

Original Research Article

Breastfeeding to reduce postpartum weight retention

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ABSTRACT

Background: Postpartum weight retention is regarded as a major public health problem because of its contribution to the incidence of obesity. Evidence regarding the effect of breastfeeding on postpartum weight retention reduction is still controversial and limited. In 3 to 6 months of postpartum, not all women will be losing weight, so that efforts are required to reduce postpartum weight retention. This study to determine the effect of breastfeeding on postpartum weight retention.

Methods: This was an observational study with a prospective cohort design. The duration of this study for three months after childbirth. The study population was all lactating mothers in Cirebon Municipality. Samples were taken with a purposive sampling technique in Cirebon with a sample size of 80 people. The data used were primary and secondary data and the instrument used were a questionnaire and adult weight scale. Data were processed using univariate analysis, bivariate analysis with ANOVA and t-test, and multivariate analysis with linear regression.

Results: Postpartum weight retention was much more in partially breastfeeding mothers compared with those who breastfed fully ($p=0.0021$). Breastfeeding can reduce postpartum weight retention at 2.57kg. Breastfeeding after being controlled with food intake, weight gain during pregnancy, and physical activity showed a significant association with postpartum weight retention and can reduce postpartum weight retention at 2.26kg ($p=0.000$).

Conclusions: Breastfeeding could reduce postpartum weight retention. Weight gain during pregnancy, food intake, and physical activity might influence postpartum weight retention.

Keywords: Breastfeeding, Postpartum, Weight retention

INTRODUCTION

One of factors contributing to obesity is postpartum weight retention.¹⁻² Around 15-20% of pregnant women will experience weight retention in the postpartum period.³ Obesity is having an impact on health, including type 2 diabetes and cardiovascular disease that can quickly become the leading cause of death in all adult population.⁴ The reason is due to the process of weight loss after giving birth that does not return to pre-

pregnancy weight.⁵ The national data say that 10.3% of the population aged ≥ 15 years are obese, while 23.8% of women are obese.⁶ Around 15-20 percent of pregnant women will experience significant weight retention in the postpartum period.³

Most women will lose weight in 3-6 months of postpartum, but not all experiences weight loss. Most women will experience weight retention in average of 1 kg in each pregnancy. Decrease in weight retention after

childbirth is influenced by other factors including parity, age of the first birth, food intake, and daily activities.³

The ways to reduce postpartum weight retention have a lot been done such as by diet, exercise, and breastfeeding. According to research, breastfeeding is the way that is most frequently done to reduce postpartum weight retention because it requires a lot of energy about 500 kcal / day. The Institute of Medicine (IOM) of the United States recommends that breastfeeding mothers should consume 330 kcal / day. Energy imbalance is making maternal postpartum weight drop when breastfeeding her baby.⁷ Cirebon Municipality is one area that has low coverage of exclusive breastfeeding, still at 25.98%.⁸

This study aimed to assess postpartum weight retention in breastfeeding women. Thus, this study can provide basic information for the development of programs promoting breastfeeding, especially exclusive breastfeeding.

METHODS

This study described the influence of breastfeeding on postpartum weight retention in the health centers of Kesambi subdistrict of Cirebon Municipality. Kesambi Subdistrict is an area in the middle of town and has a high coverage of exclusive breastfeeding. Data were collected from breastfeeding mothers in Kesambi sub District taken from each health center proportionally starting from after birth to 3 months after birth.

This study used a prospective cohort design. The duration of this study for three months after childbirth. Total samples taken were 80 people with a criteria of single baby vaginal delivery. Breastfeeding mothers who gave birth prematurely and had diabetes, hypertension, preeclampsia, and renal disease were excluded from the study.

This study focused on maternal postpartum weight. Data collected included maternal age, date of birth, place of birth, parity, education, and employment. Maternal weight was weighed immediately after birth, in the first month, second month and third month after birth. Weighing was based on the procedure of weighing for the result accuracy. The scale used was the measurement scale for adults with a condition that the scale was at 0. The mothers were weighed without wearing footwear, a thick cloth, and standing on scale with an upright position. Weight Unit used kilograms.

The dependent variable of this study was postpartum weight retention which was body weight during the postpartum derived from the difference in weight before pregnancy and weight loss 3 months after delivery. The independent variable was breast feeding divided into full and partial breastfeeding in which full breastfeeding was breastfeeding without any mixture of foods while partial breastfeeding was breastfeeding mixed with other foods. The extraneous variable included parity categorized into

primiparous if the mother had a child 1, multiparous if the mother had 2-3 children, and grandemultipara if the mother had children ≥ 4 people. Other external variables were weight gain during pregnancy, food intake, and physical activity measured with a scale ratio. Food intake data retrieval was done using 24-hour recall questionnaire that asked all the food eaten one day before.

