Effect of Obesity and Early Breastfeeding Initiation on Exclusive Breastfeeding Rates

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Objective: *To compare the 6-week postpartum, exclusive breastfeeding rates between obese mothers and mothers with a normal body mass index (BMI), with early breastfeeding initiation.*
Material and Method: *The subjects were 415 singleton, postpartum, obese mothers who delivered without complications at the HRH Princess Maha Chakri Sirindhorn Medical Center in the Nakhon Nayok province between the years of 2013 through 2015 and the same number of matched normal body mass index mothers. The early breastfeeding initiation of both the obese mothers and the normal BMI mothers was recorded. The exclusive breastfeeding rates were collected at the second day postpartum. Following discharge, telephone follow-ups were used for the collection of breastfeeding data at the 7th, 14th day and six weeks postpartum. The exclusive breastfeeding rates of the obese mothers were analyzed and compared with the exclusive breastfeeding rates of normal BMI mothers at the 2nd, 7th, 14th day and 6 weeks postpartum. The data was analyzed by Chi-square, relative risk and 95% confidence interval.*
Results: *At the 2nd, 7th, 14th day and 6th week postpartum; the exclusive breastfeeding rates of the obese mothers' group were 94.5, 71.1, 64.8 and 51.3%, respectively. The exclusive breastfeeding rates of the normal BMI mothers' group for the same periods were 95.7, 79.3, 75.4 and 63.1%, respectively. There are statistically significant differences between the exclusive breastfeeding rates of the obese mothers' group and the normal BMI groups at the 7th day, 14th day and 6th week postpartum. In the situation of early breastfeeding initiation, the exclusive breastfeeding rates of the obese mothers at the 2nd, 7th, 14th day and 6th week postpartum were 96.3, 77.0, 71.2 and 58.4%, respectively. The exclusive breastfeeding rates of the normal BMI mothers who had early breastfeeding initiation were 96.2, 81.3, 77.4 and 67.2% at the 2nd, 7th, 14th day and 6th week postpartum, respectively. No significant differences were seen between the two groups in the exclusive breastfeeding rates at the 2nd, 7th and 14th day postpartum.*
Conclusion: *The obesity had negative effect on exclusive breastfeeding rates during six weeks postpartum after mothers' discharge. But the exclusive breastfeeding rates of both the obese and normal BMI mothers were not significantly different during two weeks postpartum in early breastfeeding initiation situation. The obese mothers could be advised about early breastfeeding initiation.*

Keyword: *Obese mothers, Exclusive breastfeeding, Early breastfeeding initiation*

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The high body mass index (BMI) has effects on the duration of breastfeeding[1,2]. In 2009, the prevalence of obesity in Thai women was 12.1% and the trend has been increasing[3]. The obese mother is likely to have pregnancy complications such as; gestational diabetes mellitus, cesarean section deliveries and postpartum infections including difficult latching and positioning[4-7]. So, the obesity is one of obstacles for breastfeeding support.

Early breastfeeding initiation is recommended in ten steps to promote successful breastfeeding[8]. The early initiation of breastfeeding, within the first hour postpartum, has been shown to have a positive impact on the duration of exclusive breastfeeding[9]. If the first breastfeeding is delayed more than 6 hours, this has shown a negative association with the duration of breastfeeding[10]. We believe that the early breastfeeding initiation may help the obese mothers

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decrease breastfeeding problems. There is scant literature regarding the early breastfeeding initiation effecting on exclusive breastfeeding rate in the obese mothers. We were interested in the comparisons of the 6-week postpartum exclusive breastfeeding rates between the obese mothers and those with a normal BMI as our first objective. The secondary objective was the comparison of the exclusive breastfeeding rates between obese mothers who had early breastfeeding initiation and mothers with a normal BMI.

