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Meta-Analysis
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Effects of Antenatal Care and Postnatal Care on Exclusive Breastfeeding Practice: Meta Analysis

Nisia Hari Agusningtyas[1)], Yulia Lanti Retno Dewi[2)], Bhisma Murti[1)]

[1)]Master's Program in Public Health, Universitas Sebelas Maret
[2)]Faculty of Medicine, Universitas Sebelas Maret

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ABSTRACT

Background: The World Health Organization (WHO) reports that 2 out of 3 babies do not get exclusive breastfeeding and only 41% of babies aged 0-6 months get exclusive breastfeeding. It is believed that ANC and PNC examinations can increase the possibility of mothers to start and maintain exclusive breastfeeding, because mothers will receive information and support about the benefits of exclusive breastfeeding, the importance of giving colostrum, and the right technique for positioning and attachment in breastfeeding. This study aims to analyze the effect of ANC and PNC on the practice of exclusive breastfeeding.
Subjects and Method: This study is a systematic and meta-analysis study, with the following PICO Population = Breastfeeding mothers. Intervention = ANC <4 times and no PNC. Comparison = ANC ≥4 times and PNC. Outcome = Exclusive breastfeeding. The articles used in this study were obtained from several databases including PubMed, Google Scholar, EBSCO, Springer Link, Science Direct, and Pro Quest. The keywords used are "ANC and exclusive breastfeeding", "PNC and exclusive breastfeeding". The inclusion criteria were full-text article observational study designs. Articles are collected using PRISMA flow diagrams. Articles were analyzed using the Review Manager 5.3 application.
Results: Based on the results of a meta-analysis of 9 primary studies originating from Ethiopia, Tanzania, The Gambia, Saudi Arabia, and Indonesia, it was found that regular ANC, which was 4 times or more, has the possibility of giving exclusive breastfeeding by 1.55 times ANC (aOR=1.55; 95% CI=1.29 to 1.88; p=0.001) and mothers who conduct PNC have the possibility of giving exclusive breastfeeding by 2.43 times (aOR=2.43; 9 5%CI=1.78 to 3.31; p=0.001).
Conclusion: ANC and PNC examinations can improve the practice of exclusive breastfeeding.

Keywords: antenatal care, postnatal care, exclusive breastfeeding.

Correspondence:
Nisia Hari Agusningtyas. Master's Program in Public Health, Universitas Sebelas Maret. Jl. Ir. Sutami 36A, Surakarta, Central Java 57126, Indonesia. Email: harinisia@gmail.com. Mobile: +6282138344620

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BACKGROUND

Breast milk is the liquid secreted by the breast glands in the form of a secreted liquid. Exclusive breastfeeding is breast milk that is given to babies from birth up to the age of 6 months without adding and or replacing it

with other food or drinks (Infodatin, 2018). WHO and UNICEF also recommend that children start getting breast milk from the first hours of birth until the first 6 months of life, after that they are allowed to eat safe and adequate complementary foods by continuing to breastfeed until they are 2 years old (WHO, 2019).

WHO reports that 2 out of 3 babies do not get exclusive breastfeeding and only 41% of babies aged 0-6 months get exclusive breastfeeding. There are 820,000 children who can be saved each year if they were optimally breastfed in the first month, namely 0-23 months. Therefore, WHO actively promotes breastfeeding as the best source of food for infants and young children. WHO is also trying to increase the rate of exclusive breastfeeding in the first 6 months at least up to 50% in 2025.

Renuka et al. (2020) states that providing education about early initiation of breastfeeding can increase breastfeeding within 1 hour after birth and the practice of giving colostrum. Mothers with poor knowledge prior to the intervention had a positive attitude towards breastfeeding by showing a desire to breastfeed their children. Lack of correct information and access to information is one of the obstacles to proper breastfeeding. Therefore, to increase information and knowledge, mothers are advised to routinely perform ANC during pregnancy and perform PNC after delivery.

