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Application of cabbage leaves compared to gel packs for mothers with breast engorgement: Randomised controlled trial

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ABSTRACT

Background: The effects of cold cabbage leaves and cold gel packs on breast engorgement management have been inconclusive. No studies have compared the effects of these methods on breast engorgement using a rigorous design.
Objectives: To examine the effectiveness of cold cabbage leaves and cold gel packs application on pain, hardness, and temperature due to breast engorgement, the duration of breastfeeding and satisfaction.
Design: A randomised controlled three-group pre-test and repeated post-test study.
Setting: A private maternal and children's hospital in Singapore.
Participants: Mothers ($n = 227$) with breast engorgement within 14 days after delivery.
Methods: The mothers were randomly assigned into either cold cabbage leaves, cold gel packs, or the control group. Pain, hardness of breasts, and body temperature were measured before treatment. Two sets of post-test assessments were conducted at 30 min, 1 h, and 2 h after the first and second application. The duration of breastfeeding was measured up to 6 months. IBM SPSS 23.0 was used to analyse the data.
Results: Mothers in the cabbage leaves and gel packs groups had significant reductions in pain at all post-intervention time points compared to the control group, starting from 30 min after the first application of cabbage leaves (mean difference $= -0.38$, $p = 0.016$) or gel packs (mean difference $= -0.39$, $p = 0.013$). When compared to the control group, mothers in the cabbage leaves group had significant reductions in the hardness of breasts at all post-intervention time points, and mothers in the gel packs group had significant reductions in the hardness of breasts at two time points (1 h and 2 h after the first and second application, respectively). Mothers in the cabbage leaves group had significant reductions in pain (mean difference $= -0.53$, $p = 0.005$) and hardness of breasts (mean difference $= -0.35$, $p = 0.003$) at 2 h after the second application compared to those in the gel packs group. Both interventions had no impact on body temperature. There was no significant difference in the durations of breastfeeding for mothers among the three groups at 3-month and 6-month follow-up. More mothers were very satisfied/satisfied with the breast engorgement care provided in the cabbage leaves group compared to the other groups.
Conclusion: While cold cabbage leaves and cold gel packs can relieve pain and hardness in breast engorgement, the former had better effect, which can be recommended to postnatal mothers to manage breast engorgement.

What is already known about the topic?

- Breast engorgement is a common physiological problem for lactating mothers that may cause breast swelling, pain, fever, and eventually a cease in breastfeeding in the early postpartum period.
- The effects of cold cabbage leaves and cold gel packs on the management of breast engorgement have been inconclusive in literature.

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What this paper adds

- Cold cabbage leaves and cold gel packs were effective in reducing the pain and hardness of breasts and the former were more effective than the latter in reducing the pain and hardness of breasts at 2 h after the second application.
- Both cold cabbage leaves and cold gel packs had no effect on body temperature and the duration of breastfeeding.
- Mothers using cold cabbage leaves were the most satisfied with the breast engorgement care provided.

1. Introduction

Breast milk is considered the most desirable food for babies. There has been extensive research in various countries providing evidence that breastfeeding has short-term and long-term benefits to both mothers and infants. Most new mothers who breastfeed find it a deeply satisfying experience, both physically and emotionally (Lawrence and Pane, 2011). The World Health Organisation (WHO, 2002) has emphasised the importance of breastfeeding for a duration of greater than six months, and most countries, including Singapore, promote exclusive breastfeeding. In Singapore, 50% of the mothers breastfeed their infants exclusively when they are discharged from the hospital (Chua and Win, 2013).

Breast engorgement is a common physiological problem for lactating mothers, which can be due to the rate of secretion that exceeds the rate of the ejection of milk and/or poor/shallow latching from the baby. The reported incidence of breast engorgement varied among studies, ranging from 20% to 77% (Spitz et al., 1998; Walker, 2000). Based on an internal survey at the private hospital where the current study was conducted, the incidence was about 20%.

There are numerous consequences of breast engorgement: painful swelling breasts associated with sudden increase in milk volume, lymphatic and vascular congestion, and interstitial oedema during the first congestion (Lawrence and Pane, 2011; Lawrence and Lawrence, 2011). Studies have reported that poor management of breast engorgement leads to the failure of milk production during the early postpartum period, resulting in an early cessation of breastfeeding (Lawrence and Pane, 2011; Snowden et al., 2001; Walker, 2000). The major reason for an early cessation of breastfeeding is due to the pain caused by breast engorgement (Foo et al., 2005). If breast engorgement is not managed effectively, it can lead to mastitis and breast abscess (Olds et al., 2000).