Material and Method

Design

This study is a prospective cohort study. The singleton, postpartum obese mothers who delivered term infants without postpartum complications and had at least 6 months of breastfeeding intent were recruited in this study. Also included were normal BMI mothers as matches for the obese mothers. The demographic data of both, the obese group and normal BMI group, were collected. The early breastfeeding initiation for both, the obese mothers and the normal BMI mothers, was recorded. The exclusive breastfeeding rates were collected at the second day postpartum. Following discharge, telephone follow-up was used for collecting breastfeeding data at the 7^{th} day, 14^{th} day and 6^{th} week postpartum. The exclusive breastfeeding rates of the obese mothers compared with the rates of the normal BMI mothers were analyzed in total and in early breastfeeding initiation. This study was approved by The Ethics committee of the Srinakharinwirot University, Faculty of Medicine.

Setting

This study was performed in the Nakhon Nayok province, a rural area in the central part of Thailand. The data was collected during the period from January, 2013 to December, 2015 at the HRH Princess Maha Chakri Sirindhorn Medical Center which has a 'baby friendly' hospital policy. A routine practice in the postpartum ward is breastfeeding education. The one-hour course in breastfeeding that includes latching is taught on the first day postpartum. One nurse teaches a group of 3-5 mothers. The mothers are encouraged to stimulate their infants to feed 8-12 times per day. At the second day postpartum, the mothers and infants are discharged if they have shown no complications. Prior to discharge, a breastfeeding-recording notebook was given to the mother with an explanation of the "breastfeeding type" definitions, postpartum symptoms and complications which may require further clinical counseling.

Inclusion criteria

The postpartum women who had vaginal and cesarean deliveries without antenatal complications (i.e. multiple pregnancies, preeclampsia, antepartum hemorrhage and preterm labor) and who intended to breastfeed for at least six months were recruited. Their infants had birth weights of more than 2,500 grams and were delivered without complications. The mothers had suffered no acute postpartum hemorrhages and had no contraindications to breastfeeding. This includes mothers who were HIV positive.

Exclusion criteria

Mothers whose infants were diagnosed with galactosemia were excluded from this study.

Sample size

We used 0.05 of α error, 0.95 of power, df = 5 and an effect size equal to 0.23. The calculated sample size numbered 374 cases. The subjects were totaled with an additional 15% for data loss. The total samples collected were 415 in each group.

Exclusive breastfeeding definitions and outcomes

The outcomes of this study were in the rates of exclusive breastfeeding and breastfeeding. Exclusive breastfeeding was defined as no other food or drink, including water, other than breast milk including milk expressed. The infant was able to receive drops and syrups of vitamins, minerals and medicines and other Oral Rehydration Solutions (ORS).

The exclusive breastfeeding rates at six weeks postpartum were collected by follow-up through conversations via the telephone. The mother was taught to record breastfeeding and any fluids or foods which were given to the infant on a breastfeeding notebook that was given to the mother prior to discharge. Exclusive breastfeeding and breastfeeding results were answered by the mother consistently with established definitions.

Obese mothers are defined as the mothers who had a body mass index more than 30 kg/m^2 prior to becoming pregnant.

The normal BMI mothers meant the mother who had a body mass index between 18.5 and 23.0 kg/m^2 prior to pregnancy[11].

The early breastfeeding initiation practice is defined as the initiation of breastfeeding within one hour postpartum.

Statistical analysis

Demographic data is reported in means and percentages. The continuous data was analyzed by t-test. The parity, occupation and route of delivery were analyzed by Chi-square. The exclusive breastfeeding rates were compared by Chi-square, relative risk and a 95% confidence interval. A *p*-value of less than 0.05 was considered statistically significant. Statistical analysis was performed using SPSS, IBM Singapore Pte. Ltd (Registration No.1975-01566-C).

Results

Four hundred and fifteen postpartum obese mothers and a matching number of normal BMI mothers had been enrolled in our research project. The details of demographic data are shown in Table 1.

At the 2nd, 7th, 14th days and 6th weeks postpartum; the exclusive breastfeeding rates of the obese mothers' group were 94.5, 71.1, 64.8 and 51.3%, respectively. The exclusive breastfeeding rates of the normal BMI mothers' group were 95.7, 79.3, 75.4 and 63.1%, respectively. There are statistically significant differences between the exclusive breastfeeding rates of the obese mothers' group and the normal BMI groups at the 7th day, 14th day and 6th week postpartum but no statistically significant difference between two groups at the 2nd day postpartum. The details of exclusive breastfeeding rates in both the obese group and normal BMI group are shown in Table 2 and Fig. 1.

