

FACTORS ASSOCIATED TO EARLY INTRODUCTION OF COMPLEMENTARY FEEDING : META ANALYSIS STUDY IN INDONESIA

Azrimaidaliza¹, Helmizar², Chica Nahdatul Huda³

Nutrition Department, Public Health Faculty, Andalas University, Padang City, Indonesia
email: azrimaidaliza@ph.unand.ac.id.

Abstract

More than 40% of mothers in the world, including Indonesia, have given food other than breast milk when the baby is less than six months old. Various factors can lead to early complementary feeding in Indonesia. The novelty of this research is because it examines about factors associated with early complementary feeding in Indonesia. This study aimed to determine the factors associated with early complementary feeding in Indonesia. This study used a quantitative design and meta-analytical analysis technique. Articles were included in this study, which were searched using Google Scholar, Garuda Portal, and ISJD databases. A total of 1,157 identification articles, with keywords ((early complementary feeding, complementary feeding administration in infants aged 0-6 months, early breastfeeding or prelacteal feeding) and (factors or factors related to, risk factors, knowledge) mother or education level, family support, support health workers, promotion of complementary feeding products, baby porridge, baby biscuits, formula or culture) and (cross sectional or case control) and (region in Indonesia)). The search was performed using the Indonesian language. Fifteen articles were systematically reviewed and included in this meta-analysis. There is no significant relationship between maternal education level, family support, support from health workers and culture with early complementary feeding in Indonesia. Mothers' low knowledge of exclusive breastfeeding and complementary feeding is one of the factors contributing to early complementary feeding in Indonesia. Conclusion is Mother which low knowledge is at risk 2.63 times to have early introduction of complementary feeding for baby (95% CI; 1.14-6.09).

Keywords: Early Complementary Feeding, Factors, Meta-Analysis.

INTRODUCTION

Breast milk is the most complete source of nutrients for babies because it contains essential fats, carbohydrates, proteins, and immunological factors that babies need to grow and avoid infection in the first year of life (1)(2). Optimal breastfeeding is so important that it can save the lives of more than 820,000 children under the age of 5 each year (3).

The global coverage of exclusive breastfeeding globally in 2014-2019 was only 44%, whereas the World Health Organization (WHO) set a target for an increase in exclusive breastfeeding with a minimum target of 50% (4). This indicates that there is a global lack of exclusive breastfeeding practices. In Indonesia, the proportion of exclusive breastfeeding was only 38% in year 2013 (5). Then, the

proportion of exclusive breastfeeding patterns among infants aged 0-5 months was 37.3% in year 2018 (6). The percentage of exclusive breastfeeding infants 2018 by 0.7% between 2013 and 2018. Based on the above data, it can be seen that the government has not achieved its target of exclusive breastfeeding in Indonesia.

The government's next target of infants less than 6 months old is to get exclusive breast milk for 2020-2024 at 60% (7). Recommendations from WHO and UNICEF (2002) in Santi (2017) made for increased exclusive breast milk coverage include exclusively giving colostrum to infants and avoiding other foods or drinks or early complementary feeding in the early days of infants (8).

Early complementary feeding administration is the feeding or drinking of infants other than breast milk when the baby is less than 6 months of age (9). Early complementary feeding administration is still often found in communities both in developed and developing countries, based on previous research that found that 44% of infants have received solid food at less than 4 months of age (1)(3). Li Tang's longitudinal study in China found that age of

starting complementary feeding was 4.5 month postpartum (10). In Indonesia, the WHO stated that more than 40% of babies in 2020 have introduced breast milk companion food too early before the baby is six months old. A previous cross-sectional study by Hasan Basri and Veni Hadju (2019) reported that the frequency of non-breastfeeding mothers was 38.1% and babies who received complementary food earlier were 43.5% in East Luwu district, Indonesia (11).

Early complementary feeding administration is a risk to the health of infants; babies who receive complementary breast milk before the age of six months are at risk 17 times. They are three times more likely to develop upper respiratory tract infections than infants who receive exclusive breast milk and complementary feeding on time (4). Another finding identified that early complementary food intake at age 0–1 month was associated with a higher risk of wasting and underweight at a later age (12). This is related to a low meal frequency and low dietary diversity (13). Long-term impacts, such as increased risk of developing degenerative diseases in the future. This is in line with research conducted by Horta et al. (2007), who found a greater chance of

someone suffering from hypertension, obesity, high cholesterol, type II diabetes, and a lack of intelligence later in life in babies who were not exclusively breastfed (5).

Many factors can underlie the practice of providing early complementary feeding. A study in two European countries found that lower maternal age, education level, preterm birth, never breastfeeding, and receiving infant formula after hospital discharge were related to earlier introduction of complementary feeding, and infants who had been introduced to infant formula regularly before 6 months of postnatal age were at a higher risk of receiving complementary foods prematurely (10)(14). Another study in Eastern Ethiopia in 2014 found that lack of knowledge and perceived inadequate breast milk production by mothers were reasons for the early initiation of complementary feeding (15). Observational research on factors related to early complementary feeding administration has been widely conducted in Indonesia, but with different results or inconsistencies in the results of the study with the same variables and topics. For this reason, researchers interested to conduct an analysis

of existing studies using meta-analysis studies with the topic "Factors Related to Early complementary feeding in Indonesia".

RESEARCH METHOD

The study was quantitative and used a meta-analysis study approach. A meta-analysis is a method of combining multiple study results to obtain one result, and the conclusions are stronger. The dependent variable in this study was early complementary feeding giving, while the independent variables were maternal knowledge, education level, family support, health worker support, promotion of complementary feeding products, and culture.

