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THE EFFECT OF EXCLUSIVE BREASTFEEDING ON INFANT WEIGHT GAIN

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Abstract

Exclusive breastfeeding success is still relatively low (at 41%) and has yet to reach the target of 70%. This study employs quantitative methods and an experimental design. The approach is based on a control group pre- and post-test design, where research participants are randomly divided into two or more groups. There is no correlation between gender and baby weight after the intervention (= 0.919), and there is no correlation between a mother's age and baby weight after the intervention (= 0.464). During the first six months, infant weight gain is significantly influenced by exclusive breastfeeding. This is influenced by the mother's experience, as mothers with more than one child have more knowledge and experience with exclusive breastfeeding than previous children. Not only do those who are exclusively breastfed gain weight, but formula milk also contributes to the baby's weight gain, leading to obesity. In the meantime, exclusive breastfeeding results in average weight.

Keywords: Effect, Exclusive Breastfeeding , Infant Weight.

INTRODUCTION

The success of exclusive breastfeeding is still relatively low, namely only 41%, and has yet to reach the target namely 70% (Unicef, 2018). In the USA, the prevalence of babies who have ever been breastfed is only 74% while in Ireland is 55% (Unicef, 2018). Prevalence is 54.9% in India, especially in North India, where only 16.9% of babies are exclusively breastfed (1).

In Indonesia, babies get exclusive breastfeeding by 54.3% of 2,483,485 people (babies 0-6 months) or only 1,348,532 babies in absolute terms. In DKI Jakarta, the prevalence of babies getting exclusive breastfeeding is 62.7% of 27,264 people (babies 0-6 months).

WHO supports six months of solely breastfeeding and MPASI (complementary food for breast milk) after that by continuing to provide breast milk for up to 2 years. This decision was adopted by The Indonesian government that has targeted 80% exclusive breastfeeding for a period of six months since 2004 based on a decision letter from the Indonesian Ministry of Health (2). The prevalence of exclusive breastfeeding for babies in 2012 was only 42% in Indonesia. In Jakarta, The percentage of infants who exclusively received breastmilk was only 62.7% in the year 2013.

Exclusive breastfeeding plays a crucial role in infant weight gain and overall health. Studies have shown that infants exclusively breastfed for the first 6 months tend to have better weight outcomes compared to those who are not exclusively breastfed(3). Breastfeeding has been associated with a reduced risk of childhood obesity (4), and it has been found to positively impact the motor development of infants (5). Additionally, exclusive breastfeeding can meet the energy and nutritional needs of infants for optimal growth and development (6).

While exclusive breastfeeding has numerous benefits, sustaining high adherence to exclusive breastfeeding can be challenging in certain settings (7). Factors such as birth weight and maternal perception of birth size have been linked to the practice of exclusive breastfeeding (8). Moreover, interventions during exclusive breastfeeding to manage high early weight gain have not been extensively studied, and the positive effects of exclusive breastfeeding generally outweigh the need for such interventions (9). The independent variable was Community-Based Total Sanitation, which includes the behaviors of open defecation, drinking water and food management, household waste management, and household wastewater management(10).

Breastfeeding exclusively protects the body from disease and lowers the risk of hypertension, Type 2 Diabetes Mellitus, and obesity. Breastfeeding exclusively for 6 months is advised(2).(11) conducted a survey of 20 people At the Jetis Clinic in Yogyakarta. Study included 10 mothers who exclusively breastfed as intervention group, and 10 mothers who formula-fed as control group who breastfed their babies with partial breast milk. The difference in weight gain was 210 grams greater and more efficient in intervention vs. control group.

Based on facts that occurred at the UKI Hospital and the Cawang Urban Health Center, problems regarding exclusive breastfeeding were due to busy working mothers, short maternity leave, and high maternal anxiety due to negative thoughts about insufficient breastfeeding for babies, so mothers lack commitment in exclusive breastfeeding, and the baby's weight decreased. Therefore, researchers conducted a study called "The Effect of Exclusive Breastfeeding on Infant Weight Gain".