In the early breastfeeding initiation situation, the exclusive breastfeeding rates of the obese mothers at the 2nd, 7th, 14th day and 6th week postpartum were 96.3, 77.0, 71.2 and 58.4%, respectively. The exclusive breastfeeding rates of the normal BMI mothers who had early breastfeeding initiation were 96.2, 81.3, 77.4 and 67.2% at the 2nd, 7th, 14th day and 6th week postpartum, respectively. No significant differences were seen between the two groups in the exclusive breastfeeding rates at the 2nd, 7th and 14th day postpartum. However, there were differences in the exclusive breastfeeding rates at 6-weeks postpartum. The details of exclusive breastfeeding rates in both the obese group and normal BMI group with early breastfeeding initiation are shown in Table 3 and Fig. 2.

Discussion

The demographic data of the obese mothers has shown most to be multipara, housewives, self-employed, within a normal range of nipple length and a high incidence of cesarean sections[12-14]. The matched normal BMI mothers' data was similar with no statistically significant differences. The exclusive breastfeeding rates of the obese mothers were lower than the rates of the normal BMI mothers following discharge at the 7th, 14th day and 6th week postpartum. This result was taken from a study of O'Sullivan et al[15]. The obesity effects on exclusive breastfeeding rates with early breastfeeding initiation were a problem. However, the exclusive breastfeeding rates of both groups in this study were not significantly different at the second day postpartum. It might be due to close breastfeeding support in the hospital situation. Therefore, the follow-up of the obese mothers in the first week was required and deemed important for providing counseling and helping to resolve breastfeeding problems.

We have hypothesized that early breast-feeding initiation helps to increase the obese mothers'

Table 1. Demographic data of the obese and normal BMI mothers' groups

Mothers and newborns' data	Obese mothers' group (n = 415)	Normal BMI mothers' group (n = 415)	*p*-value
Age (years)	28.3±6.8	28.7±6.1	0.36
Gestational age (week)	38.8±1.6	38.8±1.6	0.92
Primipara n (%)	158 (38.1)	175 (42.2)	0.23
Multipara n (%)	257 (61.9)	240 (57.8)	
Housewife or self-employed n (%)	223 (53.7)	219 (52.8)	0.78
Employee n (%)	192 (46.3)	196 (47.2)	
Route of delivery n (%)			
Vaginal delivery	196 (47.2)	203 (48.9)	0.63
Cesarean section	219 (52.8)	212 (51.1)	
Blood loss (ml)	477.6±136.3	445.1±134.0	0.23
Nipple length (cm)	0.9±0.4	0.9±0.3	0.24
Birth weight (gram)	3,191.0±522.4	3,172.7±368.7	0.50

exclusive breastfeeding rates. The exclusive breastfeeding rates of both the obese and normal BMI mothers were not significantly different at the 2nd, 7th and 14th day postpartum with early breastfeeding initiation. The study of Nommsen-Rivers et al shown that the obesity associated with delayed lactogenesis[16]. Early breastfeeding initiation likely helps with the problem of inadequate breast milk which is a significant problem with the obese mothers. It makes no difference in the exclusive breastfeeding rates. However, the 6-week postpartum exclusive breastfeeding rates of the obese mothers were significantly lower than the rates of the normal BMI mothers. This might be due to the fact that early breastfeeding initiation affects only the early breastfeeding duration. The breastfeeding problems from the other factors including the mother's return to work and the mother or infant's illnesses increase over time[17]. Although early breastfeeding initiation would help the obese mothers to get off to a good start, the close follow-up of the obese mothers was also necessary. The breastfeeding counseling for mothers' and infants' illnesses, drug use during breastfeeding and the mother's returning to work preparation is required.

Table 2. The relative risk of exclusive breastfeeding rates between the obese group and the normal BMI group during the postpartum period

Exclusive breastfeeding rates during postpartum period	Relative risk	95% confidence interval
Postpartum day 2	0.77	0.41-1.45
7th day	0.64	0.47-0.88
14th day	0.60	0.44-0.81
6th week	0.62	0.47-0.81

The strength of this study was the explanation of the definition of exclusive breastfeeding, daily-recorded infant feeding advice and the mothers' telephone numbers that had been confirmed prior to the mother's discharge. The percentage of the mothers' contact at the sixth week was complete (100%). However, the parity factor has not been analyzed in this study. The breastfeeding problems of primiparous obese mothers were likely greater than those in multiparous obese mothers. The appropriate guidelines for breastfeeding support in this group should be further studied.