Routine ANC and PNC examinations are one of the protective factors for the health of mothers and babies. It is believed that this examination can increase the possibility of the mother to start and maintain exclusive breastfeeding, because the mother will know about the facts and myths about breastfeeding. For example, ancient parents considered that early breast milk or colostrum was a source of disease and had to be thrown away. ANC and PNC examinations allow mothers to receive information and support about the benefits of exclusive breastfeeding, the importance of giving colostrum, and the right technique for positioning and attachment in breastfeeding. In addition, health service providers also get the opportunity to answer concerns or questions that mothers may have about breastfeeding, increase self-confidence, and provide motivation in planning and exclusive breastfeeding.

Various studies have been carried out with varying results around the world, however, further analysis needs to be done in order to get a more convincing conclusion. Therefore, the researchers are interested in analyzing using a systematic approach to relevant studies by conducting a meta-analysis to identify the effect of ANC and PNC on the practice of exclusive breastfeeding.

SUBJECTS AND METHOD

1. Study Design

This was a systematic review and meta-analysis. The articles were obtained from several databases including PubMed, Google Scholar, EBSCO, Springer Link, Science Direct, and Pro Quest. The keywords used are "ANC and exclusive breastfeeding", "PNC and exclusive breastfeeding". The inclusion criteria were full-text article cross-sectional study designs. Articles are collected using PRISMA flow diagrams. Articles were analyzed using the RevMan 5.3 application.

2. Steps of Meta-Analysis

1) Formulate research questions through the PICO format (Population= Breastfeeding Mothers. Intervention= ANC <4 times and no PNC. Comparison= ANC ≥4 times and PNC. Outcome= Exclusive breastfeeding.
2) Searching for primary study research articles from several databases, namely PubMed, Google Scholar, EBSCO, Springer Link, Science Direct, and Pro Quest.

3) Screen and conduct an assessment using the Critical Appraisal Checklist for Cross-Sectional Study from the Center for Evidence Based Management.
4) Enter the data obtained and then combine it together using Software RevMan 5.3 data analysis
5) Interpret the results of research data analysis and draw conclusions

3. Inclusion Criteria

Inclusion criteria in this study were full paper articles, articles using English and/ or Indonesian, research subjects were mothers who were breastfeeding, cross-sectional study design with exclusive breastfeeding outcomes.

4. Exclusion Criteria

Exclusion criteria were articles with quasi-experimental study design, cohort, case control and RCT, articles that were not full-text and used languages other than English and Indonesian.

5. Operational Definition of Variable

Exclusive breastfeeding is breast milk given to babies from birth up to the age of 6 months without adding or replacing it with other foods or drinks, including water.

Antenatal Care is an examination carried out from the beginning of the first trimester to the third trimester of pregnancy to optimize the mental and physical health of pregnant women so that they are able to deal with childbirth, the postpartum period, preparation for breastfeeding and the return of reproductive health in a reasonable manner.

Postnatal Care is postpartum care given to mothers and babies during the period after birth. This period starts from the time the baby is born until the first six weeks after birth.

6. Instrument

The research is guided by the PRISMA flow chart and uses a Research Quality Assessment (Critical Appraisal) from the Center for Evidence Based Management.

7. Data Analysis

The data in the study were analyzed using the Review Manager application (RevMan 5.3). Forest plots and funnel plots are used to determine the size of the relationship and the heterogeneity of the data. The fix effect model is used for homogeneous data with an estimated effect of less than 50%, while the random effect model is used for heterogeneous data with an estimated effect of more than 50%.

RESULTS

In the initial process of searching for articles, a total of 1876 articles were obtained from 5 electronic database sources, namely Clinical Key, Google Scholar, MEDLINE/ PubMed, Science Direct, Scopus. After the checking process, there were 963 duplicate articles, so the duplicate articles were deleted and a total of 913 articles that have been filtered were obtained. Of the 913 articles, 851 articles were excluded because they did not fulfill the inclusion criteria. The final results of the selection of articles included in the systematic review process and meta-analysis were 9 articles which were divided into 2 variables, namely 5 articles on antenatal care and 8 postnatal care articles, which were divided into 2 categories, including: 1. Antenatal care and the practice of exclusive breastfeeding 2. Postnatal care and the practice of exclusive breastfeeding.

Figure 2 shows research related to the influence of ANC and PNC on the practice of exclusive breastfeeding, namely on the Asian continent and the African continent. There are 9 studies divided from the Asian Continent (2 studies from Indonesia and Saudi Arabia) and the African Continent (7 studies from Ethiopia, Tanzania, The Gambia). Table 2 show that assessment of the quality of the articles used in this study.

