15& 30 days postpartum.

Severity of nipple areola cracks	Intervention Groups						χ^2	p value
	Breast milk (n=50)		Peppermint water (n = 50)		Control group (n = 50)			
	At 15 days	At 30 days	At 15 days	At 30 days	At 15 days	At 30 days		
Areola crack							1:10.71	<0.004**
No crack	42 (84%)	40 (80%)	48 (96%)	48 (96%)	36 (42%)	32 (64%)		
Mild	0 (0%)	0 (0%)	0 (0%)	2 (4%)	0 (0%)	2 (4%)	2:16	<0.003**
moderate	2 (4%)	2(4%)	2 (4%)	0 (0%)	2 (4%)	2 (4%)		
severe	6(12%)	8(16%)	0 (0%)	0 (0%)	12 (24%)	14 (28%)		
Nipple crack							19.01	<0.001 ***
No crack	36(72%)	38(76%)	44(88%)	46(92%)	24(48%)	22(44%)		
Mild	2(4%)	0(0%)	2(4%)	2(4%)	4(8%)	2(4%)	28.82	<0.001 ***
moderate	4 (8%)	4 (8%)	2 (4%)	2 (4%)	4(8%)	6 (12%)		
severe	8(16%)	8 (16%)	2 (4%)	0(0%)	18(36%)	20(40%)		
Overall nipple & areola crack							29.91	<.001 ***
No crack	32(64%)	34(68%)	46(92%)	46(92%)	20(40%)	20 (40%)		
Mild	1 (2%)	1 (2%)	1 (2%)	2(4%)	4 (8%)	2(4%)	30.4	< 0.001 ***
Moderate	1(2%)	1(2%)	1 (2%)	1(2%)	2(4%)	0(0%)		
Severe	16(32%)	16(32%)	2(4%)	1(2%)	24(48%)	28(56%)		

1. Comparison between group at 15 days; 2. Comparison between group at 30 days

3. ** Highly significant at p value less than 0.01; 4. *** extremely significant at p value less than 0.001

Table (III) Shows that at 15 & 30-day women in the peppermint water group were less likely to report no cracked (n = 2) than women in the expressed breast milk group (n =6 & 8) & control group (24 & 28) regards areola crack (p < 0.001). Women in the control group were more likely to report severe nipple crack (18 &20) than women in the expressed breast milk group (8 & 8) respectively. While the majority of women in the group of using peppermint water were likely to report no nipple crack (44 & 46 respectively) (p < 0.001). The control group had a higher odd of experiencing overall nipple & areola crack (24& 28) than the expressed breast milk group (16 &16 respectively). Differences between groups as regard areola crack, nipple crack & Overall nipple & areola crack were extremely significant (p=<0.001).

Table (IV) Reports of nipple pain in among women in intervention (using peppermint water and expressed breast milk) &control groups at 15 & 30 days postpartum.

Pain	Intervention Groups						χ^2	p value
	Breast milk (n=50)		Peppermint water (n = 50)		Control group (n = 50)			
	At 15 days	At 30 days	At 15 days	At 30 days	At 15 days	At 30 days		
0 (No pain)	32 (64%)	34 (68%)	46 (92%)	48 (96%)	22 (44%)	20 (40%)	1.26.16	*** <0.001
1 (Mild)	2 (4%)	2(4%)	2(4%)	0 (0%)	2(4%)	4(8%)	2. 36.03	*** <0.001
2 (Moderate)	2 (4%)	4 (8%)	0 (0%)	0 (0%)	6(12%)	6(12%)		
3 (Severe)	14 (28%)	10 (20%)	2 (4%)	2 (4%)	20 (40%)	20 (40%)		

1. Comparison between group at 15 days
2. Comparison between group at 30 days
3. ** Highly significant at p value less than 0.01
4. *** extremely significant at p value less than 0.001

Table (IV) Shows that as regard pain intensity at 15 &30 days felt by women in the peppermint water group was mostly no pain (92%&96 respectively) compared to those in expressed breast milk group & control group (64%, 68% & 44%&40% respectively).(p < 0.001). Severe pain was experienced significantly further more among women in control group and breast milk group at15 & 30 days (40%,40%, 28%,20%)respectively than the group of peppermint water (4%,4%) respectively.(p < 0.001)

Table (V) Assessment of outcomes among women in intervention groups (using peppermint water and expressed breast milk) &control groups at 15 & 30 days postpartum.