In breastfeeding support, we suggested the healthcare professional should encourage the

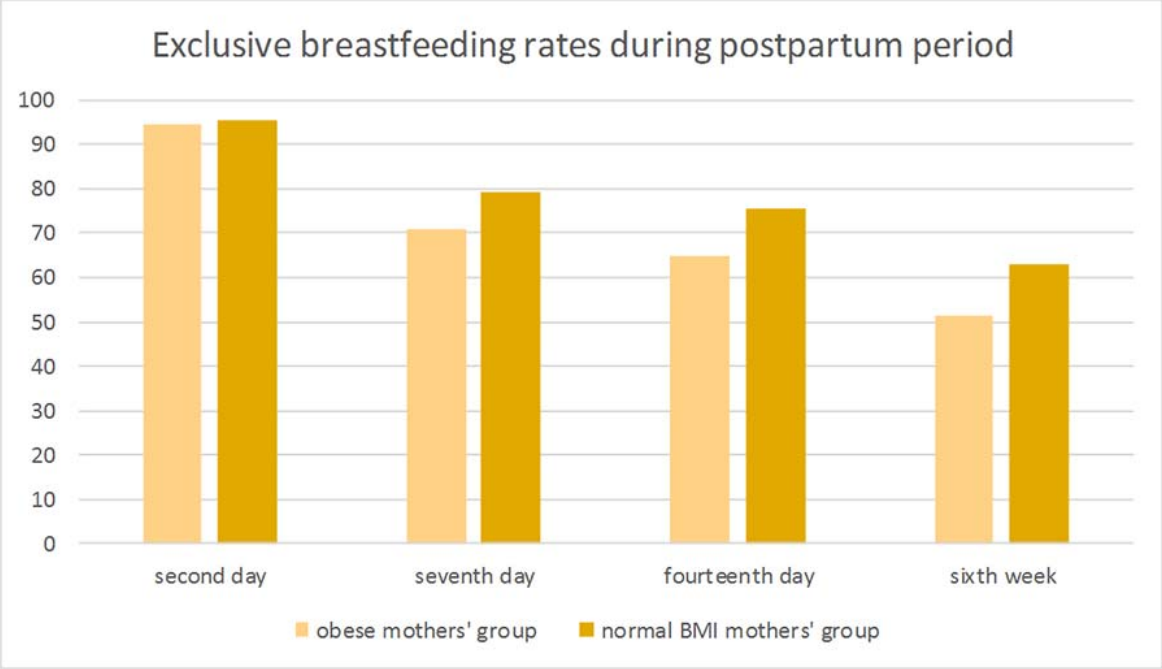

Fig. 1 The comparison of exclusive breastfeeding rates between the obese group and the normal BMI group during the postpartum period.

Table 3. The relative risk of exclusive breastfeeding rates between the obese group and the normal BMI group during the postpartum period with early breastfeeding initiation

Exclusive breastfeeding rates during postpartum period with early breastfeeding initiation	Relative risk	95% confidence interval
Postpartum day 2	1.04	0.40-2.66
7th day	0.78	0.49-1.20
14th day	0.72	0.48-1.09
6th week	0.69	0.47-0.99

