Nipple Length and its Relation to Success in Breastfeeding

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Objective: *To find the critical cut-off point of nipple length that facilitates success in breastfeeding.*
Material and Method: *The subjects were 449 postpartum women, who delivered at HRH Princess Maha Chakri Sirindhorn medical center in Nakhon Nayok province between October, 2010 and March, 2011. Data regarding nipple length and its relation to success in breastfeeding were collected and analyzed by a receiver operating characteristic curve (ROC curve). This is a graphical method of assessing the characteristics of a diagnostic test.*
Results: *The data shows that 7-millimeters in nipple length had been shown to be the cut-off point that facilitates successful breastfeeding. Sensitivity was at 72.5%. Specificity was at 46.2%. The positive predictive value was at 97.8% and the negative predictive value was at 4.9%.*
Conclusion: *The cut-off point for nipple length that facilitates successful breastfeeding has been measured at 7 millimeters. Nurses and health personnel may use 7 millimeters of nipple length as a criteria for a successful breastfeeding screening test and give close breastfeeding support if postpartum women have less than 7 millimeters in nipple length.*

Keywords: *Nipple length, Latch on, Breastfeeding, Nipple problem, Short nipple*

J Med Assoc Thai 2013; 96 (Suppl. 1): S1-S4
Full text. e-Journal: *http://jmat.mat.or.th*

Characteristics of nipples are an important factor in success in breastfeeding[1]. Nipple problems, namely short, flat, or inverted nipples can have physical and psychological effects for the breastfeeding mother. In a mother with flat or inverted nipples, latching on and breastfeeding can be problematic[2,3]. However, this data is controversial and nipple length may affect breastfeeding to only a minor degree and it may not need correction because the baby is able to use its mouth to extend the nipple/areola complex during latching on to the breast during breastfeeding[4]. There is scant data in the literature regarding average nipple length. The authors were interested in nipple length measurement and the associated success rate of breastfeeding for the present study.

Material and Method

The data was collected between October, 2010 and March, 2011. Inclusion criteria were women who delivered at the HRH Princess Maha Chakri Sririndhorn medical center and had accepted to participate in the present study. Exclusion criteria were women who had contraindications to breastfeeding. The authors measured nipple length with a tool that was made out of a modified syringe with a millimeter scale added, (Fig. 1). The sizes of syringes used were 3, 5, 10, and 20 milliliters. Nursing staff trained by the researchers measured the women's nipple lengths at day 1 postpartum. The method of measurement used was placing the mother into a sitting position, stimulating the nipple to an erect state, placing the nipple length measurement tool over the nipple, adjusting the inner lip of the tool so that it just contacted with the areola and reading and recording the length of the nipple in millimeters as shown in Fig. 2. Nipple lengths were measured in both breasts. The longer value was used in the present analysis. Subsequently, a second, properly trained nursing team accessed the mothers' success in breastfeeding the babies by analyzing a latch score[5-7]. Latch scores of more than 8 were interpreted as successful breastfeeding scores[6]. The data was analyzed to

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Fig. 1 Nipple length measurement tool

Fig. 2 Nipple length measurement method

determine the cut-off point for nipple lengths for successful breastfeeding with use of a ROC curve. Sample size was estimated based on Nakhon Nayok population, 95% confidence level and confidence interval of 5. The sample was required at least 384. The Ethics committee of the Faculty of Medicine, Srinakharinwirot University approved the present study.

Results

The number of postpartum women that enrolled in our research project was 486. Of these, 449 cases had evidenced completed data. There was incomplete latch score assessment data in 37 of the cases. The mean age of the subjects was at 26.76 $\pm$ 6.58 years. The percentage of women who were primipara was at 62.4. The percentage of multipara subjects was at 37.6. Vaginal deliveries were at 67.3% and cesarean sections were at 32.7%. The frequency of each of the latch scores is shown in Table 1. The authors analyzed the ROC curve from this data. The results have shown that a seven millimeter nipple length was the cut-off point that had given a 97% success rate of latching on. The sensitivity was at 72.5% and the specificity was at 46.2%, The positive predictive value was at 97.8% and the negative predictive value was at 4.9% as exhibited in Fig. 3 (area under the ROC curve = 0.73).

Discussion

Those with nipple lengths of seven millimeters had higher success rates in their latching on rates and the authors found the authors could use nipple length as a screening test for successful breastfeeding. The sensitivity was at 72.5% and the positive predictive value was at 97.8%. Nipple length is a significant part of the hospital personnel's and the mothers' concerns in regard to breastfeeding. Insufficient nipple length is a significant problem which often deters breastfeeding. The starting point of breastfeeding is the child's ability to latch on[3]. When mothers have a higher success rate in latching on they tend to have more success with breastfeeding. When hospital personnel detects a mother with less than a seven millimeter nipple length at the antenatal care clinic the authors attempt to advise her in ways to correct this problem. A nipple puller is an effective treatment. The aim of treatment is increasing the nipple length to seven millimeters. A one month follow-up appointment is necessary to assess nipple length again. If a mother can maintain a nipple length of over seven millimeters, this increases her confidence in breastfeeding.