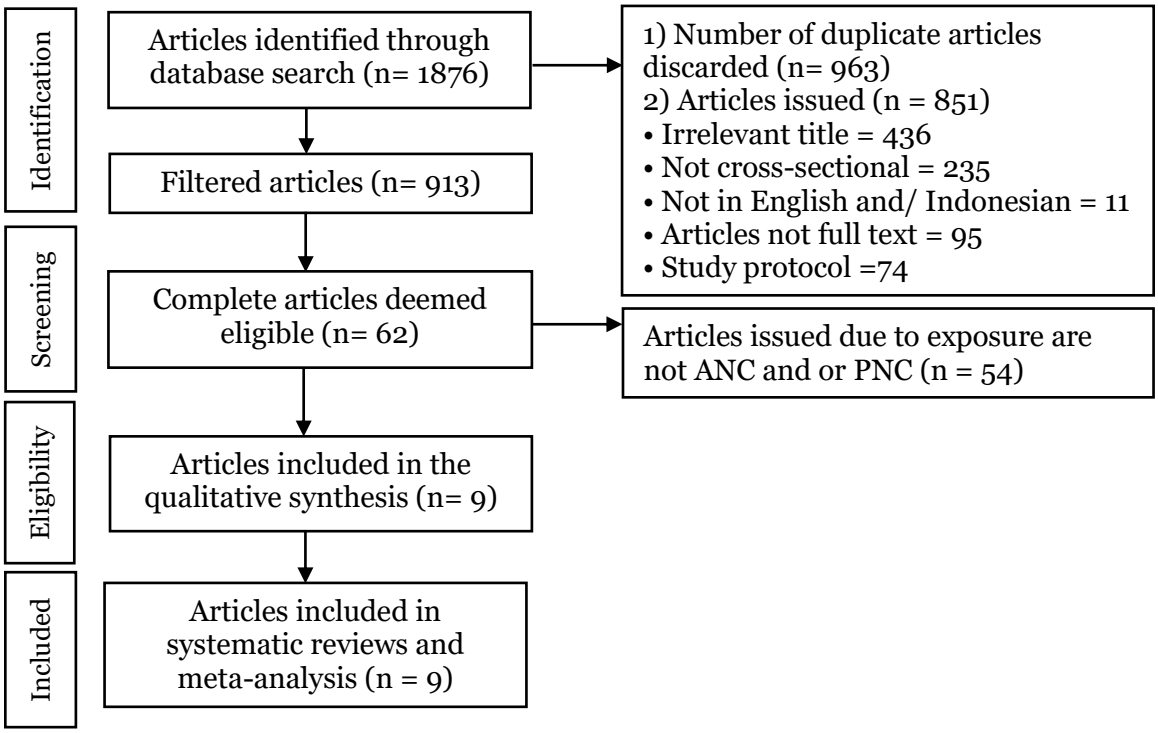

Figure 1. PRISMA flow diagram

Figure 2. Map of the studies distribution Effect of Antenatal Care and Postnatal Care on Exclusive Breastfeeding Practice: Meta Analysis

Table 1. Effect of Antenatal Care and Postnatal Care on Exclusive Breastfeeding Practice: Meta Analysis

Author (Year)	Country	Sample Size	P (Population)	I (Intervention)	C (Comparison)	O (Out-come)
Asemahagn (2016)	Ethiopia	346	Lactating mothers	ANC < 4 times; No PNC	ANC ≥4 times; PNC	EBF
Hussein et al. (2018)	Tanzania	430	Lactating mothers	No PNC	PNC	EBF

Author (Year)	Country	Sample Size	P (Population)	I (Intervention)	C (Comparison)	O (Outcome)
Sanghore et al. (2018)	Gambia	334	Lactating mothers	No PNC	PNC	EBF
Kelkay et al. (2020)	Ethiopia	344	Lactating mothers	No PNC	PNC	EBF
Awoke et al. (2020)	Ethiopia	347	Lactating mothers	ANC <4 times; no PNC	ANC ≥4 times; PNC	EBF
Jebena et al. (2022)	Ethiopia	694	Lactating mothers	ANC <4 times; no PNC	ANC ≥4 times; PNC	EBF
Weldu et al. (2023)	Ethiopia	513	Lactating mothers	ANC <4 times; no PNC	ANC ≥4 times; PNC	EBF
Alshammari et al. (2021)	Saudi Arabia	450	Lactating mothers	No PNC	PNC	EBF
Gayatri (2020)	Indonesia	1542	Lactating mothers	ANC < 4 times	ANC ≥4 times	EBF