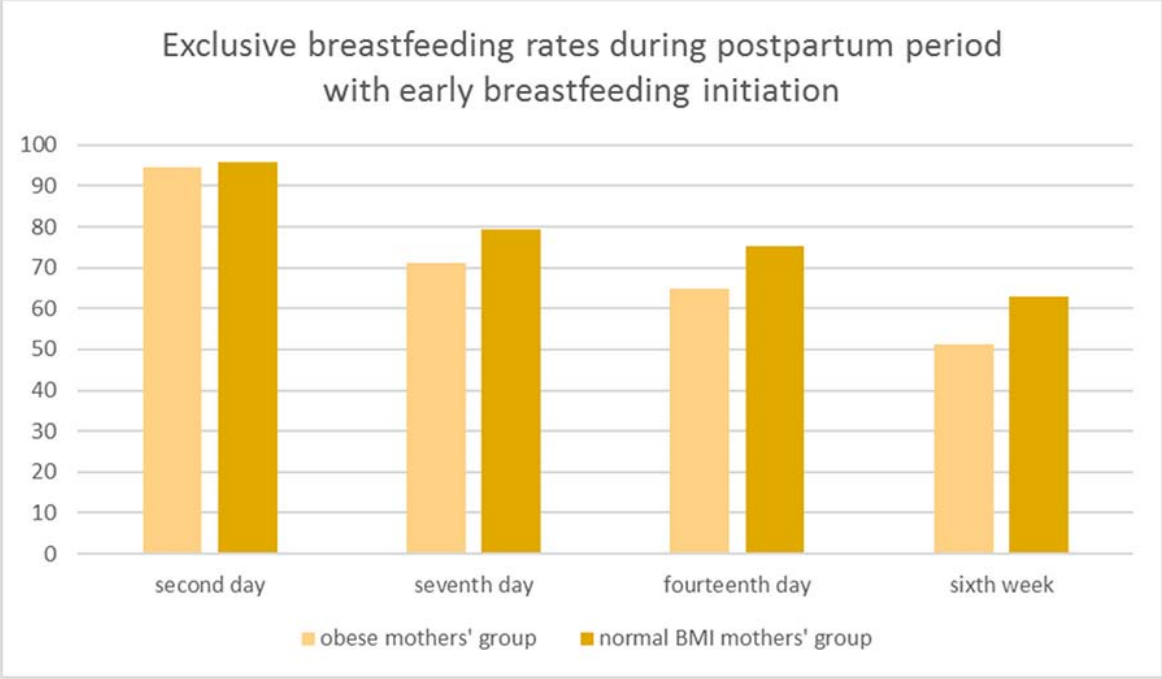

Fig. 2 The comparison of exclusive breastfeeding rates between the obese group and the normal BMI group during the postpartum period with early breastfeeding initiation.

postpartum obese mothers for early breastfeeding initiation and close follow-up should be need. This is likely to increase opportunity for exclusive breastfeeding in postpartum obese mother.

Conclusion

The obesity had negative effect on exclusive breastfeeding rates during six weeks postpartum after mothers' discharge. But the exclusive breastfeeding rates of both the obese and normal BMI mothers were not significantly different during two weeks postpartum in early breastfeeding initiation situation. The obese mothers could be advised about early breastfeeding initiation.

What is already known on this topic?

The obesity effects on breastfeeding including delayed lactogenesis. The high body mass index effects on the duration of breastfeeding. The early initiation of breastfeeding within the first hour postpartum has a positive impact on the duration of exclusive breastfeeding. If the first breastfeeding delay more than 6 hours has the negative association with the duration of breastfeeding.

What this study adds?

The exclusive breastfeeding rates of the obese mothers were significantly lower than the rates of the normal body mass index mothers at the 7th, 14th days

and 6th week postpartum. In early breastfeeding initiation situation, the exclusive breastfeeding rates of both the obese and normal body mass index mothers were not significant different at the 2nd, 7th and 14th day postpartum. The obese mothers could be advised about early breastfeeding initiation.

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Potential conflicts of interest

None.

