

## Maternal postpartum weight loss and associated factors in Beji subdistrict Depok City, Indonesia

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### ABSTRACT

**Introduction:** Weight retention during postpartum period is generally not preferred by mothers. Mothers are known to reduce energy intake during lactation in order to lose weight. Additional energy is required during lactation to provide for breast milk production. This study aimed at investigating factors that influence postpartum weight loss. **Methods:** Data from a prospective cohort quasi experiment study conducted in Beji subdistrict, Depok City were used. This study had recruited lactating mothers from community health centres and they were followed up from delivery to six months postpartum. A total of 201 breastfeeding mothers determined by cohort sample size formula were included. The dependent variable was six months' postpartum weight loss, while the independent variables included age, energy intake, education, working status, parity and exclusive breastfeeding practice. Bivariate analysis using independent *t*-test and multiple linear regression was used for statistical analysis. **Results:** Mean age of the mothers was 30.3 years (95% CI: 29.8-31.1 years). Majority of the mothers had senior high school education, were not working, multiparous and practising exclusive breastfeeding. Mean intake of energy was 1946 kcal/day (1897-1994 kcal/day). They experienced a mean weight loss of 3.79 kg during the study period (3.27-4.31 kg). Postpartum weight loss was associated with exclusive breastfeeding ( $p=0.004$ ), and education status of the mothers ( $p=0.029$ ). **Conclusion:** Exclusive breastfeeding for six months is the dominant factor associated with postpartum weight loss of the mother. Breastfeeding mothers should be supported on their intention to exclusively breastfeed and not be unduly concerned with gaining weight.

**Keywords:** Exclusive breastfeeding, postpartum, retention, weight loss

### INTRODUCTION

The average weight gain during pregnancy ranges from 7-12 kg depending on the mothers' weight before pregnancy (IOM, 2007). Underweight mothers usually gain about 12.5 kg to 18.0 kg compared to mothers with normal weight (11.5 kg-16.0 kg), and obese mothers (7.0 kg-11.5 kg) (IOM, 2007).

After delivery, with the release of infant, placenta, amniotic fluid and blood, the mother's weight will decrease but the decrease is only about 5-6 kg. Most postpartum mothers gain weight, compared to body weight before pregnancy, within one year postpartum (Endres *et al.*, 2015). This leads to women who are initially in the normal weight

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category to become overweight or obese, and triggering the occurrence of long-term obesity (Rooney, 2002). According to the World Health Organization (2008) about 1.5 billion adults older than 20 years are overweight and one-fifth of which are obese women. A total of 2.8 million adults die each year are associated with overweight and obesity (WHO, 2008). In Indonesia, the prevalence of obesity in women is increasing from 13.9% in 2007 to 32.9% in 2013 (National Basic Health Research, MOH-RI, 2013a).

In Indonesia, postpartum mothers are attracted to diets for reduction of energy intake in order to lose weight during breastfeeding. Study by Fikawati *et al.* (2013) in Jakarta and Depok showed that maternal energy intake during breastfeeding was significantly lower (1960 kcal/day) than during pregnancy (2241 kcal/day). This is in contrast to the Indonesian Dietary Recommendations which recommended a higher energy intake per day during lactation (2530-2600 kcal/day) than for pregnancy (2380-2500 kcal/day) (MOH-RI, Indonesia, 2013b).

Various studies have reported an association of energy intake during breastfeeding with success in exclusive breastfeeding for six months (Fikawati, Syafiq & Mardatillah, 2017; Syafiq, Fikawati & Widiastuti, 2015). Additional intake of energy is needed by breastfeeding mothers for breast milk production. The additional energy cost of lactation is estimated at 500 kcal/day, which is fulfilled by increasing energy consumption, reducing energy output and using fat stores (Lovelady, 2011). Normally, shortfalls of energy intake during breastfeeding is derived from the mother's energy reserve built up during pregnancy.

Postpartum mothers' weight gain is also influenced by various factors including age (Endres *et al.*, 2015; Olson, 2010), maternal education

(Althuisen *et al.*, 2011; Krummel, 2007), physical activity (Oken *et al.*, 2007), parity (Gunderson *et al.*, 2004), and energy intake (Fikawati *et al.*, 2017; Kristiyanti *et al.*, 2013; Mahan *et al.*, 2012; Padmawati, 2011). This study investigated the factors that influence postpartum weight loss among six-month postpartum mothers using secondary data from a study undertaken in Beji subdistrict Depok City, Indonesia.