Table 2. Research Quality Assessment (Critical Appraisal)

Assessment Items	Critical Appraisal													
	1a	1b	1c	1d	2a	2b	3a	3b	4	5	6a	6b	7	Total
Asemahagn et al. (2016)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Hussein et al. (2019)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Alshammari et al. (2021)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Kelkay et al. (2020)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Senghore et al. (2018)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Awoke et al. (2020)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Jebena et al. (2022)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Weldu et al. (2023)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Gayatri (2020)	2	2	2	2	2	2	2	2	2	2	2	2	2	26

Description of the question criteria:

1. Formulation of research questions in PICO acronym

a. Is the population in the primary study the same as the population in the PICO meta-analysis?

b. Is the operational definition of intervention, namely the exposed status in the primary study, the same as the definition intended in the meta-analysis?

c. Is the comparison, namely the unexposed status used by the primary study, the same as the definition intended in the meta-analysis?

d. Are the outcome variables examined in the primary studies the same as the definitions intended in the meta-analysis?

2. Methods for selecting research subjects

a. In analytical cross-sectional studies, do researchers choose samples from the population randomly (random sampling)?

b. As an alternative, if in a cross-sectional analytical study the sample is not selected randomly, does the researcher select the sample based on outcome status or based on intervention status?

3. Methods for measuring exposure (intervention) and outcome variables (outcome)

a. Are the exposure and outcome variables measured with the same instruments (measuring tools) in all primary studies?

b. If the variable is measured on a categorical scale, are the cutoffs or categories used the same across primary studies?

4. Design-related bias

If the sample was not selected randomly, has the researcher made efforts to prevent bias in selecting research subjects? For example, selecting subjects based on outcome status is not influenced by

exposure status (intervention), or selecting subjects based on exposure status (intervention) is not influenced by outcome status.

5. Methods for controlling confusion
   Whether the primary study investigators have made efforts to control the influence of confounding (for example, conducting a multivariate analysis to control for the influence of a number of confounding factors).
6. Statistical analysis methods

a. Whether the researcher analyzed the data on the study this primer with a multivariate analysis model (e.g., multiple linear regression analysis, multiple logistic regression analysis)
b. Does the primary study report effect sizes or relationships resulting from multivariate analysis (e.g., adjusted OR, adjusted regression coefficient)

7. Conflict of interest
   Is there no possibility of a conflict of interest with the research sponsor, which could cause bias in concluding the research results?

Assessment guide:

1. Total number of questions = 13 questions. Answer "Yes" to each question gives a score of "2". The answer "Undecided" gives a score of "1". The answer "No" gives a score of "0".
2. Maximum total score= 13 questions x 2= 26.
3. Minimum total score = 13 questions x 0= 0. So the range of total scores for a primary study is between 0 and 26.
4. If the total score of a primary study is ≥ 22, then the study can be included in the meta-analysis. If the total score of a primary study was <22, then the study was excluded from the meta-analysis.

Table 3. Adjusted Odd Ratio (AOR) value of the effect of ANC on the practice of exclusive breastfeeding

Author (Year)	AOR	Lower Limit	Upper Limit
Asemahagn et al. (2016)	2.24	1.18	5.76
Awoke et al. (2020)	6.66	1.75	25
Jebena et al. (2022)	2.04	0.81	5.26
Weldu et al. (2023)	1.66	1.03	2.69
Gayatri (2020)	1.38	1.10	1.73

Table 4. Adjusted Odd Ratio (AOR) value of the effect of PNC on the practice of exclusive breastfeeding

