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Masters Program in Public Health, Universitas Sebelas Maret

Meta-Analysis

Meta-Analysis: Effect of Breastfeeding Education Program on the Breastfeeding Self-Efficacy and Exclusive Breastfeeding

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ABSTRACT

Background: Improving self-efficacy in breastfeeding and the practice of exclusive breastfeeding is important for the health of infants and mothers. WHO recommends exclusive breastfeeding for six months without any additional food and fluids. One form of intervention that has been carried out is an educational program given to pregnant women. The purpose of this study was to determine the effect of breastfeeding education on self-efficacy in breastfeeding and exclusive breastfeeding.
Subjects and Method: This was a meta-analysis study using PRISMA flowchart guidelines. The article search process was carried out between 2011-2021 using databases from PubMed and Sciencedirect. Based on the database, there were 15 articles that met the inclusion criteria. The analysis was carried out using RevMan 5.3 software.
Results: There were 15 articles that met the inclusion criteria which were analyzed using the Randomized Controlled Trial method. Based on 7 studies on the effect of education and self-efficacy, it showed that pregnant women who received breastfeeding education interventions had a self-efficacy score of 0.43 times higher than the control group (SMD= 0.43; 95% CI= 0.27 to 0.60; p< 0.001) and 8 Research on the effect of education on the practice of exclusive breastfeeding showed an increase of 2.46 times in exclusive breastfeeding compared to the control group (RR= 1.59; 95% CI= 1.40 to 1.81; p=0.020).
Conclusion: Breastfeeding education programs for pregnant women affect self-efficacy in breastfeeding and exclusive breastfeeding.

Keywords: breastfeeding education, pregnant woman, self-efficacy, exclusive breastfeeding

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BACKGROUND

In 2019, it is estimated that 5.2 million children under the age of 5 will die. Most are due to preventable and treatable causes. Children aged 1 to 11 months accounted for 1.5 million of these deaths, while children aged 1 to 4 years accounted for 1.3 million of these deaths. Newborns (under 28 days of age) accounted for 2.4 million deaths. Globally, infectious diseases, including pneumonia, diarrhea and malaria, premature birth, asphyxia and trauma, and congenital anomalies remain the leading cause of death for children under five years of age (WHO, 2022). Breastfeeding is one of the most effective ways to ensure the survival and health of children and mothers (WHO, 2021). Breast milk has many beneficial an-

ti-infective and immunological properties, making it an ideal source of nutrition to optimize children's health (Madore and Fisher, 2021).

Infants who exclusively breastfed for six months reduced the incidence of lower respiratory tract disease, otitis media and diarrheal disease. Meanwhile, babies who breastfeed more than six months will reduce the risk of pneumonia by four times. In addition, exclusive breastfeeding for six months prolongs the period of lactational amenorrhea and thereby increases child spacing and reduces the risk of preterm delivery (Eidelman and Schanler, 2012). Therefore, the World Health Organization or WHO recommends exclusive breastfeeding for six months without any additional food and fluids then continued for up to two years and "as long as the mother and child mutually desire" (Shamir, 2016).

The latest World Health Organization (WHO) data shows that globally only 44 percent of the target of 70 percent of infants aged less than six months are exclusively breastfed (WHO, 2021). The cause of this low rate is the cessation of breastfeeding before six months due to pain in the mother's nipples which can be anticipated by giving breastfeeding directions (Ávila-Ortiz et al., 2020) and the perception of lack of breast milk (Hegazi et al., 2019). The possibility of discontinuing exclusive breastfeeding will decrease as self-efficacy in breastfeeding increases (Vieira et al., 2018). Mothers who give exclusive breastfeeding tend to have a higher level of knowledge about breastfeeding than mothers who do not give exclusive breastfeeding (Zielińska, et al., 2017).

Therefore, one form of intervention that has been used to improve breastfeeding outcomes is a breastfeeding education program (Patel and Patel, 2016) because it can increase self-efficacy and breastfeeding knowledge in pregnant women (Iliadou et al., 2018).