RESEARCH METHODS

This study employs quantitative methods and an experimental design. The approach is based on a control group pre- and post-test design, where research participants are randomly divided into two or more groups. The intervention group is separate from the control group. Prior to treatment, all groups were administered a pre-test to determine the respondents' initial ability. Following that, the treatment group intervened in accordance with the trial protocol, whereas the control group did not. After the treatment, a post-test is administered to all groups to determine the results of the respondents' treatment (12). The study included both the intervention and control groups, where the intervention group consisted of mothers who practiced exclusive breastfeeding, and the control group consisted of mothers who did not.

The study population consisted of all mothers who gave birth vaginally or by Caesarean section at the UKI Hospital, the Kramat Jati sub-district health center, in the previous three months. Respondents who were willing to breastfeed exclusively, had MCH books or baby development books, had newborns, were willing to sign informed consent, and could read and write were eligible. The research was carried out from August to December 2021.

RESULTS

3.1 Univariate

The univariate consists of descriptions of the mother's age, child's gender, the baby's gender, educational level, occupation, food consumed, method of administration, and the 6-month baby's weight.

Table 1: Description of the Frequency and Percentage of the Control Group

No	Data	Frequency	Percentage
1	**Mother's Age**		
	<20 Years	1	3,3
	20-35 Years	23	76,7
	>35 Years	6	20,0
2	**Baby Order**		
	1	17	56.7
	2	3	10
	3	8	26.7
	4	2	6.7
3	**Gender of Baby**		
	Woman	15	50
	Man	15	50
4	**Mother's educational attainment**		
	MiddleSchool	2	6,7
	SMA	14	46.7
	Masters	11	36.7
	Magister	3	10
5	**Mother's job**		
	Work	15	50
	Doesn't work	15	50
6	**Consumed Food**		
	Rice and Vegetables	1	3.3
	Rice, Vegetables, Side Dishes	3	10
	Rice, Vegetables, Side Dishes and Fruits	26	86.7
7	**How to Give Milk**		
	Breast Feeding	21	70
	Breastfeeding Through a Bottle	9	30
8	**Baby Weight 6 Months**		
	Above average	13	43.3
	Below average	17	56.7

Based on the above data, the highest percentage of data obtained was for mothers aged 20-35 years, which accounted for 76.7%. The percentage of first child was 56.7%. The gender balance between women and men was 50.0%. The percentage of mothers with a high school education level was 46.7%. The percentage of mothers with a balanced work situation was 50.0%. The types of food consumed included rice, vegetables, side dishes, and fruit, accounting for 86.7%. The percentage of mothers who breastfed their babies was 70.0%. The percentage of babies weighing below the average at 6 months was 56.7%.

Table 2: Description of the Frequency and Percentage of the Intervention Group

No	Data	Frequency	Percentage
1	Mother's Age		
	20 - 35 Years	27	90
	> 35 Years	3	10
2	Baby number		
	1	16	53.3
	2	11	36.7
	3	2	6.7
	4	1	3.3
3	Gender of Baby		
	Woman	11	36.7
	Man	19	63.3
4	Mother's Education Level		
	SD	1	3,3

	Middle School	1	3,3
	SMA	16	53.3
	Masters	11	36.7
	Magister	1	3.3
5	Mother's job		
	Work	13	43.3
	Doesn't work	17	56.7
6	Consumed Food		
	Rice and Vegetables	1	3.3
	Rice, Vegetables, Side Dishes	6	20
	Rice, Vegetables, Side Dishes and Fruits	23	76.7
7	How to Give Milk		
	Breast Feeding	29	96.7
	Breastfeeding Through a Bottle	1	3.3
8	Baby Weight 6 Months		
	Above average	16	53.3
	Below average	14	46.7

Based on the above data, the most data obtained were mothers at 20-35 years as much as 90.0%, first child 53.3%, male sex 63.3%, mother's education level was high school 53.3%, mother's occupation was not working 56.7%, food consumed rice, vegetables, side dishes and fruit 76.7%, how to give milk through the breast 96.7%, and the baby's weight 6 months above the average 53.3%.

3.2 Bivariate

The results of the bivariate study consisted of a control group and an intervention group.