## **MATERIALS AND METHODS**

This study analysed data from a quasi-experimental study using a prospective cohort approach undertaken in Beji Sub-district, Depok City (Fikawati *et al.*, 2017). The primary study respondents were mother-infant couples who met the inclusion criteria related to infants: sufficient gestational age, normal birth weight, no malformation, single birth, and criteria related to the mother namely, had no chronic illness, intended to give six months EBF, and willing to participate. A total of 201 mothers were recruited and followed-up for six months. The study was approved by the Commission of Research Expert and Research Ethics of Faculty of Public Health University of Indonesia (Letter of Approval No.180/H2.F10/PPM.00.02/2015 dated 20 April 2015).

In this secondary data analysis, all the 201 mothers were included. Variables included in this analysis were weight loss of six-month postpartum, age, energy intake, education, working status, parity, and exclusive breastfeeding for six months. Weight loss was measured by subtracting weight at the beginning from the weight at the end of the study. Age and education by year of schooling of mothers were recorded. Working status was categorised as working or not working based on mother's report. Parity was classified as primiparous and multiparous.

Energy intake was estimated using 24-hour recall conducted monthly. Any supplementation provided during six-month study period was taken into consideration. Exclusive breastfeeding was defined in accordance to WHO definition and checked monthly. Bivariate analysis was conducted using independent t-test to identify significant by differences of weight loss among subjects grouped by variables category. Significance was determined by  $p < 0.05$ . Multivariate analysis used multiple linear regression was conducted to identify dominant factor associated with weight loss as dependent variable after controlling of covariates.

**RESULTS**

The mean age of the postpartum mothers was 30.3 years, with 95% CI of 29.8-31.1 years and a range of 19-44 years (Table 1). Most respondents (74.10%) have at least a senior high school education.

The average energy intake of the mothers was 1946 kcal/day with a range of 891-2957 kcal/day (95% CI: 1897-1994 kcal/day). The average weight loss experienced by mothers during the six months was 3.79±3.74 kg. Most mothers (83%) lost weight while the rest gained weight. The highest weight loss was 16.0 kg and the highest weight gain was 9.0 kg, with an average weight loss of between 3.27-4.31 kg.

(education and working status), maternal parity and exclusive breastfeeding. The group of low education mothers (less than senior high school education) had slightly lower weight loss (-2.89±3.33 kg) compared to high education mothers (-4.11±3.83 kg). The independent t-test showed significant difference ( $p < 0.05$ ) in mean weight change between the high and low education groups. Most mothers (90.50%) were not employed outside the home. Weight loss of working mothers, on the average, was 4.05±5.39 kg, which was higher than that of non-working mothers of 3.76±3.54 kg, but this difference was not significant.

Most mothers (75.10%) were multiparous. The mean mother’s postpartum weight loss in primiparous mothers was higher than that for multiparous mothers, -4.32±3.49 kg and -3.62±3.81 kg respectively, however, this difference was not significant.

Most mothers (92.50%) exclusively breastfed their infants for six months. The average weight loss of mothers who exclusively breastfed for six months was -3.92±3.83 kg, more than mothers who did not, (-2.26±1.72 kg). This result showed statistically significant difference.

In multivariate analysis, six variables were included in modelling namely age, energy intake, education, occupation, parity and exclusive breastfeeding (Table 3). The analysis result showed

**Table 1.** Description of respondents’ weight loss, age and energy intake

Variable	Mean	SD	Min - Max	95% CI
Weight loss (kg)	-3.79	3.74	-16.00 – 9.00	3.27 – 4.31
Maternal age (years)	30.26	5.65	19.00 – 44.00	29.84 – 31.05
Energy intake (kcal)	1945	350	891 - 2957	1897 – 1994

<sup>1</sup> Note: (-) weight loss

<sup>2</sup> Results are expressed as Mean±SD

Table 2 presents weight loss based on socioeconomic characteristics

that standardized coefficient beta value of exclusive breastfeeding variable was

**Table 2.** Difference of weight loss based on characteristics of respondents

Variable	n	%	Average weight loss (kg)	SD	p-value
Maternal education					
Low education (< Senior High School)	52	25.90	-2.89	3.33	0.04
High education (≥ Senior High School)	149	74.10	-4.11	3.83	
Working status					
Working	19	9.50	-4.05	5.39	0.83
Not working	182	90.50	-3.76	3.54	
Parity					
Primiparous	50	24.90	-4.32	3.49	0.25
Multiparous	151	75.10	-3.62	3.81	
Exclusive breastfeeding					
Not giving exclusive breastfeeding	15	7.50	-2.26	1.72	0.004
Giving exclusive breastfeeding	186	92.50	-3.92	3.83	

<sup>1</sup> Results are expressed as Mean±SD

the largest, which means exclusive breastfeeding was the dominant factor of mother's postpartum weight loss after controlling for age, education and energy intake.