SUBJECTS AND METHOD

1. Study Design

This research was conducted using a meta-analysis research design with the PRISMA flowchart guideline. Article searches were performed using the following databases: PubMed and Sciencedirect. Some of the keywords used were: “Breastfeeding Education” AND “Pregnant Woman” AND “Self-Efficacy” AND “Exclusive Breastfeeding” AND “Randomized Controlled Trial.

2. Inclusion Criteria

The inclusion criteria for this research article were articles published with a Randomized Controlled Trial (RCT) study design, full-text articles (full paper), articles using English and Indonesian, articles using bivariate analysis with the relationship size used Mean SD. and OR, research subjects are pregnant women, the intervention is breastfeeding education and the expected results are self-efficacy in breastfeeding and exclusive breastfeeding.

3. Exclusion Criteria

The exclusion criteria for this research article were articles published not in English or Indonesian, research designs other than RCTs, articles that were not full text and articles published before 2002.

4. Operational Definition of Variables

The articles included in this study were PICO-adjusted. The search for articles was carried out by considering the eligibility criteria determined using the following PICO model: Population= Pregnant Women, Intervention= Breastfeeding education program, Comparison= No breastfeeding education program, Outcome= (1) Self-efficacy in breastfeeding and (2) Exclusive breastfeeding.

Breastfeeding Education is an effort to provide knowledge to groups of pregnant

women about lactation management so that they can increase the knowledge, understanding and confidence of mothers to exclusively breastfeed their babies after giving birth.

Self-efficacy is a person's confidence in his ability to perform and achieve the desired goals in a particular task.

Exclusive breastfeeding is a source of nutritional intake for newborns that is exclusive in its administration which applies to infants from the age of 0 months to 6 months.

5. Instrumen Study

This research is guided by the PRISMA flow diagram and assessment of the quality of research articles using the Critical Appraisal Skills Program Randomized Controlled Trial Standard Checklist (CASP, 2020).

6. Data Analysis

Articles were analyzed using the Review Manager (RevMan) 5.3 application to calculate effect size and heterogeneity, and form the final results of the meta-analysis. The results of data processing are presented in the form of forest plots and funnel plots.

RESULTS

Process of searching article wascarried out by searching several journal databases including Pubmed, and Science Direct. it can be seen using the PRISMA FLOW flowchart shown in Figure 1.