Author (Year)	AOR	Lower Limit	Upper Limit
Asemahagn et al. (2016)	1.62	1.09	3.21
Hussein et al. (2019)	2.3	1.2	3.7
Alshammari et al. (2021)	2.47	1.34	4.53
Kelkay et al. (2020)	2.62	1.44	4.80
Senghore et al. (2018)	2.68	1.68	4.29
Awoke et al. (2020)	4.94	1.31	10.19
Jebena et al. (2022)	4.74	2.92	7.70
Weldu et al. (2023)	1.5	1.04	2.16

Antenatal Care and Practice of Exclusive Breastfeeding

The results of the forest plot in Figure 3 show that there is a specific and significant effect of ANC on the likelihood of mothers giving exclusive breastfeeding to babies. Mothers who perform ANC regularly, which is 4 or more times, have 1.55 times more chance of exclusive breastfeeding compared to mothers who rarely perform ANC (aOR=

1.55; 95% CI=1.29 to 1.88; p=0.001). The forest plot showed low heterogeneity in effect estimates (I^2=45%; p<0.120). Due to the heterogeneity of effect estimates between small studies, the calculation of effect estimates was carried out using the fixed effect model approach.

The funnel plot in Figure 4 shows an asymmetric distribution of effect estimates. On the right and left of the vertical line, an even plot is not obtained, thus there is an indication of publication bias.

a. Forest Plot

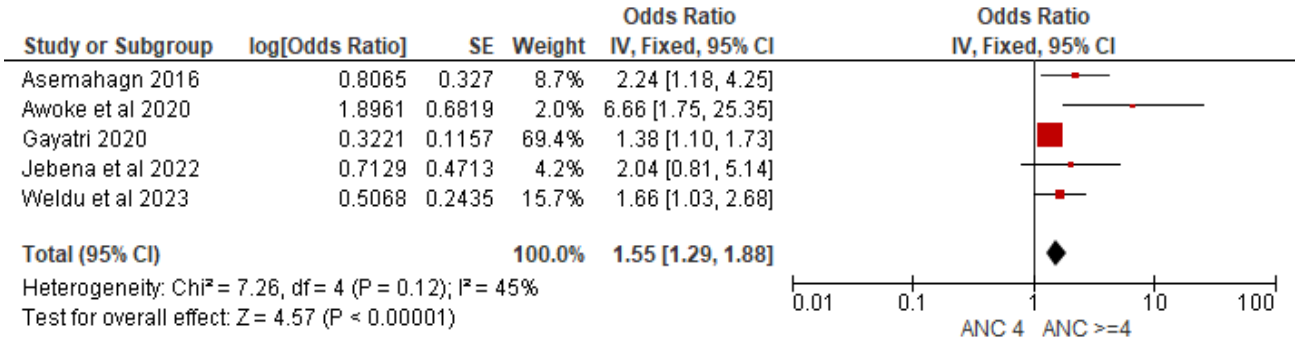

Figure 3. Forest plot of the effect of ANC on the practice of exclusive breastfeeding

b. Funnel Plot

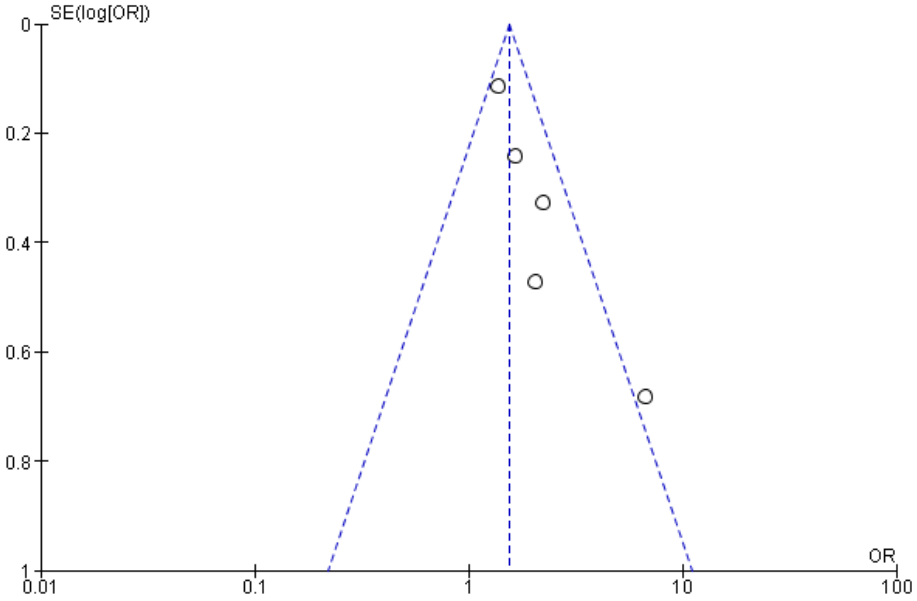

Figure 4. Funnel plot of the effect of ANC on the practice of exclusive breastfeeding

