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Outcome of Nipple Puller Use during Antenatal Care in Short Nipple Pregnant Women: A randomized controlled trial

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ABSTRACT

Objectives: The aim of this study was to compare the nipple length of the short nipple pregnant women who used nipple puller or not during antenatal care.

Materials and Methods: A randomized controlled trial was conducted. The pregnant women who were classified as low risk pregnancy and the nipple length less than 7 millimeters at the first antenatal visit were randomized into two groups; 125 cases of nipple puller use group and 125 cases of routine follow-up group. The first group, the mothers were taught by nurse and practiced nipple puller use twice a day until delivery. The second group or comparison group, the mothers had routine follow-up during antenatal care. When the mothers delivered, the nipple length was measured again at the first day postpartum and compared with the previous measurement. The demographic data and nipple length between both groups were compared using chi-square test and student t-test.

Results: The mean nipple length of the nipple puller use and routine follow-up group was not significantly different at first antenatal visit. In routine follow-up group, the mean right nipple length was 5.3 ± 1.4 millimeters at antenatal care clinic and 5.6 ± 1.4 millimeters at postpartum. The mean left nipple length was 5.0 ± 1.2 millimeters at antenatal care clinic and 5.4 ± 1.2 millimeters at postpartum. In nipple puller use group, the mean right nipple length was 4.7 ± 1.5 millimeters at antenatal care clinic and 9.5 ± 1.7 millimeters at postpartum. The mean left nipple length was 5.1 ± 1.6 millimeters at antenatal care clinic and 9.4 ± 1.7 millimeters at postpartum. The nipple length differences between routine follow-up and nipple puller use groups were statistically significant at postpartum ($p<0.001$).

Conclusion: The nipple puller use during antenatal period could increase nipple length.

Keywords: nipple puller, nipple length, short nipple, antenatal care.

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ผลลัพธ์ของการใช้อุปกรณ์ดึงหัวนมในระยะฝากครรภ์ของมารดาที่มีหัวนมสั้น

นงเยาว์ ใบยา, สุขวดี เกษสุวรรณ, สุชาสินี ธนะ, ภาวิน พัวพรพงษ์

บทคัดย่อ

วัตถุประสงค์: *เพื่อเปรียบเทียบความยาวหัวนมของมารดาที่ใช้อุปกรณ์ดึงหัวนม (nipple puller) ในระยะฝากครรภ์กับมารดาติดตามดูแลครรภ์ตามปกติ*

วัสดุและวิธีการ: *ศึกษาวิจัยทดลองควบคุมแบบสุ่ม (randomized controlled trial) ในสตรีตั้งครรภ์ความเสี่ยงต่ำที่มีความยาวหัวนมสั้นกว่า 7 มิลลิเมตร ที่มาฝากครรภ์ที่แผนกฝากครรภ์ โดยวัดความยาวหัวนมขณะมาฝากครรภ์ครั้งแรก โดยทำการแบ่งมารดาเป็นสองกลุ่มโดยวิธีการสุ่ม กลุ่มแรกมารดาใช้อุปกรณ์ดึงหัวนมแก้ไขความยาวหัวนมจำนวน 125 ราย กลุ่มนี้มารดาจะได้รับการสอนโดยพยาบาลและให้ใช้อุปกรณ์ดึงหัวนม ดึงหัวนมวันละสองครั้งจนกระทั่งคลอด ส่วนกลุ่มที่สองเป็นกลุ่มเปรียบเทียบคือ กลุ่มที่ดูแลครรภ์ตามปกติ โดยหลังการคลอดบุตร มารดาทั้งสองกลุ่มจะได้รับการตรวจวัดความยาวหัวนมในวันแรกหลังคลอด จากนั้นรวบรวมข้อมูลพื้นฐานของมารดาและความยาวหัวนมมาวิเคราะห์ผลโดยใช้สถิติ chi square และ student t-test*