Physical activity data retrieval used 24-hour recall to the maternal activities undertaken during one day before from waking up to going back to sleep. Physical activity measurement used the Physical Activity Level (PAL) obtained from the time times energy cost with the PAL lowest value of 1.4 to the highest value of 2.4. Recall for food intake and physical activity was performed over a period of 6 days for 3 months, with the final total data captured approximately 12 times each respondent. Weight gain during pregnancy was taken from the mother's KMS book. Food intake data was analyzed using a software program Nutrition Survey 2005 to see the incoming energy in calorie unit.

Data analysis performed used univariate analysis to describe the study subject, bivariate analysis using independent t-test, ANOVA and correlation with a significance level of $p < 0.05$ and 95% CI to see the relationship between two variables which were the independent variable and the dependent variable or extraneous variable. The multivariate analysis used linear regression with a larger adjusted R² to see the influence of the independent variable on the dependent variable to be controlled by the extraneous variables.⁹ Analysis of quantitative data used the software program Intercooled Stata version 11 (the license on behalf of Siswanto Agus Wilopo). Qualitative analysis was conducted to support quantitative data. Qualitative analysis was performed on mothers who breastfed partially but did not have postpartum weight retention.

RESULTS

Some explanation of the data is displayed by using tables. Table 1 describes the characteristics of study subjects by using frequency distribution, mean and standard deviation. The results showed that the majority of mothers breastfed partially (63.75%) or mixed with other foods. Low full breastfeeding described that the baby had to get food other than breast milk such as formula milk, honey, starch and water prior to 3 months. The postpartum weight retention mean was 1.81 kg with a minimum limit of -10 and a maximum of 12. The majority of respondents (45%) were primiparous. The mean of weight gain during pregnancy on the subject of study was 10.55 with a standard deviation of 3.05. During the postpartum period, the mean of food intake consumed by the subjects was still low. Maternal physical activity during the postpartum had a mean of 1.81 with a standard deviation of 3.67.

Weight changes in women who breastfeed full and partial differ each month, at the beginning postpartum have an average of 55.23 kg, in the first month of full breastfeeding women who have an average of 53.93 kg, in the second month average of 52.17 kg and the three-month average of 51.27 kg. Trend of weight loss appear greater in women who breastfeed in full compared with partial breastfeeding women (Figure 1).

Table 2 describes the relationship of breastfeeding and postpartum weight retention. The analysis results of postpartum weight retention had significant mean differences between mothers who breastfed fully and mothers who breastfed partially at -2.57 with a p value <0.05 (0.0021). It could be concluded that there were significantly mean differences in postpartum weight retention between mothers who breastfed fully and partially breastfeeding mothers, in which score of postpartum weight retention in the mother with full

breastfeeding was lower than the score of weight retention postpartum in mothers who breastfed partially.

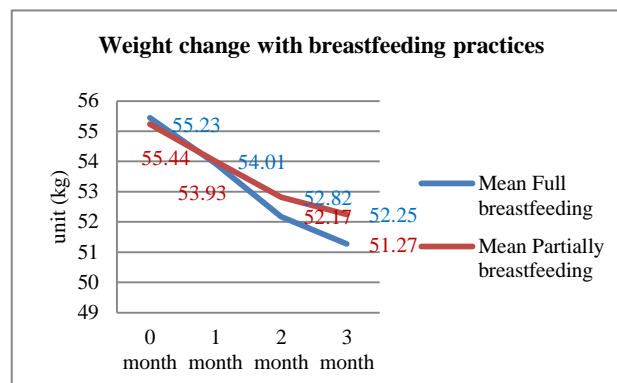


Figure 1: Trend of weight loss in women who breastfeed full and partial.

Table 1: Study subject's characteristics.

Characteristic	(mean±SD)	Min	Max	n (%)
Parity				
Primipara				36 (45)
Multipara				31 (38.75)
Grandemultipara				13 (16.25)
Breastfeeding status				
Full				29 (36.25)
Partial				51 (63.75)
Weight gain during pregnancy	(10.55±3.05)	5	19	
Food intake	(1906.1±477.6)	1123.4	2990.9	
Physical activity	(1.64±0.09)	1.4	1.87	
Postpartum weight retention	(1.81±3.67)	-10	12	

SD = Standard deviation; n = Number of respondent; % = Percentage; Min = Lowest score; Max = Highest score.