Table 3: Bivariate Test in Control Group and Intervention Group

No	Data	Mean	Std. Deviation	Say 2 Tailed *(P-Value)*
1	There are differences in infant weight before and after the intervention in the control group	-4.534	99386	0,000
2	There are differences in baby weight Pre- and post-intervention results in the intervention group.	-4.71	90063	0,000

Based on the data above, there are differences in baby weight pre- and post-intervention results in the intervention group, with a mean of -4.53400, a standard deviation of 99386, and a p-value of 0.000. In the intervention group, there are also differences in infant weight before and after the intervention, with a mean of -4.71000, a standard deviation of 90063, and a p-value of 0.000.

Table 4: Relationship Test

No	Data	Say 2 Tailed *(P-Value)*
1	No relationship between infant gender and weight after intervention	0,919
2	No relationship between mother's age and infant weight after intervention	0,464
3	No link between mother's education and baby's weight after intervention	0,521
4	No link between mother's job status and baby's weight after intervention.	0,491
5	No link between giving milk method and baby's weight after intervention.	0,341
6	No relation between mother's food and baby's weight after intervention	0,192
7	relation between children & baby's weight after intervention	0,022

According to the data, there is no relationship between gender and baby weight after the intervention = 0.919. There is no correlation between the mother's age, education

level, employment status, and the baby's weight after the intervention, as indicated by the correlation coefficients of 0.464, 0.521, and 0.491 respectively.

Table 5: Relationship Test

No	Data	Say 2 Tailed *(P-Value)*
1	There was no gender difference after the intervention was carried out.	0,435
2	There was no difference in the mother's occupation after the intervention was carried out.	0,796
3	There was no difference in food consumed after the intervention was carried out.	0,012
4	There was no difference in maternal age after the intervention was carried out.	0,297
5	There was no difference from child to child after the intervention was carried out.	0,331
6	There was no difference in the age of the babies after the intervention was carried out.	0,862
7	There was no difference in the baby's weight 6 months after the intervention was carried out.	0,545

Based on the data above, there is no difference in gender after the intervention is carried out (p = 0.435); there is no difference in mother's work after the intervention is carried out (p = 0.796); there is no difference in food consumed after the intervention (p = 0.012); there is no difference in food consumed after the intervention (p = 0.012); there is no difference in maternal age after the intervention (p = 0.297); there is no difference between children after the intervention was carried out (p = 0.331); there is no difference in the age of the baby after the intervention is carried out (p = 0.862); there is no difference in baby weight 6 months after the intervention (p = 0.545).

DISCUSSION

4.1 There are differences in the weight of the infants in the intervention group that show significant improvements between pre- and post-intervention.

The results showed differences in infant weight in the intervention group that show changes before and after intervention, with a p-value of 0.000 (less than 0.05). This happened because, in the characteristics of the baby's description, it was found that more babies had above-average weight (16 respondents) than babies with below-average weight (14 babies).

These results follow the research conducted by (13) for 38 babies at Medan Wita Clinic. The study found that exclusive breastfeeding in the intervention group resulted in a statistically significant increase in the weight of underweight babies with a p-value of 0.007 (less than 0.05), among 7 underweight babies, 21 normal weight babies, and 10 obese babies.

Exclusive breastfeeding leads to a weight gain of 4,100-5,000 grams in babies by 60%, while non-exclusive breastfeeding leads to a weight gain of 5,100-6,000 grams in babies by 60%. Babies aged 0-6 months gain 150-210 grams/week, according to published growth curve data by (13) inside the National Center For Health Statistics (NCHS). Based on (14–16) the benefits of breastfeeding for babies are well digested, cheap and easy to give directly to babies, avoid diarrhea and dermatitis as well as allergies, avoid the development of bacteria in the stomach, and contain antibodies as well as increase the baby's love and intelligence.

4.2 There were differences in the weight of the babies before and after the intervention of the control group.

The results demonstrated a discrepancy in the weight of the infants before and after the intervention. The control group showed a statistically significant difference with a p-value of 0.000 (<0.05). This occurred because, in the description of the baby's characteristics, it was found that more babies had above-average weight (13 respondents) than babies with below-average weight. There were 17 babies in the control group.