References

1. Thompson LA, Zhang S, Black E, Das R, Ryngaert M, Sullivan S, et al. The association of maternal pre-pregnancy body mass index with breastfeeding initiation. Matern Child Health J 2013; 17: 1842-51.
2. Zhu P, Hao J, Jiang X, Huang K, Tao F. New insight into onset of lactation: mediating the negative effect of multiple perinatal biopsychosocial stress on breastfeeding duration. Breastfeed Med 2013; 8: 151-8.
3. Aekplakorn W, Inthawong R, Kessomboon P, Sangthong R, Chariyalertsak S, Putwatana P, et al. Prevalence and trends of obesity and association with socioeconomic status in Thai adults: National Health Examination Surveys, 1991-2009. J Obes 2014; 2014: 410259.
4. Garner CD, McKenzie SA, Devine CM, Thornburg LL, Rasmussen KM. Obese women experience multiple challenges with breastfeeding that are either unique or exacerbated by their obesity: discoveries from a longitudinal, qualitative study. Matern Child Nutr 2016 Jul 25. doi: 10.1111/mcn.12344.
5. Al Kubaisy W, Al Rubaey M, Al Naggar RA, Karim B, Mohd Noor NA. Maternal obesity and its relation with the cesarean section: a hospital based cross sectional study in Iraq. BMC Pregnancy Childbirth 2014; 14: 235.
6. Graham LE, Brunner Huber LR, Thompson ME, Ersek JL. Does amount of weight gain during pregnancy modify the association between obesity and cesarean section delivery? Birth 2014; 41: 93-9.
7. Leth RA, Uldbjerg N, Norgaard M, Moller JK, Thomsen RW. Obesity, diabetes, and the risk of infections diagnosed in hospital and post-discharge infections after cesarean section: a prospective cohort study. Acta Obstet Gynecol Scand 2011; 90: 501-9.
8. Yotebieng M, Labbok M, Soeters HM, Chalachala JL, Lapika B, Vitta BS, et al. Ten Steps to Successful Breastfeeding programme to promote early initiation and exclusive breastfeeding in DR Congo: a cluster-randomised controlled trial. Lancet Glob Health 2015; 3: e546-55.
9. Liben ML, Yesuf EM. Determinants of early initiation of breastfeeding in Amibara district, Northeastern Ethiopia: a community based cross-sectional study. Int Breastfeed J 2016; 11: 7.
10. Chaves RG, Lamounier JA, Cesar CC. Factors associated with duration of breastfeeding. J Pediatr (Rio J) 2007; 83: 241-6.
11. WHO Expert Consultation. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. Lancet 2004; 363: 157-63.
12. Puapornpong P, Raungrongmorakot K, Paritakul P, Ketsuwan S, Wongin S. Nipple length and its relation to success in breastfeeding. J Med Assoc Thai 2013; 96 (Suppl 1): S1-4.
13. Phadungkiatwattana P, Tongsakul N. Analyzing the impact of private service on the cesarean section rate in public hospital Thailand. Arch Gynecol Obstet 2011; 284: 1375-9.
14. Charoenboon C, Srisupundit K, Tongsong T. Rise in cesarean section rate over a 20-year period in a public sector hospital in northern Thailand. Arch Gynecol Obstet 2013; 287: 47-52.
15. O'Sullivan EJ, Perrine CG, Rasmussen KM. Early breastfeeding problems mediate the negative association between maternal obesity and exclusive breastfeeding at 1 and 2 months postpartum. J Nutr 2015; 145: 2369-78.
16. Nommsen-Rivers LA, Chantry CJ, Peerson JM, Cohen RJ, Dewey KG. Delayed onset of lactogenesis among first-time mothers is related to maternal obesity and factors associated with ineffective breastfeeding. Am J Clin Nutr 2010; 92: 574-84.
17. Puapornpong P, Manolerdthewan W, Raungrongmorakot K, Ketsuwan S, Wongin S. Factor effecting on breastfeeding success in infants up to 6 month of age in Nakhon Nayok province. J Med Health Sci 2009; 16: 116-23.

ผลของภาวะอ้วนและการเริ่มให้กินนมแม่ภายในหนึ่งชั่วโมงแรกหลังคลอดต่อการเลี้ยงลูกด้วยนมแม่อย่างเดียว

ภาวิน พัวพรพงษ์, เกษม เรืองรองมรกต, วิเชียร มโนเลิศเทวัญ, เมสิตา สุขสมานวงศ์, ศิณัฐชานันท์ วงษ์อินทร์

วัตถุประสงค์: เปรียบเทียบการเลี้ยงลูกด้วยนมแม่อย่างเดียวของมารดาที่มีภาวะอ้วนกับมารดาที่มีดัชนีมวลกายปกติ ในระยะหกสัปดาห์หลังคลอด และเมื่อมีการเริ่มการให้กินนมแม่ภายในหนึ่งชั่วโมงแรกหลังคลอด