Breast examination is a routine step at the antenatal clinic. Nipple problems should be detected at that time. Flat or inverted nipples can be diagnosed simply by observation. Short nipples are difficult to diagnose on observation and their effect is not clear in regard to their effect on breastfeeding[2-4]. The authors adapted a nipple length measurement tool from a syringe nipple puller[4]. This tool is easily produced and made out of a plastic syringe. The authors nipple length measurement method is easy to understand. Nipple length in millimeters is an objective finding and can be compared to findings in follow-up visits.

If the authors want to increase the breast-feeding rate, the authors should study other factors besides the nipple length problem as well. The problem of early maternal return to work can be resolved. Knowledge of breast milk collection and storage methods should be given to retain and increase the 6-month, exclusive breastfeeding rates.

Table 1. The frequency of latch scores

Latch score	Frequency (cases)
4	1
6	2
7	10
8	42
9	232
10	162

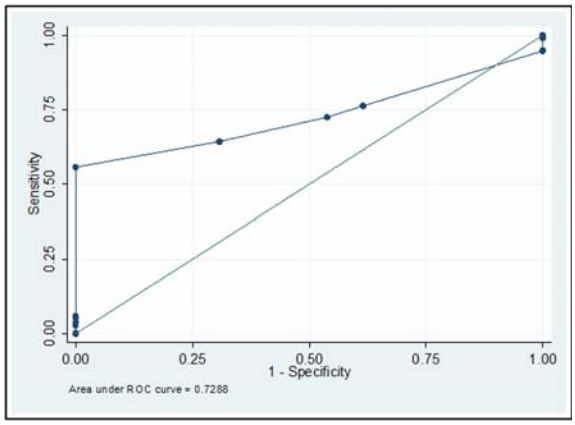

Fig. 3 ROC curve of nipple lengths

Conclusion

Minimum nipple length of seven millimeters has shown to be specific for a highly successful rate of breastfeeding. The sensitivity was at 72.5% and the positive predictive value was at 97.8%.

Acknowledgement

Thanks to the HRH Princess Maha Chakri Sririndhorn Medical Center and the Faculty of Medicine, Srinakharinwirot University for supporting our research. Special thanks to assistant professor Kittipong Kongsomboon for his assistance in data analysis.

Potential conflicts of interest

None.

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ความยาวหัวนมกับความสำเร็จในการเลี้ยงลูกด้วยนมแม่

ภาวิน พัวพรพงษ์, เกษม เรืองรองมรกต, พรรณวรา ปริตกุล, สุขวดี เกษสุวรรณ, ศิณัฐชานันท์ วงษ์อินทร์

วัตถุประสงค์: *ศึกษาความยาวหัวนมกับความสำเร็จในการเลี้ยงลูกด้วยนมแม่*

วัสดุและวิธีการ: *ศึกษาโดยทำการวัดความยาวหัวนมในกลุ่มมารดาหลังคลอดที่มาคลอดที่โรงพยาบาลศูนย์การแพทย์สมเด็จพระเทพรัตนราชสุดาฯ สยามบรมราชกุมารี อำเภอองครักษ์ จังหวัดนครนายก ตั้งแต่เดือนตุลาคม พ.ศ. 2553 ถึง เดือนมีนาคม พ.ศ. 2554 จำนวน 449 ราย โดยนำมาวิเคราะห์ผลความยาวของหัวนมกับการเข้าเต้าโดยใช้ ROC curve*

ผลการศึกษา: *จากผลการศึกษาพบจุด cut-off point ของความยาวหัวนมที่เข้าเต้าสำเร็จคือ 7 มิลลิเมตร มีอัตราความสำเร็จร้อยละ 97 มีความไว (sensitivity) ร้อยละ 72.5 ความจำเพาะ (specificity) ร้อยละ 46.2 positive predictive value ร้อยละ 97.8 และ negative predictive value ร้อยละ 4.9*

สรุป: *ความยาวหัวนมที่ 7 มิลลิเมตร สามารถทำนายอัตราการเลี้ยงลูกด้วยนมแม่สำเร็จสูง อาจนำไปใช้ในการตรวจคัดกรองและสนับสนุนให้มีการดูแลการเลี้ยงลูกด้วยนมแม่อย่างใกล้ชิดในผู้คลอดที่มีความยาวหัวนมสั้นกว่า 7 มิลลิเมตร*