

Meta-Analysis the Effects of Rotavirus Vaccine, Exclusive Breastfeeding, and Maternal Education on Diarrhea in Children Under Five

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ABSTRACT

Background: Diarrhea is an infectious disease that can cause death in children under five years. Diarrheal disease is a disease with the highest mortality and morbidity after pneumonia. The purpose of this study was to analyze and estimate the effect of rotavirus vaccine, exclusive breastfeeding, and mother's education level on the incidence of diarrhea in toddlers, with a meta-analysis based on previously conducted primary studies.

Subjects and Method: This article was prepared using a systematic review and meta-analytic study. This research was conducted using the PICO model. Meta-analytic studies were conducted by searching for articles from databases in electronic form using PubMed, Google Scholar, ScienceDirect, and Springer Link. Article searches were conducted from 1-28 February 2023. The keywords used were "Vaccination" OR "Exclusive breastfeeding" OR "Educational Mother" OR "Infection" OR "Diarrhea Childhood". The inclusion criteria for this study were complete articles using cross-sectional research, published years from 2013-2022. Analysis of the articles used RevMan 5.3 software.

Results: A total of 24 cross-sectional studies from Africa and Asia were selected for systematic review and meta-analysis. The results of the meta-analysis showed that not given rotavirus vaccine had a 3.60 times the risk of experiencing diarrhea compared to those given rotavirus vaccine (aOR= 3.60; 95% CI= 2.31 to 5.64; p<0.001), not given exclusive breastfeeding had a risk of experiencing diarrhea 3.28 times compared with those who were given exclusive breastfeeding (aOR= 3.28; 95% CI= 2.24 to 4.80; p<0.001), and children who had mothers with low education levels had a 2.08 times higher risk of experiencing diarrhea compared to children who had mothers with low education levels which is higher (aOR= 2.08; 95% CI= 1.71 to 2.54; p<0.001).

Conclusion: Not being given the rotavirus vaccine, not being given exclusive breastfeeding, and the mother's low education level are at risk of increasing the incidence of diarrhea in toddlers.

Keywords: rotavirus vaccine, exclusive breastfeeding, mother's level of education, child diarrhea

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BACKGROUND

The World Health Organization (WHO) defines diarrheal disease as a disease characterized by a change in the form and consistency of soft stools to become liquid and an increase in the frequency of bowel movements that are more than usual, namely 3 or more times a day. Diarrheal disease is still the main cause of death and morbidity in children under five. Diarrhea is the second most common cause of death in children under the age of five worldwide after pneumonia. Diarrhea is a symptom of intestinal tract infection which can be caused by various bacterial, viral and parasitic infections. The infection spreads through contaminated food and drink, or from person to person as a result of poor sanitation (WHO, 2017).

There are 1.7 billion cases of diarrhea globally and it causes around 525,000 under-five deaths each year (WHO, 2017). Diarrhea in children under five generally occurs in developing countries, most of which have poor access to drinking water, sanitation, and hygiene. There are several factors that cause diarrhea in children such as the age of the child, the level of education of the mother, exclusive breastfeeding, environmental health, not getting complete basic immunizations such as rotavirus vaccine, measles vaccine, and vitamin A. Kenya, Ethiopia, Somalia and Rwanda are countries with an incidence rate and the highest diarrheal mortality in the world (Gedamu et al., 2017). Diarrhea is still a major problem in Indonesia which causes the death of infants aged 12-59 months. Of the 28,158 deaths under five, 72.0% (20,266 deaths) occurred in the neonatal period. Meanwhile, 19.1% (5,386 deaths) occurred at the age of 29 days–11 months and 9.9% (2,506 deaths) occurred at the age of 12–59 months with the main cause being diarrhea followed by ARI and pneumonia (Santika et al., 2019).

Rotavirus vaccine administration and exclusive breastfeeding can be important factors in preventing diarrhea. Babies have an immature immune system, so breast milk provides natural protection against pathogens that enter the baby's body both in the short and long term (Gizaw et al., 2020). In addition to the Rotavirus vaccine, exclusive breastfeeding and improving the educational status of mothers are also ways to prevent diarrhea in toddlers. Exclusive breastfeeding set by WHO is 6 months (WHO, 2017).

Feleke et al. (2022) explained that early initiation of breastfeeding, exclusive breastfeeding, and dominant breastfeeding prevent diarrhea and ARI in children aged 0-23 months. This study also states that children whose mothers have low education have twice the risk of getting diarrhea and ARI compared to children whose mothers have higher education. The purpose of this study was to analyze and estimate the effect of rotavirus vaccine, exclusive breastfeeding, and mother's education level on the incidence of diarrhea in toddlers, with a meta-analysis based on previously conducted primary studies

SUBJECTS AND METHOD

1. Study Design

Meta-analysis was carried out using the PRISMA flowchart using the PubMed, Google Scholar, Science direct, and Springer Link databases, which were published from 2013 to 2022. The keywords used were “Vaccine OR Vaccination” AND “Breastfeeding OR Exclusive breastfeeding” AND “Education OR Educational Mother” AND “Infection OR Transmission” AND “Diarrhea OR Diarrhea Childhood”. There were 24 studies with a cross-sectional study design that met the inclusion criteria. Analysis was performed with RevMan 5.3 software.