วัสดุและวิธีการ: ศึกษาจากมารดาหลังคลอดที่มีภาวะอ้วนที่ไม่มีภาวะแทรกซ้อนและทารกแรกเกิดที่โรงพยาบาลศูนย์การแพทย์สมเด็จพระเทพรัตนราชสุดา ฯ สยามบรมราชกุมารี อำเภอองครักษ์ จังหวัดนครนายก พ.ศ. 2556 ถึง พ.ศ. 2558 จำนวนทั้งสิ้น 415 ราย และมารดาที่มีดัชนีมวลกายปกติจำนวนเท่ากันเพื่อเปรียบเทียบ เก็บข้อมูลการมีการเริ่มกินนมแม่ในหนึ่งชั่วโมงหลังคลอด ข้อมูลการเลี้ยงลูกด้วยนมแม่อย่างเดียวในวันที่สองหลังคลอด และโทรศัพท์สอบถามข้อมูลการเลี้ยงลูกด้วยนมแม่อย่างเดียวในวันที่ 7, 14 และ 6 สัปดาห์หลังคลอด รวบรวมข้อมูลอัตราการเลี้ยงลูกด้วยนมแม่อย่างเดียวมาวิเคราะห์และเปรียบเทียบ ระหว่างกลุ่มมารดาที่มีภาวะอ้วนกับมารดาที่มีดัชนีมวลกายปกติและเมื่อมีการเริ่มการเลี้ยงลูกด้วยนมแม่ในหนึ่งชั่วโมงแรกหลังคลอดโดยสถิติที่ใช้ ได้แก่ Chi-square, relative risk และความเชื่อมั่นที่ร้อยละ 95

ผลการศึกษา: เมื่อเปรียบเทียบในวันที่ 2, 7, 14 และสัปดาห์ที่ 6 หลังคลอด อัตราการเลี้ยงลูกด้วยนมแม่อย่างเดียวในมารดาที่มีภาวะอ้วนเท่ากับร้อยละ 94.5, 71.1, 64.8 และ 51.3 สำหรับมารดาที่มีดัชนีมวลกายปกติเท่ากับร้อยละ 95.7, 79.3, 75.4 และ 63.1 ตามลำดับ โดยอัตราการเลี้ยงลูกด้วยนมแม่อย่างเดียวในมารดาที่มีภาวะอ้วนจะมีความแตกต่างอย่างมีนัยสำคัญเมื่อเทียบกับมารดาที่มีดัชนีมวลกายปกติในวันที่ 7, 14 และสัปดาห์ที่ 6 หลังคลอด ในกรณีที่มีการเริ่มให้กินนมแม่ในหนึ่งชั่วโมงแรกหลังคลอด อัตราการเลี้ยงลูกด้วยนมแม่อย่างเดียวในมารดาที่มีภาวะอ้วนเท่ากับร้อยละ 96.3, 77.0, 71.2 และ 58.4 สำหรับมารดาที่มีดัชนีมวลกายปกติเท่ากับร้อยละ 96.2, 81.3, 77.4 และ 67.2 ตามลำดับ โดยที่ไม่พบมีความแตกต่างของอัตราการเลี้ยงลูกด้วยนมแม่อย่างเดียวในวันที่ 2, 7 และ 14 หลังคลอด

สรุป: ภาวะอ้วนมีผลลบต่ออัตราการเลี้ยงลูกด้วยนมแม่อย่างเดียวใน 6 สัปดาห์หลังคลอดเมื่อมารดากลับจากโรงพยาบาล แต่ในกรณีที่มีการเริ่มการให้กินนมแม่ในหนึ่งชั่วโมงแรกหลังคลอดจะช่วยให้อัตราการเลี้ยงลูกด้วยนมแม่อย่างเดียว ในมารดาที่มีภาวะอ้วนและมารดาที่มีดัชนีมวลกายปกติไม่แตกต่างกันในช่วงสองสัปดาห์หลังคลอด ดังนั้นควรแนะนำให้มารดาที่มีภาวะอ้วนได้เริ่มให้ทารกได้กินนมแม่ภายในหนึ่งชั่วโมงแรกหลังคลอด