ผลการศึกษา: *ความยาวหัวนมเฉลี่ยเริ่มต้นที่วัดที่คลินิกฝากครรภ์ของมารดากลุ่มที่ใช้อุปกรณ์ดึงหัวนม และกลุ่มที่ดูแลครรภ์ตามปกติไม่แตกต่างกัน ในกลุ่มที่ดูแลครรภ์ตามปกติ ความยาวหัวนมเฉลี่ยข้างขวาจากการตรวจที่คลินิกฝากครรภ์เท่ากับ 5.3 ± 1.4 มิลลิเมตร และเท่ากับ 5.6 ± 1.4 มิลลิเมตรที่หลังคลอด ความยาวหัวนมเฉลี่ยข้างซ้ายจากการตรวจที่คลินิกฝากครรภ์เท่ากับ 5.0 ± 1.2 มิลลิเมตรที่หลังคลอด ในกลุ่มที่ใช้อุปกรณ์ดึงหัวนมแก้ไข ความยาวหัวนมเฉลี่ยข้างขวาจากการตรวจที่คลินิกฝากครรภ์เท่ากับ 4.7 ± 1.5 มิลลิเมตร และเท่ากับ 9.5 ± 1.7 มิลลิเมตรที่หลังคลอด ความยาวหัวนมเฉลี่ยข้างซ้ายจากการตรวจที่คลินิกฝากครรภ์เท่ากับ 5.1 ± 1.6 มิลลิเมตรที่หลังคลอด และเท่ากับ 9.4 ± 1.7 มิลลิเมตรที่หลังคลอด ความแตกต่างของความยาวหัวนมระหว่างกลุ่มที่ดูแลครรภ์ตามปกติกับกลุ่มที่ใช้อุปกรณ์ดึงหัวนมแก้ไขที่หลังคลอดมีความแตกต่างอย่างมีนัยสำคัญ ($p<0.001$)*

สรุป: *การใช้อุปกรณ์ดึงหัวนมสามารถเพิ่มความยาวหัวนมได้*

คำสำคัญ: *อุปกรณ์ดึงหัวนม, ความยาวหัวนม, หัวนมสั้น, การดูแลระหว่างฝากครรภ์*

Introduction

Breast problem is one of important breastfeeding problem to cause breastfeeding cessation[1]. In Thailand, health professional concerns with nipple length and its length is sometimes measured during antenatal care. The nipple length and its relation to success in breastfeeding were studied. The cut-off point for nipple length that facilitates successful breastfeeding was 7 millimeters[2]. The researcher suggested health professional to use 7 millimeters of nipple length as a criteria for a successful breastfeeding screening test and give close breastfeeding support if postpartum women had less than 7 millimeters in nipple length.

Although the definition of short nipple is not clear and the short nipple diagnosis may make mother worried, but many health professionals still correct short nipple by nipple puller or syringe nipple puller without evidence-based support. We were interested to investigate the outcome of nipple puller use in the mothers with nipple length less than 7 millimeters and the routine follow-up mothers in this study. Besides, the associated factors affecting breastfeeding including body mass index, route of delivery and birth weight were collected for bias control[3-8].

Materials and Methods

Setting

The study was performed in Nakhon Nayok province, a rural area in the central part of Thailand. The data was collected during the period from September, 2013 to January, 2014 at the HRH Princess Maha Chakri Sirindhorn Medical Center. Breast examination and nipple length measurement had been routinely performed for pregnant woman who attended antenatal clinic for the first time.

Design

This study was a single-blinded randomized controlled trial. The postpartum-ward nurses who measured nipple length at postpartum did not know about antenatal care history of both groups.

Inclusion criteria

The pregnant women attended antenatal care clinic without complication including diabetes mellitus, hypertension, hyperthyroid, hypothyroid, cardiac disease, sexual transmitted disease, systemic lupus erythematosus, other autoimmune disease and had at least one short nipple. The criterion for short nipple diagnosis was nipple length less than 7 millimeters.