Postnatal Care and Practice of Exclusive Breastfeeding

The results of the forest plot in Figure 5 show that there is a specific and significant effect of PNC on the possibility of mothers giving exclusive breastfeeding to babies. Mothers who do PNC have the possibility to give exclusive breastfeeding by 2.43 times higher compared to mothers with lack of knowledge (aOR= 2.43; 95% CI= 1.78 to 3.31; p=0.001). The forest plot also showed high heterogeneity in effect estimates (I^2= 62%; p<0.009).

Due to the heterogeneity of effect estimates between large studies, the calculation of effect estimates was carried out using the random effect model approach.

The funnel plot in Figure 6 shows a symmetric distribution of effect estimates. To the right and left of the average vertical line, thus not indicating publication bias.

a. Forest Plot

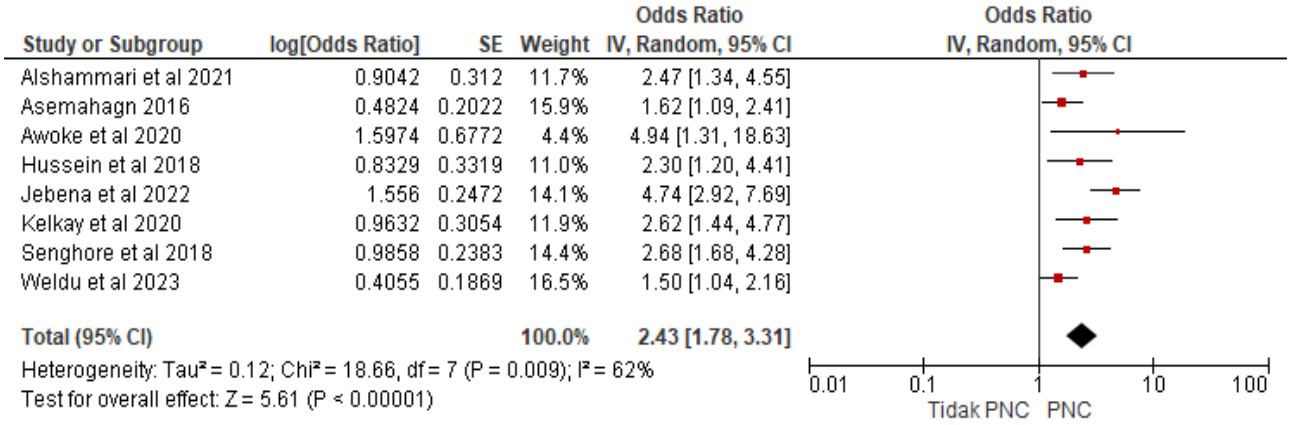

Figure 5. Forest plot of the effect of PNC on the practice of exclusive breastfeeding