Table 2: Analysis of independent t test: relationship between breastfeeding and postpartum weight retention.

Variable	Postpartum weight retention				p
	(mean±SD)	Mean difference	CI	T	
Full breastfeeding	(0.17±2.28)	- 2.57	(-4.18 – (-0.96))	-3.18	0.0021
Partial breastfeeding	(2.74±3.99)				

The ANOVA analysis in Table 3 shows that parity had no significant association with postpartum weight retention seen from the results of p values>0.05 (0.9971), meaning that parity did not affect postpartum weight retention. Seen the difference with Bonferroni, a value of the difference between primiparas and multiparas was 0.06, primiparas and grandemultipara was 0.06, and multiparas and grandemultipara 0.007.

Table 4 shows the results of correlation analysis on weight gain during pregnancy with postpartum weight retention with a value obtained ($r = 0.6881$, $p = 0.000$),

meaning weight gain during pregnancy had a significant power of the relationship with postpartum weight retention. The resulting pattern was a positive relationship, meaning that whenever there was an increase in weight gain during pregnancy, it would be followed by increased postpartum weight retention. Similarly, the obtained value of food intake was ($r=0.4502$, $p=0.000$), meaning that food intake had a significant power of association with postpartum weight retention and the resulting pattern was a positive relationship. The value of physical activity obtained was ($r = -0.6412$, $p=0.000$), meaning that physical activity had a significant power of the relationship but a negative relationship pattern. This

showed that whenever there was an increase in physical activity, it would reduce postpartum weight retention.

Table 3: Analysis of ANOVA: relationship between parity and postpartum weight retention.

Variable	Postpartum weight retention		
	(mean±SD)	F	p
Parity			
Primipara	(1.77 ± 4.08)	0.00	0.9971
Multipara	(1.83 ± 3.49)		
Grandemultipara	(1.84 ± 3.10)		

SD = standard deviation.

Table 4: Analysis of Pearson correlation: relationship between weight gain during pregnancy, food intake and physical activity and postpartum weight retention.

Variable	Postpartum weight retention	
	r	p
Weight gain during pregnancy	0.6881	0.000*
Food intake	0.4502	0.000*
Physical activity	-0.6412	0.000*

r=Correlation; *=Significant.

Table 5 is a multivariate analysis using linear regression statistical test to look at R2 and 95% CI. This analysis aimed to determine the effect of breastfeeding on postpartum weight retention by being controlled with the

extraneous variables which were weight gain during pregnancy, food intake, and physical activity. The results showed that breastfeeding would affect postpartum weight retention after being controlled by some extraneous variables.

Of 7 models, Model 7 had the most impact on postpartum weight retention. After being controlled by all extraneous variables, the obtained regression coefficient value of breastfeeding decreased to -2.26, meaning that by being controlled by the extraneous variables, breastfeeding would reduce postpartum weight retention by 2.26 kg. Adjusted R 2 value increased to 0.7333, meaning that after being controlled by the extraneous variables, breastfeeding would affect postpartum weight retention by 73.33%. As a result, this model was the most appropriate to explain the important factors associated with postpartum weight retention. The result of multivariate analysis can be poured in a linear regression equation:

$$y = 20.6 + (-2.26)(\text{breastfeeding}) + 0.46(\text{weight gain during pregnancy}) + 0.0017(\text{food intake}) + (-15.9)(\text{physical activity})$$

Qualitative analysis was performed on mothers who breastfed partially but did not have postpartum weight retention. Data were taken from five partial breastfeeding mothers and 2 posyandu cadres. In-depth Interview was to see the reasons partial breastfeeding, dietary intake, physical activity, and body weight during lactation.

Table 5: The analysis of linear regression: the effect of breastfeeding on postpartum weight retention by controlling weight gain during pregnancy, food intake and physical activity.