2. Steps of Meta-Analysis

The meta-analysis was carried out through 5 steps as follows:

- 1) Formulate research questions using the PICO model. Population: children under five years. Intervention: given rotavirus vaccine, exclusive breastfeeding, and a high level of mother's education. Comparison: rotavirus vaccine was not given, breastfeeding was not exclusive, and the mother's education level was low. Outcome: incidence of diarrhea.
- 2) Search for primary study articles from libraries or electronic databases, namely PubMed, Google Scholar, Scimedirect, and Springer link.
- 3) Conduct screening and quality assessment of primary research articles
- 4) Extract and analyze data into RevMan 5.3 software.
- 5) Interpret results and draw conclusions.

3. Inclusion Criteria

This research article is a full-text paper with a cross-sectional study design that analyzes the effect of rotavirus vaccine, exclusive breastfeeding, and mother's education level on the incidence of diarrhea. The influence measure used is the OR. Analysis was performed using multivariate with adjusted odds ratio (aOR) and 95% confidence interval. The research subjects were toddlers.

4. Exclusion Criteria

Articles published other than in English, non-cross-sectional study design, and articles published before 2013.

5. Operational Definition of Variables

Diarrhea: is a change in bowel habits, frequency (bowel movements more than 3 times 1 day) with changes in liquid stools occurring less than 14 days in children.

Rotavirus vaccine: is a biological product which when given to a person will cause active specific immunity against rotavirus attacks that cause diarrhea.

Exclusive breastfeeding: is breast milk that is given to babies from birth for six months, without adding or replacing it with other foods or drinks.

Mother's education level: is the last formal education taken by the mother.

6. Study Instruments

This study adopts the PRISMA flowchart and uses the CEBMa critical assessment cross-sectional study.

7. Data Analysis

Data analysis was performed using RevMan 5.3. Forest plots and funnel plots are used to determine the size of the relationship and the heterogeneity of the data. The fixed effect model is used for homogeneous data, while the random effect model is used for heterogeneous data across studies.

RESULTS

The process of searching for articles is done through several journal databases which include PubMed, Google Scholar, Scimedirect, and Springer link. The article review process can be seen in the PRISMA flow diagram in Figure 1. The research related to the effect of rotavirus vaccine, exclusive breastfeeding, and mother's education level on the incidence of diarrhea in children under five consisted of 24 articles. The initial search process yielded 1,356, after the article deletion process 693 articles were obtained, of which 72 met the requirements for further full-text review, 24 articles that met the quality assessment were included in the quantitative synthesis meta-analysis. It can be seen in Figure 2 that research articles originating from the African continent include (Ethiopia and Rwanda) and Asia only includes (Indonesia).

From Table 2 a summary of primary research on the effect of rotavirus vaccine on the incidence of diarrhea was carried out on 9 articles from Ethiopia and Rwanda. The

largest research population was found in a study conducted by Negesse et al. (2021) with 10,946 children under five, and research with the smallest population, namely research conducted by Nsabimana et al. (2017) as many as 357 children under 5.

A summary of primary research on the effect of exclusive breastfeeding on the incidence of diarrhea, was carried out on 9 articles from Ethiopia, Rwanda, and Indonesia. The largest research population is found in research conducted by Santika et al. (2020), with 5,858 children under five, and

research with the smallest population, namely research conducted by Gizaw et al. (2017) as many as 367 children under five.

A summary of primary research on the effect of maternal education level on the incidence of diarrhea was carried out on 10 articles from Ethiopia and Rwanda. The largest research population was found in the study by Sahiledengle et al. (2021), with 1,975 children under five, and research with the smallest population was conducted by Nsabimana et al. (2017) as many as 359 children under five.