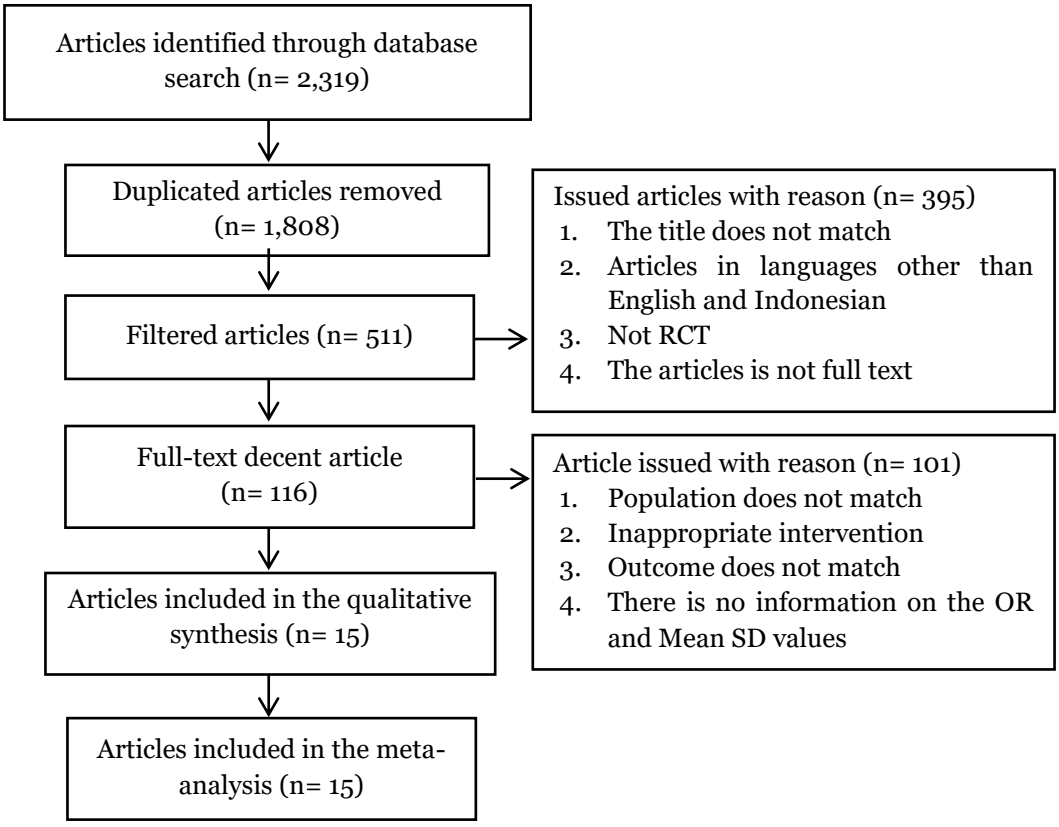

Figure 1. Results of Prisma Flow Diagrams

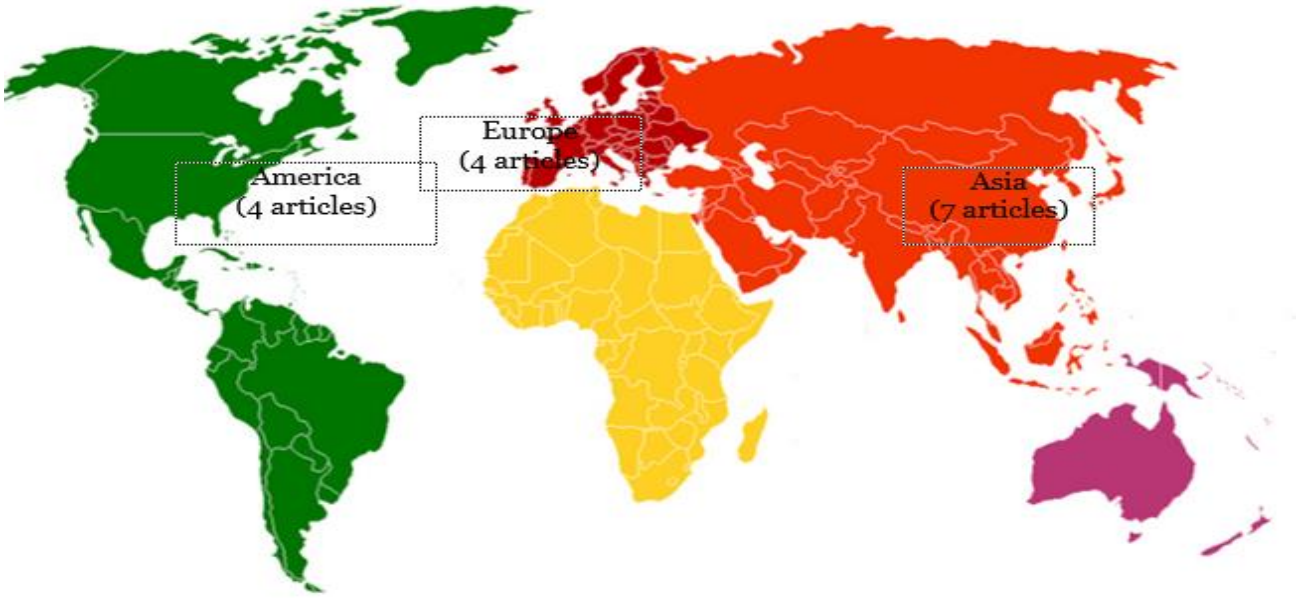

Figure 2. Research Distribution Map

The total articles obtained were 15 articles spread across 3 continents, namely Asia, America, and Europe. The 7 main studies were from Asia (Taiwan, Hongkong, Iran, Singapore, and Lebanon), 4 Studies form Europe (Turkey, Spain, and Croatia), and 4 studies form America (Canada and America).