Clinical outcome	Intervention Groups						χ^2	p value
	Breast milk (n=50)		Peppermint water (n = 50)		Control group (n = 50)			
	At 15 days	At 30 days	At 15 days	At 30 days	At 15 days	At 30 days		
Intact nipples and areola	30 (60%)	32 (64%)	44 (88%)	46 (92%)	22 (44%)	20 (40%)	1. 21.53	<0.001 ***
Painless feeding	26 (52%)	28 (56%)	46 (92%)	48 (96%)	24 (48%)	20 (40%)	1. 25	<0.001 ***
							2. 36.1	<0.001 ***
Full breastfeeding	28 (56%)	30 (60%)	46 (92%)	46 (92%)	22 (44%)	24 (48%)	1. 27.8	<0.001 ***
							2. 23.28	<0.001 ***
Partial breastfeeding	22 (44%)	20 (40%)	4 (8%)	4 (8%)	28 (56%)	26 (52%)	1. 9.8	<0.007 **
							2. 16	<0.001 ***

1. Comparison between group at 15 days; 2. Comparison between group at 30 days
3. ** Highly significant at p value less than 0.01; 4. *** extremely significant at p value less than 0.001

Table (V) illustrated that on the fifteen & thirteen days, we found significant differences in intact nipples and areola between the two intervention groups & control group. The group using peppermint water showed an increase intact nipple and areola (88% & 92%) than the group using expressed breast milk (60% & 64% and control group 44%&40%)respectively, Painless feeding began to increase in the group using peppermint water at fifteen & thirteen days (92%&96%, than the group using expressed breast milk (52% &56%), while in the control group, painless feeding initially decreased and peaked on the thirteen days postpartum (48%& 40%) respectively. The difference in self-reported painless feeding between the three groups reached statistically highly significance on all days ($p < 0.001$). Most of the participants (92% & 92%) in group using peppermint water continued to breastfeed at 15 & 30 days. Whereas 44% & 40% of the mothers in the expressed breast milk group and 56%&52% in the control group used infant formula in addition to breast milk. Differences between groups as a regard full breast feeding were highly significant ($p < 0.001$).

Part(c) Satisfaction with breast milk & peppermint water methods for Prevention of cracked nipple.

Table (VI) Frequency distribution of satisfaction of women in the intervention groups toward used method for prevention of cracked nipple

Attitude	Intervention Groups		χ^2	p value
	Breast milk (n=50)	Peppermint water (n = 50)		
Satisfaction with method			0.21	0.89 NS
Satisfied	45 (90%)	46 (92%)		
Dissatisfied	2 (4%)	2 (4%)		
Uncertain	3(6%)	2 (4%)		
Preferred future use			5.81	0.054 NS
preferred	45 (90%)	46 (92%)		
Not preferred	4 (8%)	0 (0%)		
Uncertain	1 (2%)	4(8%)		

NS: no significant

Table (VI) Shows that women in all intervention groups (using expressed breast milk & peppermint water) were mostly satisfied with the used methods to prevent cracked nipple (45 & 46) respectively) and they stated that they preferred to use it in their future pregnancies (45&46). Differences between groups as regard satisfaction with methods and future use were not statistically significant ($p=0.89, p=0.054$, respectively)

Discussion

The health benefits of breastfeeding for mothers and infant are well-documented. [17, 21, 22] One of the major problems in lactating women at the beginning of breastfeeding is nipple cracks, and this may represent an obstacle to successful breastfeeding, leading to a decrease in milk production. [23]

In the early weeks of breastfeeding, sore nipples are most often caused by a poor latch by the feeding infant. The latch can best be assessed by someone experienced in lactation observing a feeding. [25] No one topical agent has shown superior results in the relief of nipple discomfort. The most important factor in decreasing the incidence of nipple pain is the provision of education in relation to proper

breastfeeding technique and latch-on as well as anticipatory guidance regarding the high incidence of early postpartum nipple pain. [26] With adequate support and good information on preventing some of the common problems associated with breastfeeding, a woman's chance of successfully breastfeeding her new baby is greatly improved. There are a number of clinical studies with different treatments and treatment combinations to prevent nipple pain and damage in breastfeeding women. [27] Bearing in mind the health hazards associated with not breastfeeding and the fact that sore nipples are not inevitable during the early days of breastfeeding [7, 11], it is logical to create healthy, flexible tissue that is very resistant to cracks.