Exclusion criteria

Pregnant women had inverted or flat nipple, previous nipple or breast surgery, multiple pregnancies and previous preterm birth would be excluded.

Sample size

The sample size was based on 0.05 of α error, 0.95 of power and 0.47 of effect size (the mean difference between two groups was 23.5% from the pilot study of 20 cases). The calculated sample size was 119 in each group. The subjects were summed up with 5% added for data loss. The total samples collected were 250.

Nipple length measurement

Nipple length was measured by the tool that was made of a cut off syringe with a millimeter scale[2]. Two nurses at antenatal care clinic and two nurses at postpartum ward were trained by researchers for nipple length measurement. The correct steps for nipple measurement of the nurses were assessed before research beginning. The measurement was done after nipple stimulation to an erection state while pregnant woman was in sitting position, placing the nipple length measurement tool over the nipple, adjusting the inner lip of the tool so that it just contacted the tip of nipple, and reading and recording the length of the nipple in millimeters. Nipple length was measured in both breasts. After birth, the nipple length was measured again in the same way at the first day postpartum.

Procedure and collection of material

Randomization was done using a computer-

generated list with block of five methods. Sequential number would be kept in sealed envelopes. Participants who met the inclusion criteria would be allocated to either nipple puller use group or routine follow-up group. In the first group, the mothers were taught and practiced nipple puller use. The method of nipple puller use was compressing the bulb of nipple puller for negative pressure formation, placing the nipple puller on areola area, releasing pressure out of the bulb compression, waiting for 10 minutes. After that, the nipple puller was off by opening and allowing air pass into the contact area. The nipple puller was lost of negative pressure and came out of the breast. The mothers had to use nipple puller for short nipple twice a day until delivery. The data of nipple puller use was daily recorded and the mothers had to use nipple puller more than 80% of all recorded days. The preterm labor complication was followed and recorded. In the second group, the mothers had no intervention during antenatal care. Both groups would get the same routine antenatal care. When the mothers delivered, the nipple length was measured and compared with the previous measurement on the first day postpartum. Demographic data, factors affecting breastfeeding including body mass index, route of delivery, birth weight and nipple length were analyzed.

Ethical considerations

This study was approved by the Ethics committee of Srinakharinwirot University, Faculty of Medicine and registered with Thai Clinical Trials Registry (registration number TCTR20170509002)

Statistical analysis

Demographic data was reported in means and percentages. We used the student t-test to compare the means of maternal age, gestational age, body mass index, birth weight and nipple length between the nipple puller use and routine follow-up groups. The data of parity and route of delivery was analyzed by chi-square test. We used intention to treat method for analysis. Nipple puller use group must practice 80% of the recorded days or more. If the mothers used nipple puller less than 80%, subgroup analysis was done for this data. A p-value less than 0.05 was considered statistically significant. Statistical analysis was performed using SPSS version 19.0 IBM Singapore Pte. Ltd (Registration No.1975-01566-C).

Results

The total number of short nipple pregnant women who enrolled in our research project was 250. A flow chart of the number of participants was shown in Fig. 1. The mean mother's age was 24.8 ± 6.2 years. The mean gestational age of nipple length measurement at antenatal care clinic was 25.1 ± 1.9 weeks. The percentage of primipara was 74.0. The mean body mass index was 24.7 ± 5.0 kg/m^2. The demographic data of nipple puller use group was similar to the routine follow-up group. There were no statistically significant differences of the mother's age, gestational age, parity, body mass index, route of delivery, birth weight and nipple length between the nipple puller use and routine follow-up groups. Demographic data were shown in Table 1. There was no mother who used nipple puller less than 80% of all recorded days.

In both routine follow-up and nipple puller use groups, the nipple length differences between antenatal care clinic and postpartum measurement were statistically significant. The comparison of nipple length between antenatal care clinic and postpartum measurement was shown in Table 2.