Research Quality Assessment

Assessment of the quality of research articles using the Critical Appraisal Skills Program Randomized Controlled Trial Standard Checklist study which can be seen in table 1. The criteria for evaluating articles with cross-sectional study design are as follows:

1. Did the study address a clearly focused research question?
2. Was the assignment of participants to interventions randomized?
3. Were all participants who entered the study accounted for at its conclusion?
4. Were all participants, the investigators, the people assessing or analysing outcomes blinded?
5. Were the study groups similar at the start of the randomised controlled trial?
6. Apart from the experimental intervention, did each study group receive the same level of care?
7. Were the effects of intervention reported comprehensively?
8. Was the precision of the estimate of the intervention or treatment effect reported?
9. Do the benefits of the experimental intervention outweigh the harms and costs?
10. Can the results be applied to your local population/in your context?
11. Would the experimental intervention provide greater value to the people in your care than any of the existing interventions?

After assessing the quality of the study, 15 articles were divided into 2 categories according to the dependent variable included in the quantitative synthesis of meta-analysis using RevMan 5.3.

Table 1. Research Quality Assesment using the Critical Appraisal Checklist for Randomized Controlled Trial Standard.

Primary Study	Criteria											Total
	1	2	3	4	5	6	7	8	9	10	11	
Araban *et al.* (2018)	2	2	2	2	2	2	2	2	2	2	2	22
Cangol and Sahin (2017)	2	2	2	2	2	2	2	2	2	2	2	22
Chan *et al.* (2016)	2	2	2	2	2	2	2	2	2	2	2	22
F-Antonio *et al.* (2021)	2	2	2	2	2	2	2	2	2	2	2	22
Mcqueen *et al* (2011)	2	2	2	2	2	2	2	0	2	2	2	20
Necipoglu *et al.* (2021)	2	2	2	2	2	2	2	0	2	2	2	20
Tseng *et al.* (2020)	2	2	2	2	2	2	2	2	2	2	2	22
Noel-Weiss *et al.* (2006)	2	2	2	2	2	2	2	0	2	2	2	20
Shafaei *et al.* (2019)	2	2	2	2	2	2	2	0	2	2	2	20
Sandy *et al.* (2009)	2	2	2	2	2	2	2	2	2	2	2	22
Mattar *et al.* (2019)	2	2	2	2	2	2	2	0	2	2	2	20
Nabulsi *et al.* (2019)	2	2	2	2	2	2	0	2	2	2	2	20
Puharic *et al.* (2020)	2	2	2	2	2	2	2	2	2	2	2	22

Note: Answer 2= Yes; Answer 1= Can't tell; Answer 0= No

1. The effect of Breastfeeding Education on Self-efficacy in Exclusive Breastfeeding.

a. Forest plot

The forest plot in Figure 3 showed that breastfeeding education for pregnant women increased by 0.43 times self-efficacy in breastfeeding (SMD= 0.43; 95% CI= 0.27 to 0.60) and was statistically significant (p<0.001). The heterogeneity of the research I^2= 82% so that it shows the distribution of the data is heterogeneous (random effect model).

b. Funnel plot

The funnel plot (Figure 4) shows a publication bias because the plot is not symmetrical between right and left, where on the left there are 3 plots and on the right there are 2 plots, and 2 plots touch the vertical line. The plot on the left has a standard error of 0.1 to 0.3 while the plot on the right has a standard error of 0.2 to 0.3.