In the present study, the application of peppermint water was found to be an effective method to prevent nipple cracks. In addition, no areola crack was observed in the peppermint water group. In our previous study [19], the use of peppermint water was found to be three times more effective than expressed breast milk [EBM; 27% vs. 9%]. This study showed a significant reduction in the frequency of nipple pain and cracks in breastfeeding mothers where peppermint water was applied after breastfeeds. These effects

could be attributed to the calming and numbing effects and the antibacterial activity of peppermint water leading to the reduction of irritation and nipple discomfort. Furthermore, painful feeding could be the reason for the reduction of the frequency and duration of feeds in the expressed breast milk group.

Regarding the rate of nipple crack in the present study in mothers in the peppermint water group, at 15 and 30 days, they were more likely to report no cracks ($n = 2$) than were women in the expressed breast milk group ($n = 6$ & 8) and the control group ($n = 24$ & 28). Regarding areola crack ($p < 0.001$), women in the control group were more likely to report severe nipple crack (18 & 20) than were women in the expressed breast milk group (8 & 8 respectively) while the majority of women in the peppermint water group were likely to report no nipple crack (44 & 46 respectively) ($p < 0.001$). The control group had a higher probability of experiencing overall nipple and areola crack (24 & 28) than had the expressed breast milk group (16 & 16 respectively), which is relatively less than the value of 9% obtained in our previous study for the rate of nipple crack in peppermint water users. [19]

As regards pain intensity at 15 and 30 days, women in the peppermint water group felt mostly no pain (92% & 96 respectively) compared to those in the expressed breast milk group and the control group (64% & 68% , and 44% & 40% respectively) ($p < 0.001$). These results are supported by the findings of Akkuzu and Taşkin (2000) [28], who noted that applying warm compresses or expressed breast milk was found to be less effective in preventing cracked nipples than simply keeping the nipples dry and clean. There were fewer cases with nipple pain in the group that applied expressed breast milk. Ideally, further studies should be performed to gain more insight into the effectiveness of peppermint water because the use of a cream or an ointment is easier than a solution, and in order to prescribe a fixed dosage of peppermint water, planning a randomized trial comparing peppermint cream/ointment to no treatment could be the next step.

Conclusions

The results showed that the formulated peppermint water as a natural remedy is more effective in the prevention of nipple cracks than expressed breast milk. To our knowledge, this is the second study reporting the effect of peppermint water on nipple and areola cracks and pain. Daily use of peppermint water is associated with an increase in the duration and number of feeds, and less nipple pain compared to the application of expressed breast milk alone. Based on the present findings, peppermint water application could be suggested as a prophylaxis

of nipple cracks; in addition, proper instruction at the initiation of breastfeeding and education program are needed to improve mothers' awareness toward prevention of cracked nipples.

Acknowledgement

We gratefully acknowledge the willing assistance given by the mothers in our study, the hospital midwife staff working in the Maternity and Child Health Hospital and the Azazia Maternity Hospital. We also thank Dr. Basam Eldek for helping with the final analysis.

Corresponding Author:

Dr. Samira Alsenany, BSc (Hons), RN, MSc, PGCert ANP, Mphil, PhD. Assistant Professor in Gerontology, Faculty of Nursing, King Abdulaziz University, Salsenany@kau.edu.sa