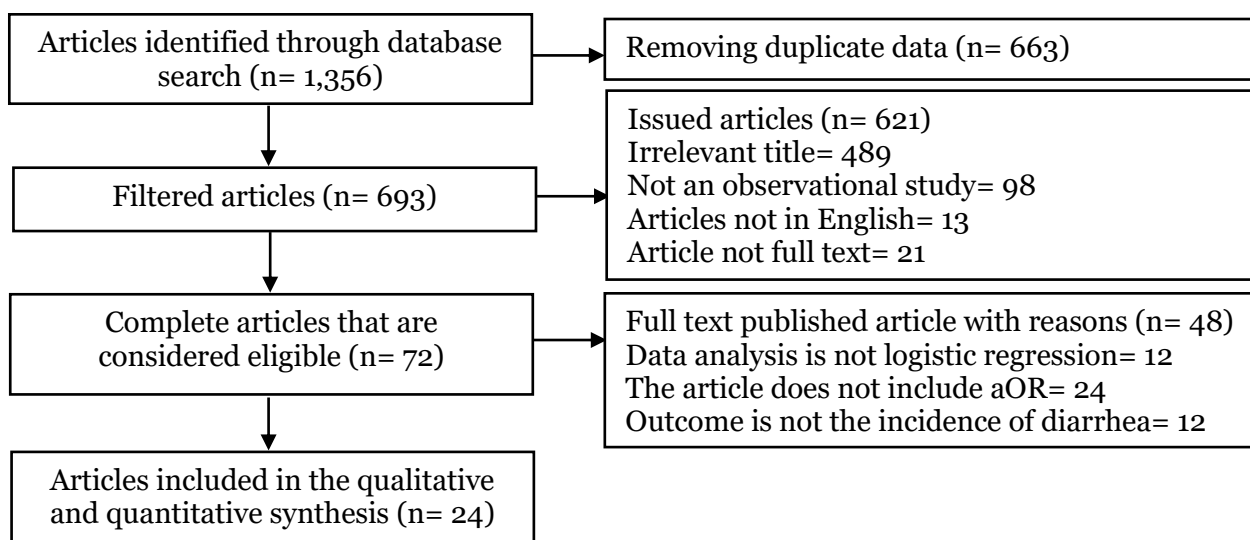


Figure 1. PRISMA Flow Diagram



Figure 2. Map of the research area

Table 1. Critical appraisal checklist for cross-sectional studies in meta-analysis

Primary Study	Criteria of Questions												Total
	1	2	3	4	5	6	7	8	9	10	11	12	
Alemayehu et al. (2019)	2	2	2	2	2	2	2	2	2	2	2	1	23
Alemayehu et al. (2020)	2	2	2	2	2	2	2	2	2	2	2	2	24
Amamo et al. (2020)	2	2	2	2	2	2	2	2	2	2	2	2	24
Ayele et al. (2014)	2	2	2	2	2	2	2	2	2	2	2	2	24
Azage et al. (2016)	2	2	2	1	2	2	2	2	2	2	2	2	23
Bekele et al. (2021)	2	2	2	2	2	2	2	2	2	2	2	2	24
Dagneu et al. (2019)	2	2	2	2	2	2	2	2	2	2	2	2	24
Feleke et al. (2022)	2	2	2	2	2	2	2	2	2	2	2	2	24
Gambura et al. (2016)	2	2	2	2	2	2	2	2	2	2	2	2	24
Gedamu et al. (2017)	2	2	2	2	2	2	2	2	2	2	2	2	24
Getachew et al. (2018)	2	2	2	2	2	2	2	2	2	2	2	2	24
Gizaw et al. (2017)	2	2	2	2	2	2	2	2	2	2	2	2	24
Hashi et al. (2016)	2	2	2	1	2	2	2	2	2	2	2	2	23
Melese et al. (2019)	2	2	2	2	2	2	2	2	2	2	2	2	24
Mengistie et al. (2013)	2	2	2	2	2	2	2	2	2	2	2	2	24
Mohammed et al. (2014)	2	2	2	2	2	2	2	2	2	2	2	2	24
Mulu et al. (2020)	2	2	2	2	2	2	2	2	2	2	2	2	24
Negesse et al. (2021)	2	2	2	1	2	2	1	2	2	2	2	2	22
Nsabimana et al. (2017)	2	2	2	2	2	2	2	2	2	2	2	2	24
Sahiledengle et al (2021)	2	2	2	2	2	2	2	2	1	2	2	2	23
Santika et al. (2020)	2	2	2	2	2	2	2	2	2	2	2	2	24
Shine et al. (2020)	2	2	2	2	2	2	2	2	2	2	2	2	24
Shumetie et al. (2018)	2	2	2	2	2	2	2	2	2	2	2	2	24
Woldu et al. (2016)	2	2	2	2	2	2	2	2	2	2	2	2	24

Description of the question criteria:

- 1 = Does the study address the clinical problem clearly?
- 2 = Is the research method appropriate to answer the research question?
- 3 = Is the method for selecting research subjects clearly described?
- 4 = Does the method of obtaining the sample avoid selection bias?
- 5 = Is the sample representative of the research target population?
- 6 = Was the sample size of the study subjects estimated taking into account the results of preliminary studies on statistical power?
- 7 = Was the minimum response rate achieved?
- 8 = Is the measurement (questionnaire) valid and reliable?
- 9 = Has statistical significance been tested?
- 10 = Did the researcher report the confidence interval?
- 11 = Are there any confounding factors that have not been taken into account?
- 12 = Are the results applicable in practice or in the community?

Description of the answer score:

- 0 = No
- 1 = Hesitant
- 2 = Yes

Table 2. PICO table summary of cross-sectional articles from primary study sources with sample size (n= 35,324)