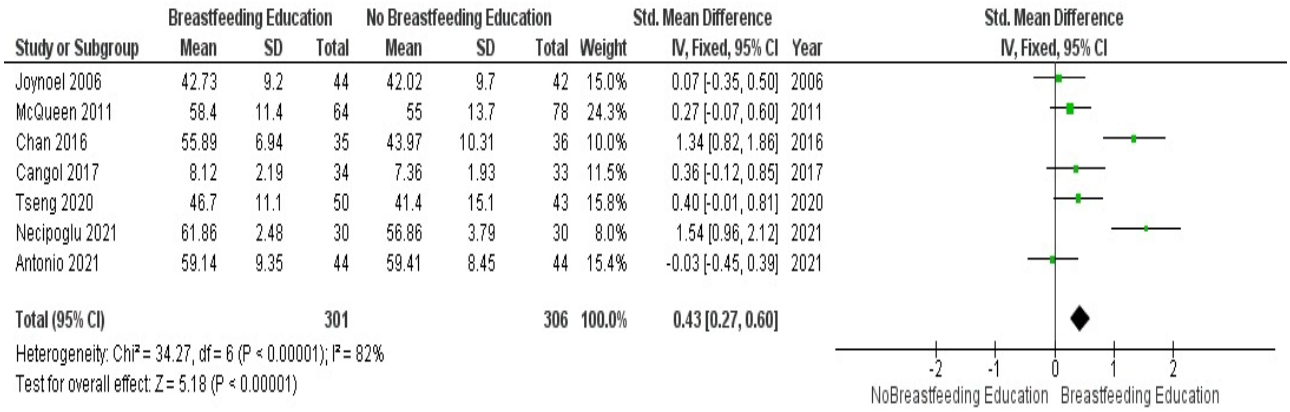

Figure 3. Forest Plot Effect of Breastfeeding Education on Self-Efficacy in Breastfeeding

Table 2. Summary of Sources of Breastfeeding Education for Pregnant Women on Self-Efficacy in Breastfeeding

No	Author (Year)	Country	Study Design	Sample		Population (P)	Intervention (I)	Comparison (C)	Outcome (O)	Value	
				IG	CG					Mean	SD
1	Cangöl et al. (2017)	Turkey	RCT	50	50	Pregnant women with gestational age 32 weeks	Breastfeeding education	Non breastfeeding education	Self-efficacy on breastfeeding	8.12	2.19
2	McQueen et al. (2011)	Kanada	RCT	69	81	primiparous mother	Breastfeeding education	Non breastfeeding education	Self-efficacy on breastfeeding	59.00	13.70
3	Necipoğlu et al. (2021)	Turkey	RCT	30	30	primiparous mother	Breastfeeding education	Non breastfeeding education	Self-efficacy on breastfeeding	61.86	2.48
4	Tseng et al. (2020)	Taiwan	RCT	52	52	Pregnant women with gestational age 12 weeks	Breastfeeding education	Non breastfeeding education	Self-efficacy on breastfeeding	46.70	11.10
5	Joynoel et al. (2006)	Kanada	RCT	55	55	primiparous mother	Breastfeeding education	Non breastfeeding education	Self-efficacy on breastfeeding	42.73	9.20
6	Chan et al. (2016)	Hongkong	RCT	35	36	Pregnant women aged 28 to 36 weeks	Breastfeeding education	Non breastfeeding education	Self-efficacy on breastfeeding	55.89	6.94
7	Antonio et al. (2021)	Spanyol	RCT	44	44	Women who visit the Aden health center	The perception of many benefits, a lot of self-efficacy	Low perceived benefits, low self-efficacy	Self-efficacy on breastfeeding	59.14	9.35

Table 3. Summary of Sources of Breastfeeding Education for Pregnant Women on Exclusive Breastfeeding

No	Author (Year)	Country	Study Design	Sample		Population (P)	Intervention (I)	Comparison (C)	Outcome (O)	RR (955% CI)
				IG	CG					
1	Tseng et al. (2020)	Taiwan	RCT	52	52	Pregnant woman (12-32 weeks)	Breastfeeding education	Non breastfeeding education	Exclusive breastfeeding	2.29 (1.00 to 5.34)
2	Araban et al. (2018)	Iran	RCT	60	60	primiparous mother	Breastfeeding education	Non breastfeeding education	Exclusive breastfeeding	1.50 (1.00 to 2.20)
3	Wiess et al. (2006)	Canada	RCT	47	45	primiparous mother	Breastfeeding education	Non breastfeeding education	Exclusive breastfeeding	1.22 (0.90 to 1.66)
4	Shafaei et al. (2019)	Iran	RCT	54	54	Pregnant women with gestational age 12 weeks	Breastfeeding education	Non breastfeeding education	Exclusive breastfeeding	4.33 (2.33 to 8.05)
5	Sandy et al. (2009)	America	RCT	137	101	primiparous mother	Breastfeeding education	Non breastfeeding education	Exclusive breastfeeding	1.62 (1.02 to 2.57)
6	Mattar et al. (2007)	Singapore	RCT	132	146	Pregnant women aged 28 to 36 weeks	Breastfeeding education	Non breastfeeding education	Exclusive breastfeeding	2.11 (1.00 to 4.52)
7	Nabulsi et al. (2019)	Lebanese	RCT	174	188	Women who visit the Aden health center	The perception of many benefits, a lot of self-efficacy	Low perceived benefits, low self-efficacy	Exclusive breastfeeding	1.25 (1.00 to 1.72)
8	Puharic et al. (2019)	Croatia	RCT	136	136	Pregnant women.	Breastfeeding education	Non breastfeeding education	Exclusive breastfeeding	1.73 (1.41 to 2.12)