Variable	Model 1 Coefficient CI P value	Model 2 Coefficient CI P value	Model 3 Coefficient CI P value	Model 4 Coefficient CI P value	Model 5 Coefficient CI P value	Model 6 Coefficient CI P value	Model 7 Coefficient CI P value
Breastfeeding							
Fully	-2.57	-1.56	-2.28	-3.29	-1.42	-2.50	-2.26
Partially	(-4.1-(-0.9)) 0.002	(-2.7-(-0.3)) 0.013	(-3.7-(-0.8)) 0.002	(-4.4-(-2.1)) 0.000	(-2.5-(-0.3)) 0.011	(-3.5-(-1.4)) 0.000	(-3.20-(-1.32)) 0.000
Weight gain during pregnancy		0.77 (0.5-0.9) 0.000			0.71 (0.5 – 0.8) 0.000	0.45 (0.2-0.6) 0.000	0.46 (0.29-0.62) 0.000
Food intake			0.003 (0.001-0.004) 0.000		0.002 (0.001-0.003) 0.000		0.0017 (0.0008-0.002) 0.000
Physical activity				-25.98 (-31.3-(-20.5)) 0.000		-18.7 (-24.2-(-13.3)) 0.000	-15.9 (-21.2-(-10.7)) 0.000
Adjusted R²	0.1034	0.5016	0.2742	0.5856	0.6081	0.6874	0.7333
Constanta	2.74	-5.80	-3.56	45.6	-10.1	28.7	20.6
N	80	80	80	80	80	80	80

Reason for partial breastfeeding

The reasons for mothers breastfeeding partially were due to fussy baby, worry of having less milk, and mothers who would leave for work so that they added formula feeding. Provision of starch water was provided with the grounds for the baby's strong stomach not to be easy to get diarrhea. The results of the interview as follows were:

"I could not breastfeed fully because I am learning to breastfeed, so infant is also formula-fed..." (IP 1.)

"I've put the milk from me but the baby is still crying, so I give formula milk..." (IP 2).

"I give formula milk during my work, other than that the baby is given starch water for a strong stomach and no diarrhea..." (IP 3).

"Mostly they buy milk formula, after they were given information for full breastfeeding, but the answer is sorry for his son continued to cry..." (IK 1).

Food intake

Food consumed by breastfeeding mothers mostly was tofu, tempe, and vegetables (pumpkin, carrots, spinach) 2-3 times a day. There were dietary restrictions such as fish and eggs on the grounds that those meals would make the milk or blood of childbirth to smell fishy. Eating should not be at night. The results of the interview as follows were:

"I eat 3 times a day and often eat tofu or tempe, vegetables, drink a lot, feel thirsty continuously..." (IP 5)

"Lazy to eat unless hungry..." (IP 1)

"Often hungry anyway, but said, parents should not eat at night, so I should not eat before sunset..." (IP 2)

"There is a taboo word from parents that should not eat fried foods or fish and eggs, they said later the breast milk smells fishy..." (IK2)

Physical activity

Breastfeeding mothers activity was mostly doing chores daily such as cleaning, child care, and some work outside the home. Here's the interview:

"I do my own homework, tired, because of taking care also of the big child ..." (IP4)

"I worked, so my job is washing clothes, washing dishes and tidying the room, if the husband cleans the floor ..." (IP 2)

Body weight during breastfeeding

Breastfeeding mothers were asked about the perception of body weight during lactation, regular weighing, and the importance of knowing the body weight during lactation. The results of the interview were as follows:

"Mothers who give birth or take out the baby are never weighed, if the mother wants to know her weight, then they do the weighing and perform her own without being seen by officers" (IK 1)

"Usually when breastfeeding becomes skinny, it is normal, otherwise the mother will not sleep so she will lose weight..." (IP 1)

"Parents used to say that breastfeeding mothers would lean like a dog...." (IK 2)

DISCUSSION

WHO and UNICEF recommend giving the baby breast milk exclusively until 6 months, meaning not given food other than breast milk for 6 months. One successful attempt to breastfeed exclusively for 6 months is at least women should breastfeed exclusively for 3 months.¹⁰ In addition to exclusively breastfeed at least 3 months, it is also important to initiate breastfeeding early because, with early initiation of breastfeeding, exclusive breastfeeding would be more increased.¹¹

The difference with the results of other studies was because there were differences in study time. At 12 weeks postpartum, exclusively breastfeeding mothers lost more weight (4.41 kg) compared with mixed feeding mothers (2.79 kg).⁷ Another opinion suggested that the average reduction in postpartum weight retention in women who fully breastfed for 6 months was 4.6 kg compared with mothers who breastfed partially 3.1 kg.¹² Another study stated that exclusive breastfeeding / predominant had smaller weight compared with partial breastfeeding.¹³ This was because the energy required in the process of breastfeeding was partly taken from the reserve weight gain during pregnancy. The energy required for exclusive breastfeeding was 500 kcal / day, whereas according to the Institute of Medicine, breastfeeding mothers consumed 330 kcal / day to offset the expenditure of energy needed to produce milk.⁷

Breastfeeding has a role in mobilizing fats thus helping mothers lose weight and have an impact in increasing the tolerance to glucose and cholesterol metabolism.¹⁴ Milk production vary, the first 24 hours produced is about 300-400 ml, the fifth day increases to 500-800 ml but will be back down in the sixth month.¹⁵

Breastfeeding reduces postpartum weight retention, but will not affect the growing baby. Average weight loss is 0.5 kg per week between 4 and 14 weeks in overweight women who breastfeed exclusively.¹⁶ The results of in-

depth interviews found that mothers who breastfed was natural for weight loss.