This study's results follow the research of (13) on 38 babies at Wita Medan Clinic. It was found that in the group that received alternative breastfeeding, 6 babies (15.8%) were more underweight than the exclusively breastfed respondents. Only 1 respondent (2.63%) was underweight. There were 8 respondents (21%) who were less normal weight babies and were not exclusively breastfed compared to babies who were exclusively breastfed, and 13 respondents (34.3%) had average weight. 9 respondents were not given exclusive breastfeeding, and more than 1 respondent (2.63%) were exclusively breastfed babies who were overweight.

This study's results are based on the research of (17) on 100 babies. It was found that in the control group, 44.4% of the babies had abnormal weight, while 55.6% had normal weight babies.

The study conducted by (18) on 39 babies in Mulyojati showed that babies who were not given exclusive breastfeeding had an average weight of 8.124 kg, which was higher than the average weight of babies who were given exclusive breastfeeding, which was 7.189 kg.

Babies who receive exclusive breastfeeding and those who receive nutrition through non-exclusive breastfeeding have different weights. Babies that are exclusively breastfed for 6 months tend to be more slender and healthier in the long term. Non-exclusive babies have excess weight, which can lead to digestive diseases, the risk of asthma attacks, decreased cognitive intelligence development, the risk of obesity, the risk of heart and blood vessel disease, malnutrition, the risk of death, and dental caries. This can hinder the baby's future growth and development (18).

4.3 The relationship between giving milk to the infant's mass after the intervention.

Results showed no relationship between how milk is given to the baby and their weight. After the intervention, the P-Value was 0.341, which is greater than 0.05, indicating that it is not statistically significant. These results occurred because one respondent gave breast milk via a bottle. Therefore, the researchers concluded that breastfeeding given through the breast and bottle did not have an effect on the baby's weight gain but could result in tooth decay.

According to (19), breastfeeding can reduce the incidence of dental caries in babies. Babies who receive formula milk are more likely to experience tooth decay compared to those who receive breast milk. This is because breastfeeding with bottles and pacifiers can cause prolonged contact between the teeth and leftover formula milk, leading to acidity and tooth damage. Additionally, breastfeeding helps prevent jaw disorder malocclusion caused by the habit of pushing the tongue forward during bottle and pacifier feeding.

4.4 The relationship between sex and baby's weight after the intervention.

The results of this study corroborate the research conducted by (20) which they observed no correlation between sex and infant weight after the intervention. This finding could be due to the uneven distribution of male and female babies in the intervention group, with 11 female and 19 male babies. The p-value of 0.919 (> 0.05) further confirms this conclusion, which showed no balanced distribution between male and female babies, namely 50 male babies and 74 female babies.

4.5 Research results from (21) on 409 baby respondents at the Rejosari village health center in Pekanbaru, revealed that among the 409 respondents, 33 male respondents were affected by wasting incidents, while 17 female respondents were affected. Wasting refers to the status of malnutrition based on weight/pb measurements. Infants and toddlers become wasted due to rapid (acute) weight loss. Wasting can occur due to a lack of access to health services, inadequate nutrition fulfillment (such as inadequate exclusive breastfeeding or nutritional intake that does not meet the quality and quantity standards of nutritious food), a lack of mothers' knowledge about food storage and processing, and poor environmental sanitation. The highest percentage of wasting (undernutrition/poor nutritional status) occurs in men compared to women because boys require more caloric intake for growth and development.

4.6 The relationship between the mother's nutrition and the infant's weight gain after the intervention.

The results indicated that there was no correlation between the mother's diet and the infant's weight gain following the intervention, with a p-value of 0.192 (> 0.05). The study's results occurred because there were still respondents who were breastfeeding mothers who ate foods with incomplete nutritional intake - 5 respondents had a healthy diet, while 6 had a perfect diet consisting of carbohydrates, protein, fat, and fiber. The findings of the single variable analysis revealed that 1 respondent ate rice and vegetables, 6 respondents ate rice, vegetables, and side dishes, and 23 respondents ate rice, vegetables, side dishes, and fruit.

Based on (19), nutrition in breastfeeding mothers is closely related to breast milk production, which is vital for the growth and development of infants. If breastfeeding is successful, the baby's weight will increase. Breastfeeding mothers need to regulate their nutrition, with the most important aspect being food that ensures the production of high-quality milk and sufficient quantity to meet the nutritional needs of their babies. A complete diet for nursing mothers should include carbohydrates, proteins, fats, folic acid, and ascorbic acid.