times more than mothers who do not give exclusive breastfeeding (Oken *et al.*, 2007). The high prevalence of six-month exclusive breastfeeding may be due to effect of intervention in the form

**Table 3.** Multivariate analysis results in maternal postpartum weight loss

Variable	Non-standardised coefficients, b	Standardised coefficients, B	p-value
Age	0.052	0.078	0.265
Education	-1.326	-0.126	0.029
Energy intake	0.001	0.103	0.159
Exclusive breastfeeding	-1.792	-0.156	0.044

## DISCUSSION

In this study, six months after delivery, most mothers lost weight, with an average weight loss range of 3.7-4.3 kg. This quantum of postpartum weight loss was not as much as the weight gain during pregnancy of 7.5-11.6 kg reported in another study of Indonesian mothers (Fikawati *et al.*, 2012).

Mothers who breastfed exclusively for six months lost weight (3.92 kg) more than mothers who did not (2.26 kg). This study is in line with study by Kristiyanti & Kusumastuti (2013) stating that weight loss in mothers who give exclusive breastfeeding is 1.54

of education on exclusive breastfeeding and supplementation provision that becomes an encouraging factor and positive reward for mothers to maintain breastfeeding exclusiveness. This is in line with views of Green and Kreuter (1991) on reinforcement factors (Green *et al.*, 1991) and social behaviour theory from Bandura (1977) on positive rewards.

Breastfeeding mothers who reduce energy intake are at risk of insufficient milk production (Fikawati *et al.*, 2017; Syafiq *et al.*, 2015). Shortened exclusive breastfeeding duration and associated decrease in maternal energy expenditure

may lead to maternal desire to lose weight.

Exclusive breastfeeding was the dominant factor of mother's postpartum weight loss after controlling for age, education and energy intake variables. Many studies showed that exclusive breastfeeding is the significant factor affecting postpartum weight loss. This is because to produce 100 cc of breast milk, mothers can burn 80-90 kcal calories (Oken *et al.*, 2007). The result of this study also is supported by previous studies which showed that exclusive breastfeeding is associated with maternal postpartum weight loss. Furthermore, Baker *et al.* (2008) mentions that exclusive breastfeeding for six months helped mother to lose the remaining weight due to accumulation of postpartum fat after delivery. Epidemiological evidence showed that obese and overweight mothers are less likely to breastfeed their infants than mothers with normal body weight (Amir & Donath, 2007).

The results of this study also showed a significant difference in postpartum weight loss of mothers with low and high education. These results are in line with another study which suggested that postpartum mothers who have low education experience a high weight gain at least 9.07 kg (Endres *et al.*, 2015). The level of education significantly affects the ability to receive nutritional information. The level of education affects the ease with which a person accepts knowledge. The higher the mother's education, the easier is the access to nutrition information (Montgomery *et al.*, 2013). The level of education and nutrition knowledge affected exclusive breastfeeding practice among Indonesian mothers (Fikawati *et al.*, 2014).

This study was subjected to several limitations. The number of subjects might be too small to yield sufficient power to the variables studied, especially for

exclusive breastfeeding where almost all mothers were exclusively breastfeeding. Energy intake measurement might be underestimated due to the flat slope syndrome found in this study.

## CONCLUSION

Exclusive breastfeeding for six months is the dominant factor associated with postpartum weight loss of the mother. Breastfeeding mothers should be supported on their intention to exclusively breastfeed the infants for six months, and not be unduly concerned with gaining weight.

## Conflict of interest

The authors declare that they have no conflict of interest.

## Authors' contributions

Fikawati S, principal investigator, conceived and design the study, led the data collection, prepared the draft of manuscript, reviewed the manuscript and revised the manuscript as MJN's reviewer suggestion; Sari VGP, conducted data analysis and interpretation, and added new related references for manuscript.

## References

- Althuisen E, Poppel MN, Vries JH, Seidell JC & Mechelen W (2011). Postpartum behaviour as predictor of weight change from before pregnancy to one year postpartum. *BMC Public Health* 11:165.
- Amir LH & Donath S (2007). A systematic review of maternal obesity and breastfeeding intention, initiation and duration. *BMC Pregnancy & Childbirth* 7:9.
- Baker JL, Gamborg M, Heitmann BL, Lissner L, Sørensen TIA & Rasmussen KM (2008). Breastfeeding reduces postpartum weight retention. *Am J Clin Nutr* 88(6):1543-1551.
- Bandura A (1977). *Social Learning Theory*. General Learning Press, New York.
- Chezem JC (2012). Breastfeeding attitudes among couples planning exclusive breastfeeding or mixed feeding. *Breastfeed Med* 7(3):155-162.