Author (year)	Country	Sample size	P	I	C	O
Alemayehu et al. (2019)	Ethiopia	826	Age 6-59 months	Rotavirus vaccinated	Not rotavirus vaccinated	Diarrhea incident
Alemayehu et al. (2020)	Ethiopia	722	Under 5 years	Vaccinated	Not vaccinated	Diarrhea incident
Amamo et al. (2020)	Ethiopia	717	Age <5 years	Exclusive breastfeeding, Higher education	No EBF, Illiterate	Diarrhea incident
Ayele et al. (2014)	Ethiopia	634	Age <5 years	Collage and Above	No formal education	Diarrhea incident
Azage et al. (2016)	Ethiopia	2,495	Under 5 years	Rotavirus vaccinated	Not rotavirus vaccinated	Diarrhea incident
Bekele et al. (2021)	Ethiopia	512	Age <5 years	Rotavirus vaccinated	Not rotavirus vaccinated	Diarrhea incident
Dagneu et al. (2019)	Ethiopia	498	Under 5 years	EBF	No EBF	Diarrhea incident
Feleke et al. (2022)	Ethiopia	455	Age <5 years	History of EBF	History of breastfeeding is not exclusive	Diarrhea incident
Gambura et al. (2016)	Ethiopia	634	Age 6-59 months	EBF	No EBF	Diarrhea incident
Gedamu et al. (2017)	Ethiopia	1,007	Under 5 years	Rotavirus vaccinated	Not rotavirus vaccinated	Diarrhea incident
Getachew et al. (2018)	Ethiopia	736	Age <5 years	EBF, Above class 12	No EBF, Unable to read and write	Diarrhea incident
Gizaw et al. (2017)	Ethiopia	367	Age <2 years	Only breastfed for up to 6 months	Not given EBF up to 6 months	Diarrhea incident
Hashi et al. (2016)	Ethiopia	1,807	Age <5 years	Formal education	No formal education	Diarrhea incident
Melese et al. (2019)	Ethiopia	546	Age <5 years	Formal education	No formal education	Diarrhea incident
Mengistie et al. (2013)	Ethiopia	1,446	Age <5 years	Grade 12 and College	No formal education	Diarrhea incident
Mohammed et al. (2014)	Ethiopia	590	Age <5 years	Grade 12 and above	No formal education	Diarrhea incident
Mulu et al. (2020)	Rwanda	530	Age < 5 years	EBF	No EBF	Diarrhea incident
Negesse et al. (2021)	Ethiopia	10,946	Age < 5 years	Rotavirus vaccinated	Not vaccinated	Diarrhea incident
Nsabimana et al. (2017)	Rwanda	359	Age < 5 years	Rotavirus vaccinated, Higher education	Not received rotavirus vaccinated, never school	Diarrhea incident
Sahiledengle et al (2021)	Ethiopia	1,975	Age 6-59 months	Higher education	Never school	Diarrhea incident
Santika et al. (2020)	Indonesia	5,858	Age 0-23 months	EBF	No EBF	Diarrhea incident
Shine et al. (2020)	Ethiopia	420	Age <5 years	Vaccinated	Not vaccinated	Diarrhea incident
Shumetie et al. (2018)	Ethiopia	553	Age <5 years	Rotavirus vaccinated, EBF	Not vaccinated, no EBF	Diarrhea incident
Woldu et al. (2016)	Ethiopia	704	Age <5 years	Formal education	No formal education	Diarrhea incident

The forest plot Figure 3 shows that there is an effect of the rotavirus vaccine on the incidence of diarrhea in children under five and this effect is statistically significant. Children under five who were not given rotavirus vaccine had a risk of diarrhea 3.60 times compared to children under 5 who were given rotavirus vaccine (aOR= 3.60; 95% CI= 2.31 to 5.64; p<0.001). The heterogeneous variations in effect estimates (I²= 88%; p<0.001). Thus the calculation of the average effect estimate is carried out using the random effect model approach.

The funnel plot in Figure 4 shows the asymmetrical distribution of effect estimates. The distribution of effect estimates is more to the right of the estimated average vertical line, thus indicating publication bias. Because the distribution of effect estimates is located to the right of the average vertical line in the funnel plot which is the same as the average effect estimate in the forest plot which is located on the right, the publication bias tends to overestimate the true effect.

Table 3. Adjusted Odds Ratio (aOR) data on the effect of rotavirus vaccine on the incidence of diarrhea (N= 17,840)

Author (Year)	aOR	95%CI	
		Lower Limit	Upper Limit
Alemayehu et al. (2019)	4.27	3.23	5.64
Alemayehu et al. (2020)	2.87	1.86	4.43
Azage et al. (2016)	4.88	3.56	6.69
Bekele et al. (2021)	10.9	2.87	41.40
Gedamu et al. (2017)	1.61	1.14	2.27
Negesse et al. (2021)	1.44	1.12	1.85
Nsabimana et al. (2017)	8.11	1.84	35.74
Shine et al. (2020)	10.3	3.20	33.15
Shumitie et al. (2018)	2.69	1.39	5.21