b. Funnel Plot

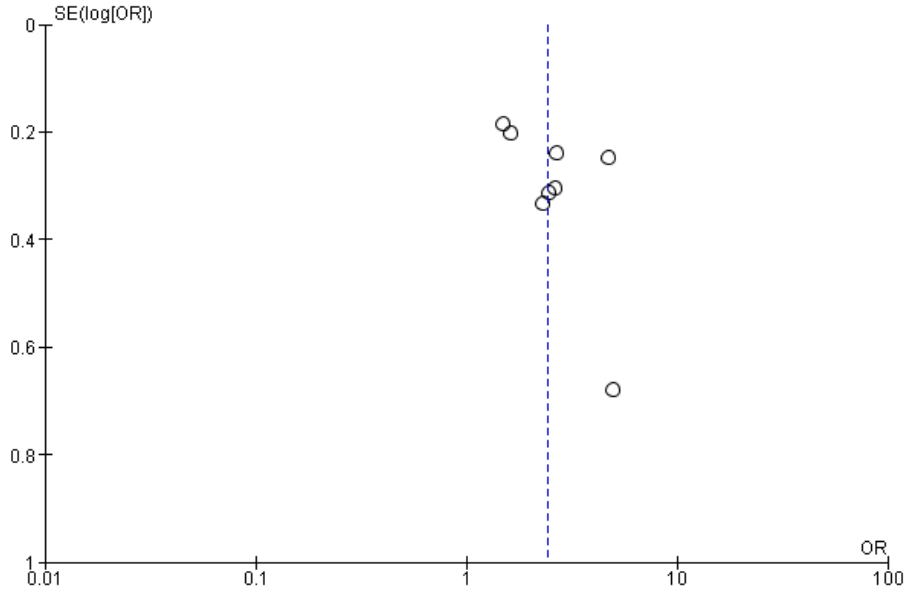

Figure 6. Funnel plot of the effect of PNC on the practice of exclusive breastfeeding

DISCUSSION

Systematic review and meta-analysis in this study were carried out with the aim of increasing the generalization of the findings and obtaining convincing conclusions from the results of various similar studies regarding the effect of ANC and PNC on the practice of exclusive breastfeeding. Primary studies on the effect of ANC and PNC on exclusive breastfeeding practices that met the criteria totaled 9 articles originating from Asian continents (2 articles) and 7 articles from the African continent. A total of 9 experimental research articles with cross-

sectional as a source of meta-analysis of the effect of ANC and PNC on the practice of exclusive breastfeeding.

This study show that ANC and PNC have a statistically significant effect on the success of exclusive breastfeeding practices. The forest plot results showed that regular ANC, which is 4 times or more, has 1.55 times more chance to perform exclusive breastfeeding compared to mothers who rarely do ANC (aOR=1.55; 95% CI=1.29 to 1.88; p=0.001) and mothers who do PNC are 2.43 times more likely to give exclusive breastfeeding than those who do not do PNC (aOR= 2.43; 95% CI= 1.78 to 3. 31; p=0.001). Pregnant women who make ANC visits will receive counseling by health workers. Counseling will work well if the mother is open to the problems she faces.

Counseling about lactation starts with ANC visits in 3rd TM by explaining to mothers about the meaning, benefits, stages, management, and myths about exclusive breastfeeding. It is hoped that the mother who conduct ANC will get the benefit of the counseling received and the mother will be willing to carry out breastfeeding for 6 months (Nurfatimah et al., 2019). ANC visits that are routinely carried out by pregnant women have a significant effect on exclusive breastfeeding after giving birth. Increased knowledge and changed attitudes due to information provided by the ANC care clinic about infant feeding and the nutritional value of breast milk (Asemahagn., 2016).

This is also in line with research conducted by Hussein et al. (2018) which stated that every time mothers come for ANC visits, they will receive information about infant feeding and the importance of exclusive breastfeeding. The importance of ANC counseling to all pregnant women who come to the clinic has been proven to be useful for promotion of breastfeeding. PNC is an important effort in caring for mothers and babies after giving birth.

Mothers who have given birth will experience a critical period in breastfeeding because problems in loving begin to emerge. By doing PNC, mothers will receive intensive lactation counseling to help mothers improve their abilities and skills in dealing with the difficulties they experience. After PNC, it is hoped that there will be an increase in the implementation of breastfeeding to their babies (Nurfatimah et al., 2019).

Jebena et al. (2022) stated that the chances of exclusive breastfeeding were 4.75 times higher for mothers who had PNC and received treatment. Mothers who do PNC will receive further counseling on various issues related to newborn care, the postpartum period, and exclusive breastfeeding. Problems regarding breastfeeding can be consulted again with health workers if the mother follows up on PNC. Mothers who have problems with breastfeeding and do not do PNC will experience their own difficulties. These unresolved difficulties about breastfeeding which can lead to insolvability so that mothers are more prone to stop giving breast milk.

AUTHORS CONTRIBUTION

Nisia Hari Agusningtyas is the main researcher who selected topics, explored and collected the data. Yulia Lanti Retno Dewi and Bhisma Murti played a role in analyzing the data and reviewing research documents.

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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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