- Endres LK, Straub H, McKinney C, Plunkett B, Minkovitz CS, Schetter CD, Ramey S, Wang C, Hobel C, Raju T & Shalowitz MU (2015). Postpartum weight retention risk factors and relationship to obesity at 1 year. *Obstet Gynecol* 125(1):144-152.
- Fikawati S, Syaifiq A, Purbaningrum RP & Karima K (2014). Energy consumption of lactating mothers: Current situation and problems. *Makara J. Health Res* 18(2):58-64.
- Fikawati S, Wahyuni D & Syaifiq A (2012). Relationship between maternal nutritional status and infant birth weight of vegetarians in DKI Jakarta. *Makara J. Health Res* 16(1):29-35.
- Fikawati S, Syaifiq A & Mardatillah (2017). Maternal calorie intake is a significant factor associated with 6 months of exclusive breastfeeding among lactating mothers in Depok City, Indonesia. *Mal J Nutr* 23(1):31-41.
- Green LW & Kreuter MW (1991). *Health Promotion Planning: An Educational and Environmental Approach*. Mayfield Publishing Company, California.
- Gunderson EP, Murtaugh MA, Lewis CE, Quesenberry CP, West DS & Sidney S (2004). Excess gain in weight and waist circumference associated with childbearing. The Coronary Artery Risk Development with pregnancy Study (CARDIA). *JAMA* 28(4):525-535.
- Institute of Medicine (2007). *Influence of Pregnancy Weight on Maternal and Child Health*. The National Academies Press, Washington, DC.
- Kristiyanti FNA & Kusumastuti AC (2013). *Association between Exclusive Breastfeeding and Weight Loss on Lactating Mothers*. Master Thesis. Universitas Diponegoro.
- Krummel DA (2007). Postpartum weight control: a vicious cycle. *J Am Diet Assoc* 107(1):37-40.
- Lovelady C (2011). Session 1: Balancing intake and output: food v. exercise. Balancing exercise and food intake with lactation to promote postpartum weight loss. Symposium on 'Nutrition: getting the balance right in 2010'. *Proc Nutr Soc* (70):181-184.
- Ministry of Health Republic of Indonesia (2013a). *National Basic Health Research (Riskesdas) 2013. Jakarta: The National Institute of Health Research and Development*. From <http://ghdx.healthdata.org/record/indonesia-basic-health-research-2013>. [Retrieved April 6 2017].
- Ministry of Health Republic of Indonesia (2013b). *Regulation of The Minister of Health of The Republic of Indonesia number 75 by 2013. About Nutritional Adequacy Figures Recommended For Indonesia*. From <https://www.global-regulation.com/translation/indonesia/2963429/minister-of-health-regulation-no.-75-of-2013.html>. [Retrieved April 6 2017].
- Mahan LK, Stump SE, Raymond JL (2012). *Food, Nutrition & Diet Therapy (13<sup>th</sup> ed)*. United States. Saunders.
- Montgomery KS, Best M, Aniello TB, Phillips JD & Flanigan EH (2013). Postpartum weight loss: weight struggles, eating, exercise, and breastfeeding. *J Holist Nurs* 31(2):129-138.
- Oken E, Taveras EM, Popoola FA, Rich-Edwards J & Gillman M (2007). Television, walking, and diet: associations with postpartum weight retention. *Am J Prev Med* 32(4):305-311.
- Olson CM, Strawdermas MS, Hinton PS & Pearson TA (2010). Gestational weight gain and postpartum behaviors associated with weight change from early pregnancy to one year postpartum. *Int J Obes Relat Metab Disord* 27(1):117-27.
- Padmawati R, Dasuki D & Sudargo T (2016). Breastfeeding to reduce postpartum weight retention. *Int J Community Med Public Health* 12(3):3504-3510.
- Rooney BL, Schauburger CW (2002). Excess pregnancy weight gain and long term obesity: one year decade later. *Obstet Gynecol* 100(2):245-252.
- Syaifiq A, Fikawati S, Widiastuti R. (2015). Energy Consumption during Lactation and Duration of Breastfeeding at Puskesmas Margajaya Bekasi City in 2014. *Makara J. Health Res* 19(2): 81-86. doi: 10.7454/msk.v19i2.5419
- WHO (2008). *Global Health Observatory (GHO) data. Obesity: situation and trends*. From [http://www.who.int/gho/ncd/risk\\_factors/obesity\\_text/en/](http://www.who.int/gho/ncd/risk_factors/obesity_text/en/). [Retrieved April 6 2017].