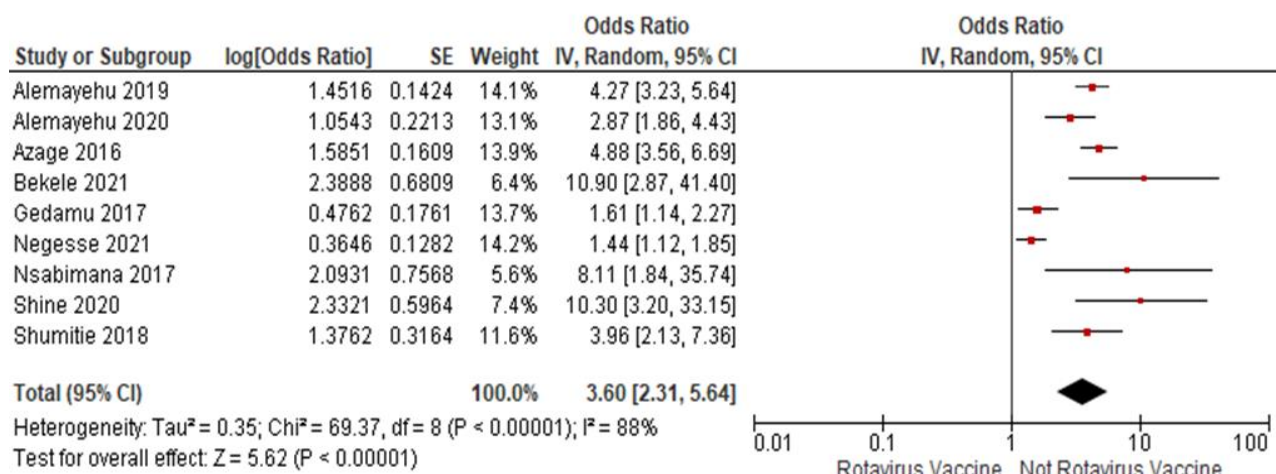


Figure 3. Forest plot of the effect of rotavirus vaccine on the incidence of diarrhea

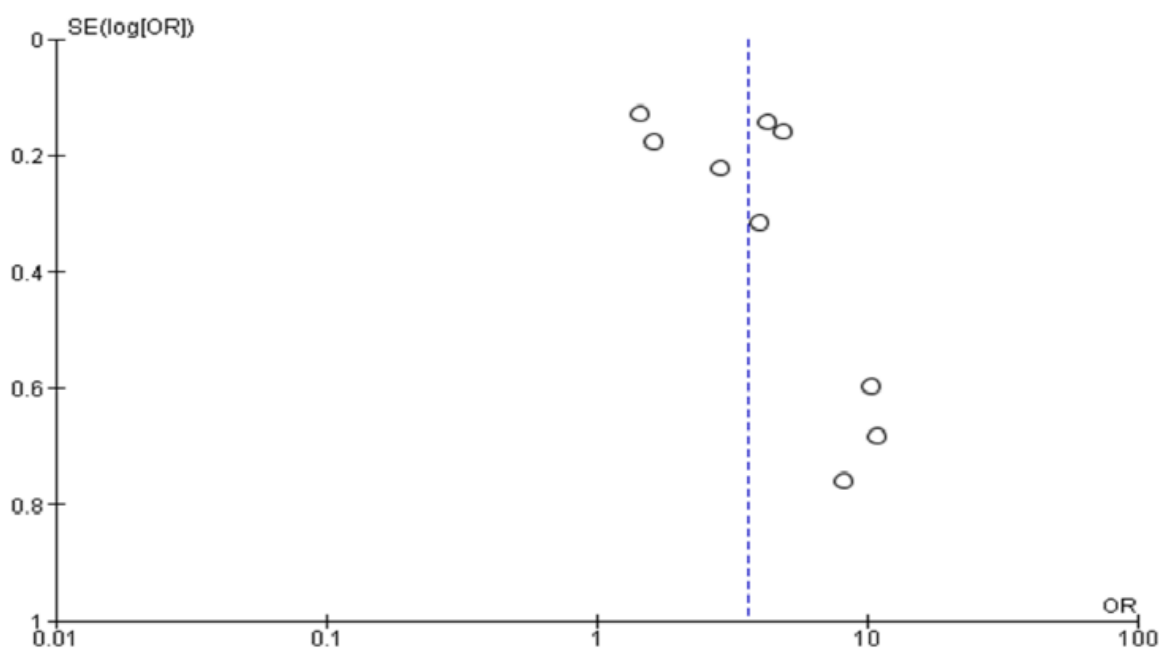


Figure 4. Funnel plot of the effect of rotavirus vaccine on the incidence of diarrhea

Forest plot Figure 5 shows that there is an effect of exclusive breastfeeding on the incidence of diarrhea in children under five and this effect is statistically significant. Children under five who were not exclusively breastfed had a risk of experiencing diarrhea 3.28 times compared to children under five who were exclusively breastfed (aOR= 3.28; 95% CI= 2.24 to 4.80; $p < 0.001$). The forest plot in Figure 5 shows heterogeneous variations in effect estimates ($I^2=64\%$; $p=0.005$). Thus the calculation of the average effect estimate is carried out using the random

effect model approach.

The funnel plot in Figure 6. Shows the asymmetric distribution of effect estimates. The distribution of effect estimates is more to the left of the estimated average vertical line, thus indicating publication bias. Because the distribution of effect estimates lies more to the left of the vertical line of the average estimate in the funnel plot which is the same as the average effect estimate in the forest plot which is located on the left, the publication bias tends to overestimate the true effect.