Based on (22), the mother's behavior in fulfilling her nutrition to increase breast milk production is based on knowledge that is good for the nutritional status of her baby. Mothers who have good knowledge will behave well in fulfilling their nutritional intake. Mothers will look for all information that can support good nutritional intake for consumption during breastfeeding. The nutritional intake consumed by the mother will have an impact on the mother's nutritional status. Mothers have a good level of knowledge about nutrition when breastfeeding, and this has an impact on the baby's good nutritional status.

4.8 There is no correlation between the mother's educational attainment and the infant's weight after the intervention.

The findings indicated that there was no correlation between the mother's educational attainment and the infant's weight. This is consistent with the findings of Novita's study, which suggested that the higher the level of education, the more mothers who do not breastfeed their babies. However, in comparison to the theory, a higher level of education should be the standard for individuals to behave scientifically. With a higher education, mothers will find it easier to understand their role as a mother.

This study's results, based on the research of (23) on 84 children in Jekani Village, found that there is no correlation between mother's education and stunting, with a p-value of 0.064. The mothers in this study had low education levels, but they were more open to obtaining and searching for reliable information through the internet, which can be accessed using a cellphone. Nowadays, it is easier for people to access information using cellphones, and this can be done by anyone, regardless of their level of education. Despite having low education, their desire to learn how to use cellphones is very high, which enables them to acquire knowledge.

4.9 There is no correlation between the mother's employment status and the baby's weight after the intervention.

The results of this study diverge from those of (24) study, which revealed a significant correlation between maternal employment and exclusive breastfeeding in infants (p-value <0.05). Mothers who do not work have a 0.396 greater likelihood of giving breast milk than those not giving exclusive breastfeeding. Many mothers are less concerned about the health of their babies and give lots of formula milk. Furthermore, formula milk is unsuitable for increasing baby weight and health.

Research conducted by (25) found a correlation between a mother's employment status and exclusive breastfeeding, where working mothers have difficulty getting breast milk because they have to divide their time with work.

The results of this study are different from the results of research conducted by (26) on 340 respondents at DR M Jamil Hospital in Padang. It was found that the average birth weight of babies in the group of working mothers was lower than the average for mothers who did not work. The average weight of babies with working mothers is 3041.48 kg, while the average weight of babies with non-working mothers is 3153.02 kg.

4.10 There is no correlation between the mother's age and the baby's weight after the intervention.

This study's results align with previous studies, which showed that as many as 27 out of 34 (79.4%) mothers were young and did not solely nurse their infants. The statistical test results yielded a p (sig) value of 0.000 < 0.05, thus demonstrating that there is a correlation between age and exclusive breastfeeding.

They are also supported by research by (27) on factors pertaining to exclusive breastfeeding. The conclusion is that there is no correlation between maternal age and exclusive breastfeeding, with a p-value of 0.667 which is greater than the alpha value of 0.05. The results of this study are different from the results of research conducted by (28) on 35 breastfeeding mothers, 105 breastfed babies aged 0-6 months, and 106 breastfed babies aged 6-24 months at Posyandu Semuli Raya and

Suka Maju working areas at the Community Health Center Semuli Raya, Abung Semuli District, North Lampung. It was found that there is a relationship between mother's age and exclusive breastfeeding, where only 4 people were aged < 20 years, 8 were mothers aged 20-35 years (23%), and only 3 were mothers aged > 35 years (9%). For breastfeeding exclusively breast milk, there are 5 people (14%) who are < 20 years old, 12 people (34%) who are aged 20-35 years, and 3 people (9%) who are > 35 years old who do not breastfeed exclusively.

CONCLUSION

Exclusive breastfeeding significantly affects infant weight gain during the first 6 months. This is influenced by the mother's background, where mothers with more than one child have better knowledge about exclusive breastfeeding and more experience. Not only do babies who are exclusively breastfed gain weight, but formula milk also contributes to their weight gain, which can lead to obesity. On the other hand, exclusive breastfeeding results in a healthy average weight.

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