The main aim of the management of breast engorgement is to successfully establish and maintain the flow of breast milk and empty the breast milk effectively via the baby or expression to prevent engorgement (Lawrence and Pane, 2011). Current approaches involve a combination of pharmacotherapy (Snowden et al., 2001) such as pain medications and non-pharmacological management such as direct massage to the areas with blocked ducts (Snowden et al., 2001; Walker, 2000), cold cabbage leaves (e.g. Arora et al., 2008; Nikodem et al., 1993; Roberts et al., 1995), cold gel packs (Roberts, 1995), cabbage leaves extract (Roberts et al., 1995), *gua-sha* as a form of Chinese massage (Chiu et al., 2010), acupuncture (Kvist et al., 2007), therapeutic ultrasound (Mclachlan et al., 1993), and breast binding (Swift and Janke, 2003).

Non-pharmacological treatments for breast engorgement are becoming increasingly popular. The use of cabbage leaves is a popular non-pharmacological method used in managing breast engorgement and it can reduce the discomfort, tenderness, and swelling of breasts (Arora et al., 2008; Roberts et al., 1995; Robson, 1990). The cabbage leaves contain enzymes such as sinigrin and rapine (Joy, 2013) and have proven to be a good source of antioxidants (Nilnakara et al., 2009). The sulphur compound in cabbage leaves has antiseptic, disinfectant, anti-bacterial, and anti-inflammatory properties (Hatfield, 2004), which will support their use to relieve pain and swelling. The temperature of cabbage leaves has an impact on its effectiveness (Rosier, 1988). In the study hospital, non-pharmacological methods of massage, cold cabbages, and cold gel packs were used to treat mothers with breast engorgement. A systematic review was conducted on the effectiveness of cabbage leaf application on pain and hardness in breast engorgement and its effect on the duration of breastfeeding (Wong et al., 2012). The review found that cabbage leaves can potentially help to reduce the pain and hardness of engorged breasts and increase the duration of breastfeeding, but the results were inconclusive. Nikodem et al. (1993) reported that when compared to mothers in the control group, 18% more mothers who received the cabbage leaf intervention were exclusively breastfeeding at six weeks postpartum. From the literature, only one study has been conducted to compare the effectiveness between gel packs and cabbage leaves (Roberts, 1995). Roberts' (1995) study showed a reduction in pain with the breast engorgement post-intervention with both gel packs and cabbage leaves, but there was no significant difference in pain scores between the two groups.

Although a few studies have found that the cabbage leaf treatment and cold gel packs can potentially reduce symptoms caused by breast engorgement, the findings from these studies were inconclusive. Furthermore, a review of the literature identified gaps such as a lack of control group used in the design, small sample sizes, a lack of blinding technique, a lack of follow-ups, and inconsistency in the duration of the application of cold cabbage leaves and cold gel packs. Hence, our study aimed to examine the effectiveness of cold cabbage leaves and cold gel packs in improving mothers' outcomes of pain, hardness of breasts, temperature, duration of breastfeeding, and satisfaction using a randomised controlled trial. The hypotheses were:

(1) When compared with those in the control group, mothers using cold cabbage leaves or cold gel packs will report lower levels of pain, hardness of breasts, and body temperatures with statistically significant differences over time in the first and second hour after the two applications, as well as at each post-test time point;
(2) When compared with those in the cold gel packs group, mothers receiving cold cabbage leaves application will report lowers level of pain, hardness of breasts, and body temperatures with statistically significant differences at each post-test time point.
(3) When compared with those in the control group, mothers in the two treatment groups will have longer durations of breastfeeding at 3-month and 6-month follow-ups with statistically significant differences.
(4) When compared with those in the control group, more mothers will be satisfied with the treatment of breast engorgement in the two treatment groups with statistically significant differences.

2. Methods

2.1. Study design

A randomised controlled three-group pre-test and repeated post-test study design was adopted. Mothers were randomly assigned into intervention group 1 (cold cabbage leaves application plus routine care), intervention group 2 (cold gel packs application plus routine care), or the control group (routine care only).

2.2. Setting and sampling

Mothers with breast engorgement were recruited on their day of discharge from a private maternal and children's hospital, which has an average of 768 deliveries per month, in Singapore. No limitations were imposed on the parities or gravity statuses of the subjects. The inclusion criteria for the participants were mothers who were: (1) 21 years old and above; (2) breastfeeding and developed breast engorgement within 14 days postpartum; (3) able to read, understand, or speak English; (4) fulfilled 5 out of 10 criteria using the Infant Breastfeeding Assessment Tool; and (5) demonstrated at least a score of 5 out of 10 using a