Table 4. Adjusted Odds Ratio (aOR) data on the effect of exclusive breastfeeding on the incidence of diarrhea (N= 10.348)

Author	aOR	95% CI	
		Upper Limit	Lower Limit
Amamo et al. (2020)	2.45	1.61	3.73
Dagneu et al. (2022)	2.30	1.02	5.17
Feleke et al. (2016)	4.72	1.17	19.13
Gambura et al. (2018)	1.82	0.79	4.21
Getachew et al. (2018)	3.13	1.62	6.03
Gizaw et al. (2017)	19.24	8.26	44.81
Mulu et al. (2020)	2.25	0.66	7.60
Santika et al. (2020)	3.30	2.32	4.69
Shumetie et al. (2020)	2.69	1.39	5.21

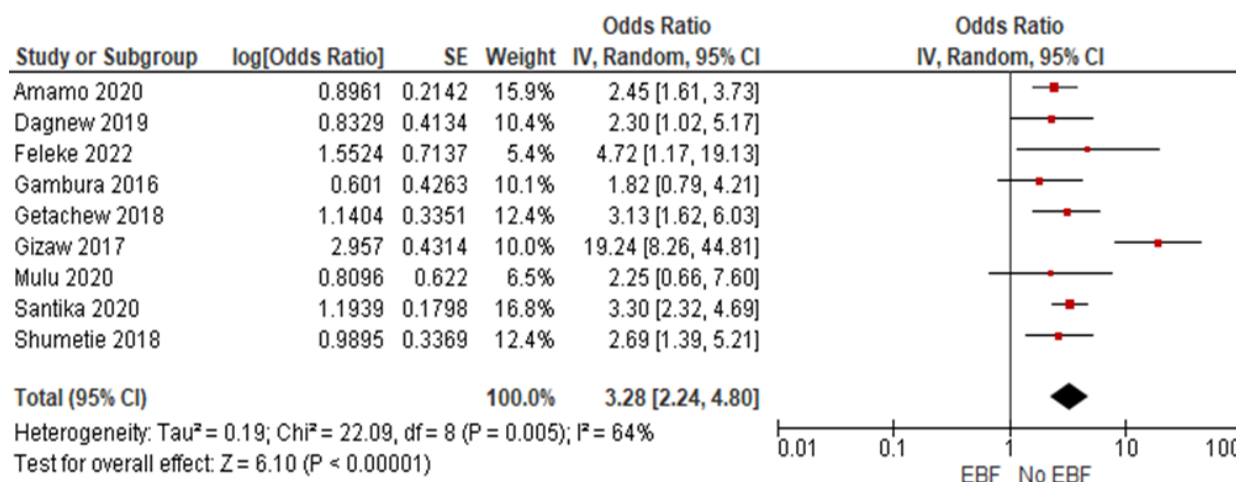


Figure 5. Forest Plot Effect of exclusive breastfeeding on the incidence of diarrhea

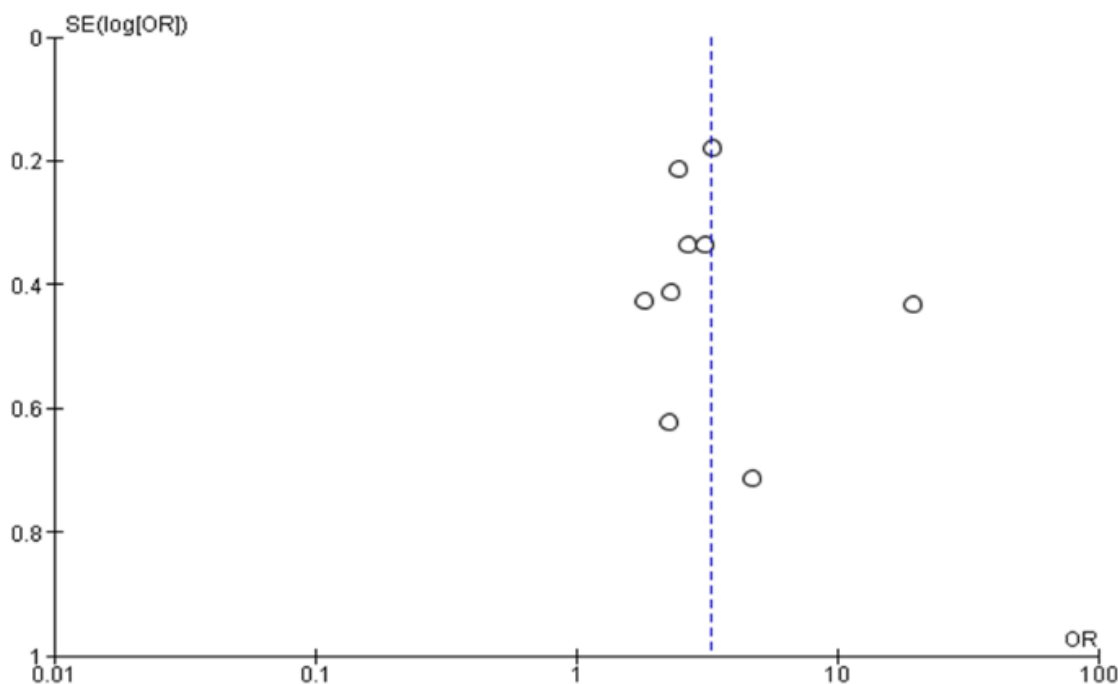


Figure 6. Funnel plot effect of exclusive breastfeeding on the incidence of diarrhea

Forest plot Figure 7 shows that there is an effect of the mother's education level on the incidence of diarrhea in children under five and this effect is statistically significant. Children under five who have mothers with low education levels have a risk of experiencing diarrhea 2.08 times compared to children under five who have mothers with

high levels of education (aOR= 2.08; 95% CI= 1.71 to 2.54; p<0.001). The forest plot in Figure 7 shows a homogeneous variation in effect estimates (I²=35%; p= 0.130). Thus the calculation of the average effect estimate is carried out using the fixed effect model approach.