At postpartum, there were statistically significant nipple length differences between the nipple puller use and routine follow-up groups. The comparison of the nipple length between nipple puller use and routine follow-up groups at postpartum were shown in Table 3. The mean difference between antenatal care clinic and postpartum nipple length measurement was 3.8 ± 0.2 and 4.0 ± 0.2 millimeters in the right and left nipple.

There was no complication of nipple puller use including abrasion, cracked nipple and preterm labor which was reported during antenatal care follow-up.

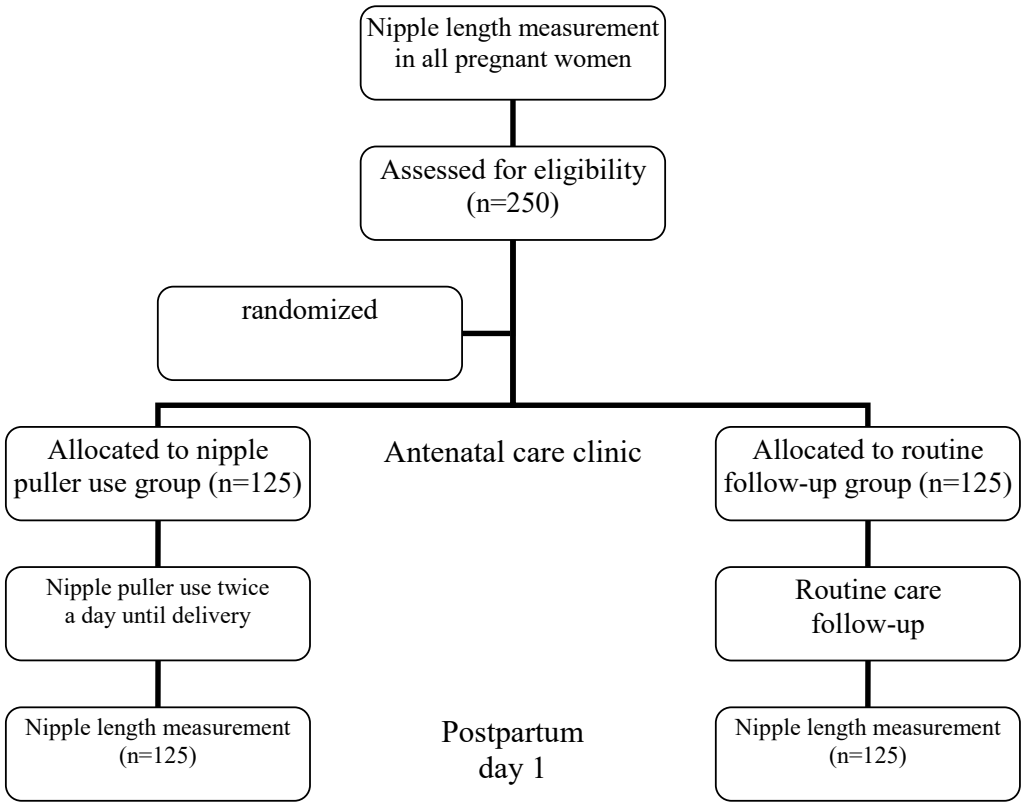

Fig. 1. Flow diagram of participants through the study.

Table 1. Demographic data of the nipple puller use and routine follow-up groups.