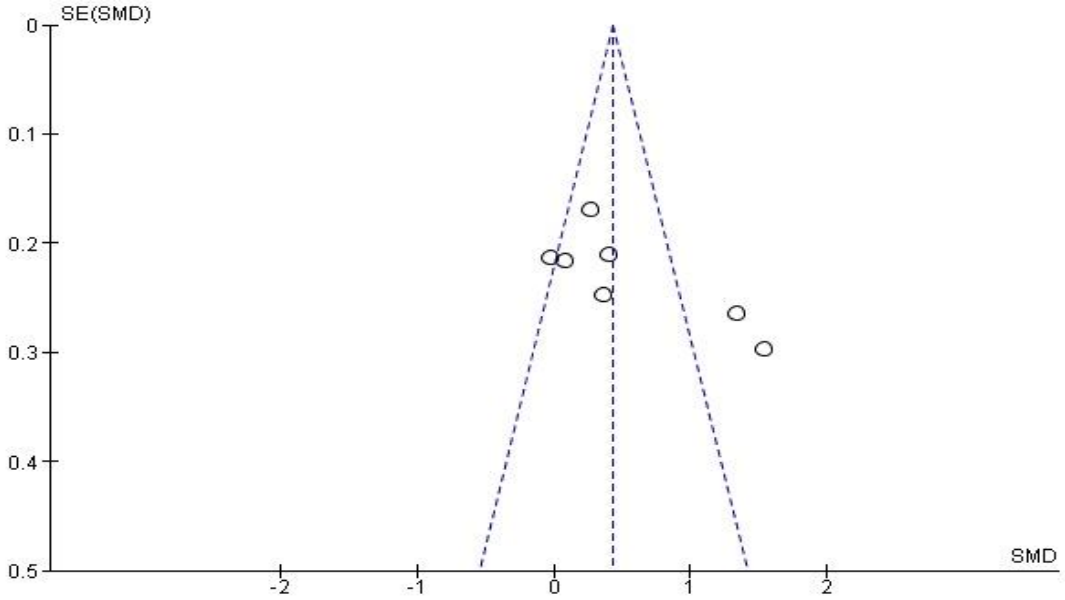

Figure 4. Funnel Plot Effect of Breastfeeding Education on Self-Efficacy in Breastfeeding

2. The effect of Breastfeeding Education on Exclusive Breastfeeding

The results of the study were obtained from 8 articles.

a. Forest Plot

Based on the results of the forest plot (Figure 5), it was shown that breastfeeding education for pregnant women increased exclusive breastfeeding by 1.59 times (RR= 1.59; 95% CI= 1.40 to 1.81) and was statistically significant (p=0.02). The heterogeneity of the research I^2= 59% so that it shows the distribution of the data is heterogeneous (random effect model).

b. Funnel plot

The funnel plot (Figure 6) shows a publication bias because the plot is not symmetrical between right and left, where on the left there are 3 plots, on the right there are 4 plots, and 1 plot touches the vertical line. The plot on the left has a standard error of 0.0 to 0.6 while the plot on the right has a standard error of 0.2 to 0.6.