Table 7. Adjusted Odds Ratio (aOR) data on the effect of the mother's education level on the incidence of diarrhea

Author	aOR	95% CI	
		Upper Limit	Lower Limit
Amamo et al. (2020)	3.05	0.81	11.48
Ayele et al. (2014)	2.49	1.28	4.84
Getachew et al. (2018)	4.37	1.72	11.09
Hashi et al. (2016)	3.02	1.56	5.85
Melese et al. (2019)	3.97	1.60	9.85
Mengistie et al. (2013)	1.23	0.79	1.92
Mohammed et al. (2014)	1.89	1.35	2.65
Nsabimana et al. (2017)	3.76	1.26	11.22
Sahiledengle et al (2021).	1.50	0.60	3.75
Woldu et al. (2016)	2.50	1.20	5.21

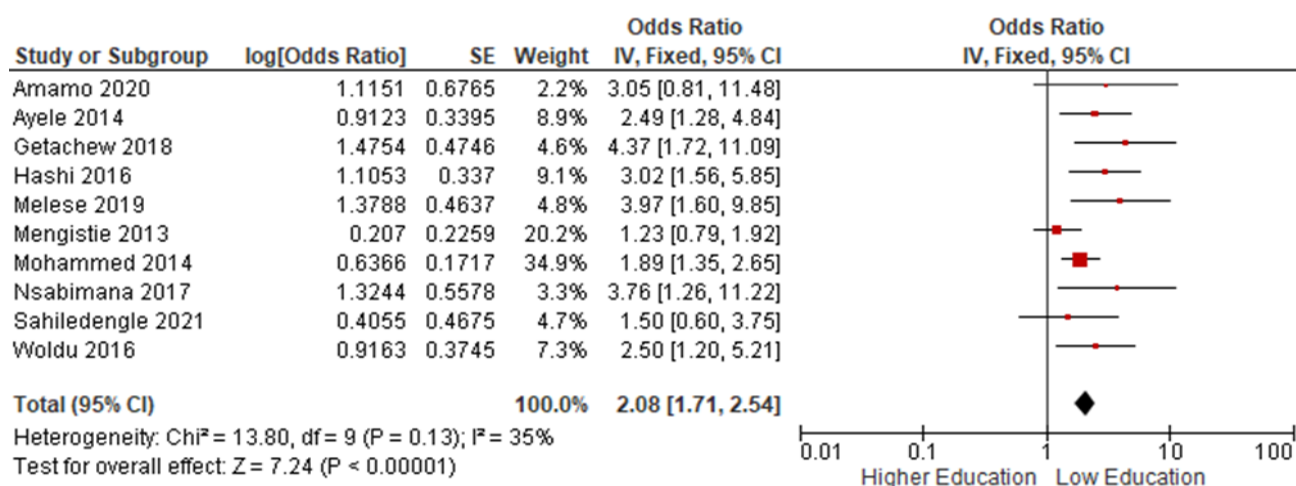


Figure 7. Forest Plot Effect of mother's education level on the incidence of diarrhea

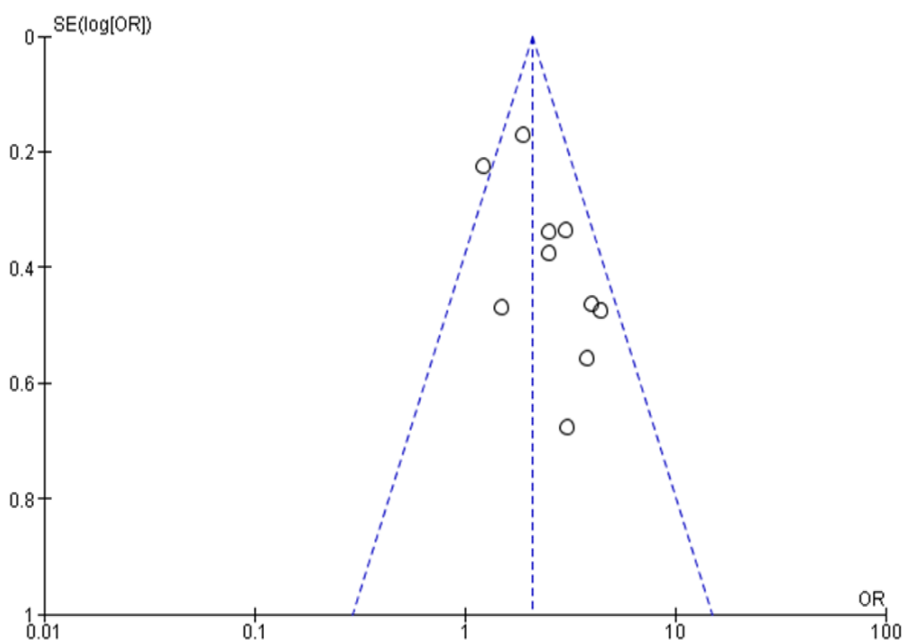


Figure 8. Funnel Plot Effect of mother's education level on the incidence of diarrhea

Diarrhea is a disease characterized by changes in the shape and consistency of loose stools until they are liquefied and an increase in the frequency of bowel movements more than 3 or more times a day. Diarrhea is the second most common cause of death in children under the age of five after pneumonia. There are 1.7 billion cases of diarrhea globally and cause around 525,000 under-five deaths each year (WHO, 2017).