References

1. Graffy JP. Mothers' attitudes to and experience of breast-feeding: a primary care study. *Br J Gen Pract.* 1992;42:61-64.
2. Ziemer MM, Paone JP, Schupay J, Cole E. Methods to prevent and manage nipple pain in breast-feeding women. *West J Nurs Res.* 1990;12:732-744.
3. Lawrence RA. *Breast-feeding: A Guide for the Medical Profession.* St Louis, Mo: Mosby-YearBook; 1994.
4. Powers NG, Slusser W. Breast-feeding update, 2: clinical lactation management. *Pediatr Rev.* 1997; 18:147-161.
5. Goyal RC, Banginwar AS, Ziyoo F and Toweir A. Breastfeeding practices: Positioning, attachment (latch-on) and effective suckling - A hospital-based study in Libya. *J Family Community Med.* 2011 May-Aug; 18(2): 74-79.
6. Dongre AR, Deshmukh PR, Rawool AP, Garg BS. Where and How Breastfeeding Promotion Initiatives Should Focus Its Attention? A Study from Rural Wardha. *Indian J Community Med.* 2010;35:226-9
7. Nacy.B, Sherill JR, Beverly Retal: sore nipples in breast feeding woman, a clinical trial of wound dressings Vs conventional care. *Chicago, 1998, 152:1077-83*
8. Huml S, moist wound healing for cracked nipples in breast feeding mother, *Leaven 1994; 29:2-69.* Hagen RI, Brent NB: Lonolin for sore nipples. *Archives of pediatrics & adolescent medicine, chicago, 1999, 153(6):658-59.*
10. Braund D, Amir LH. Review of the management of nipple pain and damage. *Topics in breast feeding. Melbourne, lactation resource center, 2001.*

11. Kramer MS, Kakumor: optimal duration of exclusive breast feeding. Cochrane reviews in the Cochrane library issues 2. Oxford, update software, 2003.
12. Blair A, Cadwell K, Turner – Maffei C, Brimdyr K: The relationship between positioning, the breast dynamic, the latching process & pain in breast feeding mother with sore nipples. *Breastfeed Rev*, 2003; 11(2) 5-10
13. Riordan J, Auerbach K. *The Breast-feeding Process: Breast-feeding and Human Lactation*. Boston, Mass: Jones & Bartlett Publishers; 1993:229-234.
14. Neville MC, Neifert MR. Routine management of breast-feeding. In: Neville MC, Neifert MR, eds. *Lactation Physiology, Nutrition, and Breast-feeding*. New York, NY: Plenum Press; 1983:284- 285.
15. Lavergne NA. Does application of tea bags to sore nipples while breast-feeding provide effective relief? *J Obstet Gynecol Neonatal Nurs*. 1997; 26:53-58.
16. Newton N, Lansdowne PA. Nipple pain and nipple damage. *J Pediatr*. 1952;41:411-423.
17. Walker M: Conquering common breast-feeding problems. *J Perinat Neonatal Nurs*. 2008 Oct-Dec;22(4):267-74.
18. Livingstone VH, Willis CE, Berkowitz J: *Staphylococcus aureus* and sore nipples. *Can Fam Phys*, 1996; 42: 654–59
19. Sayyah Melli M, Rashidi MR, Delazar A et al: Effect of peppermint water on prevention of nipple cracks in lactating primiparaus women, a randomized controlled trial. *Int breastfeeding J*, 2007, 19(2):7.
20. Blumenthal M, Goldberg A, Brinckmann J: *Herbal Medicine: Expanded Commission E Monographs*. Newton, MA. Integrative Medicine Communications, 2000; 297–303
21. Schelz Z, Molnar J, Hohmann J: Antimicrobial and antiplasmid activities of essential oils. *Fitoterapia*, 2006; 77: 279–85.
22. Tait P: Nipple pain in breastfeeding women: causes, treatment, and prevention strategies. *J Midwifery Women’s Health*, 2000; 45: 197–201
23. Akkuzu G, Taskin L: Impacts of breast-care techniques on prevention of possible postpartum nipple problems. *Professional Care of Mother & Child*, 2000; 10(2): 38–41
24. Henderson A, Stamp G, Pincombe J: Postpartum positioning and attachment education for increasing breastfeeding: a randomized trial. *Birth*, 2001; 28(4): 236–42
25. Lawrence RA, Lawrence RM. Management of the mother-infant nursing couple. In: *Breastfeeding: A Guide for the Medical Profession*. 6th ed. St. Louis, Mo.: Mosby; 2005:255–316
26. Morland-Schultz K, Hill PD: Prevention of and therapies for nipple pain: a systematic review. *J Obstet Gynecol Neonatal Nurs*. 2005 Jul-Aug; 34(4):428-37.
27. Page T, Lockwood C, Guest K. Management of nipple pain and/or trauma associated with breast-feeding. *JBI Reports*. 2003;1:127–147.
28. Akkuzu G, Taşkin L.: Impacts of breast-care techniques on prevention of possible postpartum nipple problems. *Prof Care Mother Child*. 2000;10(2):38-41.
- 29.

11/2/2013