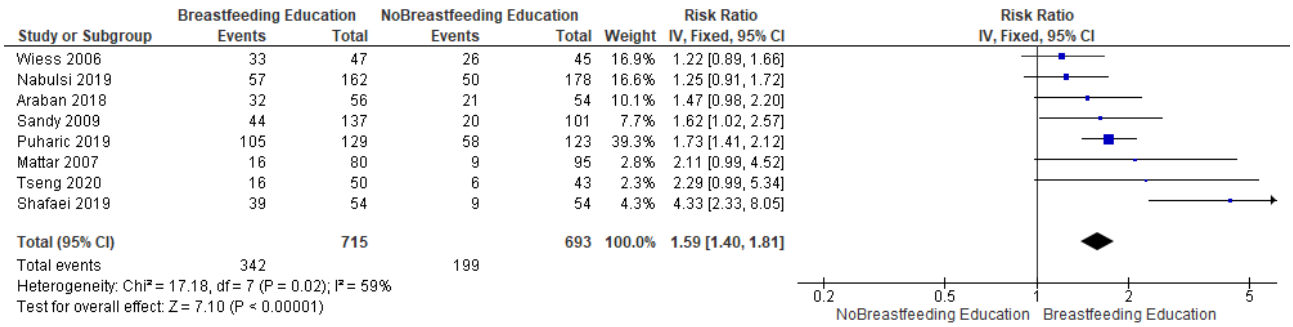

Figure 5. Forest plot Effect of Breastfeeding Education on Exclusive Breastfeeding

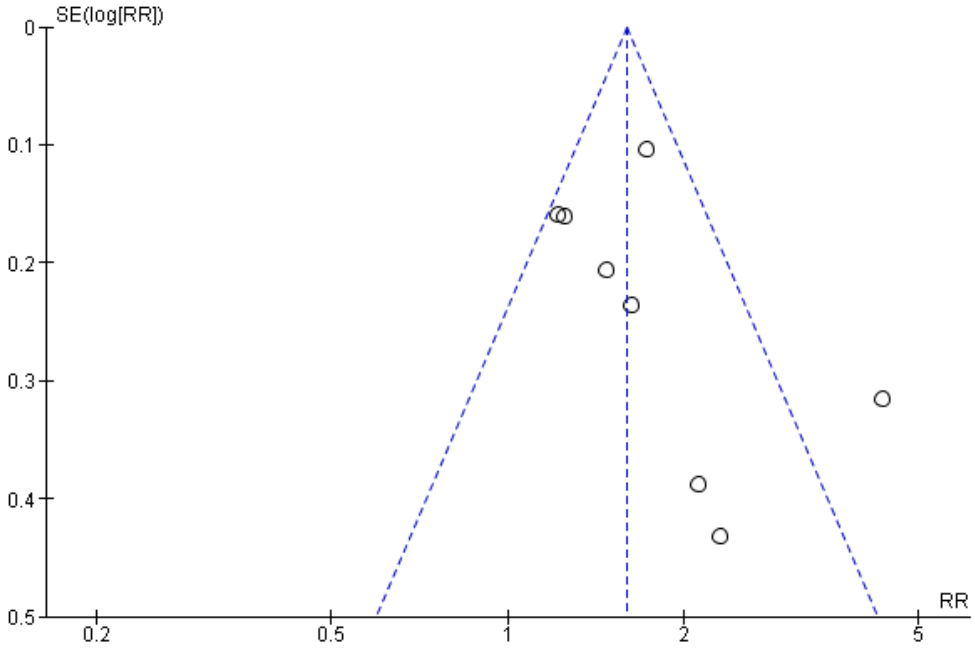

Figure 6. Funnel plot Effect of Breastfeeding Education on Exclusive Breastfeeding

DISCUSSION

This systematic review and meta-analysis study raised the theme of the effect of providing breastfeeding education to pregnant women on self-efficacy in breastfeeding and exclusive breastfeeding. This study discusses data on self-efficacy in breastfeeding and exclusive breastfeeding behavior in pregnant women which are considered important because of the low level of knowledge of mothers about the importance of exclusive breastfeeding for their babies.