Diarrhea is classified into 4, namely: acute diarrhea that lasts less than 14 days (generally less than 7 days), dysentery accompanied by blood in the stool, persistent is diarrhea that lasts more than 14 days continuously, and diarrhea with other problems, namely suffering from diarrhea, accompanied by other diseases, nutritional disorders or other diseases (WHO, 2017).

This systematic study and meta-analysis research raised the theme of the effect of exposure to Rotavir vaccine, exclusive breastfeeding, and the level of education of the mother on the incidence of diarrhea in children under five. The dependent variable analyzed was the incidence of diarrhea. The independent variables analyzed were Rotavirus vaccine administration, exclusive breastfeeding, and mother's education level.

1. The Effect of Rotavirus Vaccine on Diarrhea

A total of 9 observational research articles with a cross-sectional study design as a source of meta-analysis of the effect of Rotavirus vaccine on the incidence of diarrhea. This study showed the results of the analysis that children under five who did not receive rotavirus vaccine had a risk of experiencing diarrhea 3.60 times compared to children under five who were given rotavirus vaccine, and these results were statistically significant (aOR= 3.60; 95% CI= 2.31 to 5.64; $p < 0.001$). The heterogeneity of the research data shows $I^2 = 88\%$ so that the spread of

the data is stated to be heterogeneous (random effect model).

According to research by Gedamu et al. (2017) children under five who were not given the Rotavirus vaccine were at greater risk of contracting and spreading diarrhea than children who were vaccinated. There is a significant relationship between Rotavirus vaccine administration and the risk of diarrheal disease.

This is supported by research by Negesse et al. (2021) infants who were not given the rotavirus vaccine increased the risk of diarrhea by 44% which was observed in children who had had diarrhea. The results of this study are in line with research conducted by Azage et al. (2014) stated that children who were not vaccinated with Rotavirus had an increased incidence of diarrhea (aOR= 4.88; 95%= CI 3.56 to 6.69; $p < 0.001$).

2. The effect of exclusive breastfeeding on the incidence of diarrhea

A total of 9 observational research articles with a cross-sectional study design as a source of meta-analysis of the effect of exclusive breastfeeding on the incidence of diarrhea. This study showed that children under five who were not exclusively breastfed had a risk of experiencing diarrhea 3.28 times compared to children under five who were exclusively breastfed, and these results were statistically significant (aOR= 3.28; 95% CI= 2.24 to 4.80; $p < 0.001$). The heterogeneity of the research data shows $I^2 = 64\%$ so that the spread of the data is stated to be heterogeneous (random effect model).

According to Mulu et al. (2020) explained that children who are not exclusively breastfed until the age of 6 months of life had a greater risk of developing diarrhea than children who are exclusively breastfed. There is a significant relationship between exclusive breastfeeding and the incidence of diarrhea in children.

The results of this study are in line with Dagnew et al. (2019) which stated that children who were not exclusively breastfed increased the incidence of diarrhea (aOR= 2.30; 95% CI 1.02 to 5.17; $p < 0.001$). Children who are not exclusively breastfed because they are given additional food before the age of 6 months are at risk of developing diarrhea 2.45 times greater than children who are exclusively breastfed (Amamo et al., 2020).

3. The effect of mother's education level on the incidence of diarrhea

A total of 10 observational research articles with a cross-sectional study design as a source of meta-analysis of the effect of maternal education level on the incidence of diarrhea. This study shows that children under five who have mothers with low education levels have 2.08 times the risk of experiencing diarrhea compared to children under five who have mothers with high levels of education, and these results are statistically significant (aOR= 2.08; 95% CI= 1.71 to 2.54; $p < 0.001$). The heterogeneity of the research data shows $I^2 = 35\%$ so that the distribution of the data is declared homogeneous (fixed effect model).

Hashi et al. (2016) found that toddlers whose mothers had a low education level had a greater risk of developing diarrhea than toddlers whose mothers had a high education level.

The results of this study are in line with the research of Getachew et al. (2018) that children with mothers with low levels of education are likely to increase the incidence of diarrhea (aOR = 1.50; 95% CI= 0.60 to 3.75; $p < 0.001$). The lower the mother's education level, the greater the likelihood of developing diarrhea, namely 3.97 times (Melese et al., 2019).

Not being given the rotavirus vaccine, not being given exclusive breastfeeding, and the mother's low education level are at risk

of increasing the incidence of diarrhea in toddlers.

AUTHOR CONTRIBUTION

Genn Andrian Pratama as a researcher who selects topics, searches for and collects research data. Bhisma Murti and Setyo Sri Rahardjo analyzed the data and reviewed research documents.

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CONFLICT OF INTEREST

There is no conflict of interest.

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