Mother's and newborn's data	Nipple puller use group (n=125)	Routine follow-up group (n=125)	p value
Mother's age (years)	24.5 ± 6.0	25.1 ± 6.3	0.406
Gestational age at the first antenatal visit (weeks)	27.9 ± 2.6	24.6 ± 1.2	0.148
Primipara n (%)	99 (79.2)	86 (68.8)	0.064
BMI (kg/m^2)	25.2 ± 6.9	25.1 ± 5.1	0.933
Route of delivery n (%)			
Vaginal delivery	63 (50.4)	68 (54.4)	0.810
Cesarean section	62 (49.6)	57 (45.6)	0.810
Birth weight (grams)	3,070.0 ± 450.8	3,141.6 ± 415.8	0.280
Gestational age at delivery (weeks)	38.2 ± 1.0	38.0 ± 0.9	0.165
Nipple length (mm.)			
Right nipple	4.7 ± 1.5	5.3 ± 1.4	0.060
Left nipple	5.1 ± 1.6	5.0 ± 1.2	0.224

Table 2. Comparison of the nipple length between antenatal care clinic and postpartum measurement in routine follow-up and nipple puller use groups.

Group	Antenatal care clinic measurement (n=125)	Postpartum measurement (n=125)	p value
Routine follow-up			
right nipple (millimeters)	5.3 ± 1.4	5.6 ± 1.4	< 0.001
left nipple (millimeters)	5.0 ± 1.2	5.4 ± 1.2	< 0.001
Nipple puller use			
right nipple (millimeters)	4.7 ± 1.5	9.5 ± 1.7	< 0.001
Left nipple (millimeters)	5.1 ± 1.6	9.4 ± 1.7	< 0.001

Table 3. Comparison of the nipple length between nipple puller use and routine follow-up groups at postpartum.

Nipple length at postpartum	Nipple puller use group (n=125)	Routine follow-up group (n=125)	p value
right nipple (millimeters)	9.5 ± 1.7	5.6 ± 1.4	< 0.001
left nipple (millimeters)	9.4 ± 1.7	5.4 ± 1.2	< 0.001

Discussion

The nipple length between nipple puller use and routine follow-up group had statistically significant difference. The nipple puller could make nipple elongate about 3.8-4.0 millimeters if the nipple puller use was started at the second trimester in this study. In Thailand, an alternative method for nipple elongation is breast cup use which can soften areola concurrently. The breast cup can elongate nipple about 2.4 millimeters during antenatal care use whereas the nipple length can increase automatically 1.8 millimeters by no intervention[9]. The nipple length associated with breastfeeding success is more than 7 millimeter at postpartum evaluation[2]. For the pregnant women at antenatal care clinic who have nipple length about 3-5 millimeters, the nipple puller may be an effective method for nipple elongation. However, the mothers with nipple length about 4.5-5 millimeters and firm areola consistency may have more benefit from nipple cup.

In this study, the routine follow-up group had only 0.3-0.4 millimeters of nipple length elongation. It was different from previous study which had more nipple elongation. We had a hypothesis; the short nipple may elongate less than normal length nipple because the different data was collected from the pregnant women who had nipple length more than 7 millimeters in the study of Thanaboonyawat, et al[10]. However, it needs further research for more investigation.

The complication of nipple puller use might be concerned. In this study, no preterm labor, nipple abrasion and cracked nipple were detected. However, the pregnant women who choose the nipple puller should be low risk for preterm labor.

The nipple puller is used routinely but no evidence-based support for nipple elongation and no answer of the question "How many millimeters of nipple length does the nipple puller use effectively" were reported. The strength of this study was the answer of this research question. In addition, our method of nipple length measurement was simple and health professional in community hospital can use plastic syringe to produce this tool. The cost of nipple puller is 120-250 baht. The application of nipple measurement tool and nipple puller is possibly accessible.

We determined only the nipple length in this study but not other nipple factors including nipple width, areola size and consistency which might affect breastfeeding. This was the limitation of this study. So we suggest that nipple and areola should be evaluated during breast examination of pregnant women at antenatal clinic. If only the nipple length was suspected as breastfeeding problem, the nipple puller is the alternative method to elongate nipple length.

Conclusion

The nipple puller use in low risk pregnant women could increase nipple length without preterm labor complication.

Acknowledgements

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Potential conflicts of interest

The authors declare no conflict of interest.

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