1. The Effect of Breastfeeding Education on Self-Efficacy in Breastfeeding.

The analysis carried out in the study was a Randomized Controlled Trial (RCT) research design. The results on the forest plot showed that breastfeeding education interventions for pregnant women had an effect on self-efficacy in breastfeeding by 0.43 times compared to non-breastfeeding education interventions (SMD=0.43; 95% CI 0.27 to 0.60; p<0 ,00001). The heterogeneity of the research data shows I2 = 82% so it is declared heterogeneous (random effects model). Forest plots can show effect sizes and 95% confidence intervals or display the results of meta-analyses (Makowski et al., 2019). The funnel plot shows the effect size and accuracy of the effect size and makes it possible to evaluate possible publication bias in the form of a symmetrical triangular graph (Makowski et al., 2019).

The results of this study are also in accordance with the research conducted by Fitriah et al., (2017), it is known that educational programs regarding breastfeeding greatly affect the increase in mothers' self-efficacy in exclusive breastfeeding for their babies (paired sample t-test results t= -4.45; p< 0.010). In the study, it was stated that the education class provided by cadres of breastfeeding care organizations or the Indonesian Breastfeeding Mothers Association (AIMI) to mothers and expectant mothers regarding information and knowledge about the importance of breastfeeding and

providing support to mothers who will breastfeed their children. This educational class also increases the number of mothers who give exclusive breastfeeding to their babies due to the seriousness of mothers in obtaining information that is in accordance with the educational class material (Aprilia and Fitriah, 2017).

Research conducted by Angio et al., (2018) also shows that success in breastfeeding education to mothers and prospective mothers can increase mothers' self-efficacy in breastfeeding their babies. This research was conducted by community nurses to mothers and prospective mothers by conducting peer education. The intervention was given to the group as a basic provision of information and share experiences for respondents related to breastfeeding. Peer education can increase BSE in breastfeeding mothers (Angio, 2019). This statement is supported by the results of this study, namely that there was an increase in BSE scores before and after peer education was carried out in the intervention group. Peer education contains education carried out with a peer group approach, with topics related to breastfeeding that can change mothers' thoughts and beliefs in breastfeeding.

This meta-analysis study is also in line with Puspita's research (2015), which showed that support in the form of sharing experiences from mothers who have successfully provided exclusive breastfeeding presented at meetings in pregnant womens classes can increase mother's self-efficacy to give exclusive breastfeeding. Health education with a modeling approach provided by nurses is very effective in increasing mother's knowledge, practice ability and confidence (Puspita, 2015).

2. The Effect of Breastfeeding Education on Exclusive Breastfeeding

The results of a meta-analysis of 8 articles on the effect of breastfeeding education on pregnant women on exclusive breastfeeding are summarized in a forest plot. Figure 4 shows that breastfeeding education interventions for pregnant women increase the practice of exclusive breastfeeding 2.46 times. This result is also in line with previous research which stated that breastfeeding education during the antenatal period significantly increased the 1.73 times the ratio of exclusive breastfeeding until six months after giving birth (Su and Chong, 2007) and if it was added with postnatal education, it would be better (Vural and Chong, 2007). Vural, 2017).

Ihudiebube-Splendor et al., (2019) found that mother's knowledge about exclusive breastfeeding was a significant factor for the practice of exclusive breastfeeding (RR= 1.59; 95% CI= 1.40 to 1.81; p= 0.020). Knowledge of breastfeeding can be obtained from antenatal care visits. A study showed that pregnant women who had at least one antenatal visit would give 1.41 times higher exclusive breastfeeding (Tariku et al., 2017). Education during pregnancy has an important role in improving the practice of exclusive breastfeeding and in child care (Kushwaha et al., 2014).

The results of this study are also in line with a meta-analysis on the effectiveness of educational interventions in exclusive breastfeeding which examined using a sub-group method of several educational methods and it was found that overall, educational and support interventions would have a significant positive effect on the practice of exclusive breastfeeding. within 2 and 6 months after delivery. (Wong et al., 2021).

AUTHOR CONTRIBUTION

Anisya Fajar Rahmawati and Annisa Nurindra Rahmadani work together in determining research topics, finding and collecting research data, analyzing data and writing meta-analytical articles that are carried out simultaneously.

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This study is self-funded.

CONFLICT OF INTEREST

There is no conflict of interest in this study.

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