This study showed that weight gain during pregnancy had a significant relationship to postpartum weight retention and had a positive correlation. It was in accordance with another study that mentioned that by combining weight gain during pregnancy around 12 kg, it could eliminate postpartum weight retention in many women. Weight gain during pregnancy would affect excess of postpartum weight retention.¹⁷ Weight gain during pregnancy was one of the main factors affecting the high postpartum weight retention.^{2,3,18} Weight gain during pregnancy, the frequency of exercise during pregnancy, and food intake had a significant relationship to changes in body weight from pregnancy until one year postpartum.¹⁹ Weight gain during pregnancy was tailored to the body Mass Index (BMI) recommended that was underweight total of weight gain (12.5-18 kg), normal weight (11.5 to 16 kg), overweight (7 to 11.5 kg), and obese (5-9 kg).²⁰

Most women will experience postpartum weight retention average of 1 kg each pregnancy, so more parity will be presenting more postpartum weight retention.³ In contrast, this study found that parity had no significant relationship to postpartum weight retention. It was in line with results of other studies which stated that parity was not a factor that had a significant association with postpartum weight retention.²¹

The results of this study showed that food intake had a significant and positive power of postpartum weight retention, meaning that whenever there was an increase in food intake, it would increase postpartum weight retention. It was in accordance with the results of in-depth interviews that breastfeeding mothers did not have postpartum weight retention due to the smaller food intake due to dietary restrictions. Body weight is influenced by the balance of energy intake with energy out. Energy intake is required for body metabolism and physical activity.^{22,23} Intake of food have contributed to the incidence of postpartum weight retention. Food intake required breastfeeding mothers is 10% if the woman is not physically active, but for women who are moderately active or very active they require 20% more food.¹⁵

Physical activity will reduce postpartum weight retention. The results of in-depth interviews showed that physical activity done was mostly the daily activities of the chores, child care, and some work outside the home. The average of women can lose weight or maintain weight in order not to increase physical activity needed in their daily activities. Women can maintain body weight when doing physical activity in the moderate category.²⁴

The results of multivariate analysis using linear regression indicated that breastfeeding had a significant relationship after being controlled with the variables of weight gain during pregnancy, food intake, and physical activity. But there were other factors that might influence

postpartum weight retention as the social environment, the state of maternal, genetic, psychological mother, diet, and body image.^{3,20,25,26}

Large weight loss will have a risk of nutritional deficiencies in the body because, in addition to breastfeeding, mothers also experience a large weight loss so that the nutrients needed for the body is reduced.²⁷

Although breastfeeding is beneficial to the health of mothers and children, but in this study, mothers who giving exclusive breastfeeding with 36.2%, this is according to research conducted in rural field practising area of Kakatiya Medical College, Warangal.²⁸

Anticipating a large weight loss should consider other factors that can help provide balance to the body. Food intake is a factor that could be improved so that even if the weight has decreased and continue breastfeeding, maternal body will still have sufficient nutrients to maintain body fitness.

CONCLUSION

Based on the analysis and discussion in this study, it can be concluded that There was a significant relationship between breastfeeding and postpartum weight retention; the mean of postpartum weight retention was lower in mothers who breastfed fully than in those who partially breastfed. Fully breastfeeding was still low compared with partial breastfeeding.

Other variables that influenced postpartum weight retention were weight gain during pregnancy, food intake, and physical activity. Parity in this study had no relationship with postpartum weight retention.

Recommendations

Based on the conclusion of this study, some suggestions are put forward for consideration:

- At the time of pregnancy, weight gain should be controlled in accordance with a body mass index (BMI) of women before pregnancy to anticipate the occurrence of excess postpartum weight retention.
- During the postpartum, mothers are advised to do postpartum gymnastics with purposes to restore the pelvic floor muscles, to maintain fitness and to be able to reduce postpartum weight retention.
- It needs to provide information that additional food intake necessary for breastfeeding mothers is 500kcal/day.

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