Sample from this study of research articles on factors related to early complementary feeding provision in Indonesia Scientific Journal Database (ISJD), Garuda and Google scholar with Sample from this study of research articles on factors related to early complementary feeding provision in Indonesia Scientific Journal Database (ISJD), Garuda and Google scholar with limitations from 2010 to 2020, with keywords used ((Early complementary feeding or complementary feeding administration in infants aged 0-6 months

OR Early breastfeeding or prelacteal feeding) AND (or factors or factors related to OR risk factors OR knowledge) mother OR education level OR family support OR support health workers OR promotion of complementary feeding products OR baby porridge OR baby biscuits OR formula or culture) AND (cross sectional OR case control) AND (region in Indonesia)). The search was performed using the Indonesian language.

Before the study was conducted, the study protocol was reviewed and approved by the Nutrition Program Study of the Public Health Faculty of Andalas University.

Data analysis in this study was performed using Review Manager 5.3 (RevMan 5.3). In this meta-analysis, statistical techniques were used that were divided into two groups, namely the fixed effects model and random effects model, to obtain a pooled odds ratio estimate.

RESULTS AND DISCUSSION

1,157 articles were identified from database Indonesia Scientific Journal Database (ISJD), Garuda and Google

scholar. After identifying 1,157 articles, a review of their titles was conducted. Articles that have relevant potential were conducted abstract reviews. A total of 956 articles were excluded based on title review. Thus, the result of the reviewed abstracts was 201 articles. Articles that had the potential for the next relevant were reviewed in the form of full text. Irrelevant articles were excluded from analysis. A total of 63 articles were excluded; therefore, only 138 articles were reviewed in the full-text form.

The next stage of 138 articles were reviewed in full text form, as many as 15 articles were included in a systematic review and 123 articles will be excluded, of 123 articles including: 55 articles not in journal form such as thesis, scientific papers and Proceedings, 14 duplication articles, 5 articles are inaccessible, 21 articles have variables with operational definitions and cut-off points that are different from those that have been set, 6 articles do not display complete data, 22 articles are not indexed Science and Technology Index or SINTA (Table 1).

Table 1. Overview Research

No.	Name of Research	Year	Location	Total of subject	Total of case	Risk Factor	Risk factor Definition	PR/OR/p-value	Comments
1.	Oktova	2017	Pekanbaru, Riau	92 Person	64 Person	Education	High Low	0.833 (0.308 –2.257) (p-value =0.027)	- The study subjects were mothers who had babies aged 0-6 months in the period January-December 2015 - Adjusted variables: the work and income of the parents. - Articles included in meta-analysis.
						Knowledge	Good Less good	0.229 (0.062 – 0.844) p-value = 0.019	
2.	Heryanto	2017	Lahat District, South Sumatera	51 Person	23 Person	Support of family	Support Not support	p-value = 0.000	- Study subjects of all mothers who had babies aged 7-12 months - Adjusted variables: maternal work and adequacy of breast milk. - The result is in the form of OR calculated from existing data - Articles included in meta-analysis.
						Knowledge of mother	Good Less good	p-value = 0.017	
3.	Helmi et al	2011	Tanggamus District, Lampung	100 Person	33 Person	Education of mother	≤ Junior high school > Junior high school	p-value = 0.013	- The study population was all mothers who had babies (age ≥ 6 months) in the period in September 2011 in Sumberejo District of Tanggamus Regency. - Adjusted variables: socio-cultural, health worker role and attitude - Article included meta-analysis
						Knowledge of nutrition	Good Less good	p-value = 0.00	
						Support of family	Good Less	p-value = 0.00	
4.	Ekasari	2017	ProbolinggoDi	40	26	Support of	Support	p-value = 0.002	- The study subjects were all mothers who had babies less than 6 months

No.	Name of Research	Year	Location	Total of subject	Total of case	Risk Factor	Risk factor Definition	PR/OR/p-value	Comments
			strict, East Java	Person	Person	family	Not support		old, which is as much as 40. - The result is in the form of OR calculated from existing data - Article included in meta-analysis
5.	Maulidanita	2019	Medan, North Sumatera	34 Person	21 Person	Support Family education	Support Not support Good Enough less	p-value = 0.011 p-value = 0.033	- The subjects of the study were all mothers who had babies less than 6 months old - The result is in the form of OR calculated from existing data - Article included in meta-analysis - The subjects in this study were all mothers who were pregnant at BPM Romauli Silalahi -Adjusted variables : Mother's attitude and work - The result is in the form of OR calculated from existing data - Articles are included in meta-analysis except knowledge variables because they have different cut-off points.
6.	Wulandari et al	2016	Grobogan District, Central Java	78 Person	47 Person	Knowledge of mother Education of mother	Good Enough less ≤ Junior high school > Junior high school	p-value = 0.020 p-value = 0.002	- The subject of this study was a mother who had a baby aged 0-6 months in Boloh Village of Toroh District of Grobogan Regency - Adjusted variables: maternal age, employment status, maternal experience, socio-cultural and information. - The result is in the form of OR calculated from existing data

No.	Name of Research	Year	Location	Total of subject	Total of case	Risk Factor	Risk factor Definition	PR/OR/p-value	Comments
7.	Juliarti et al	2016	Pekanbaru, Riau	67 Person	41 Person	Knowledge	Good Less good	5.235 (1.777 – 15.42), p- value =0.004	<ul style="list-style-type: none"> - The article is included in the meta-analysis except the knowledge variable because it has a different cut-off points than desired. - The study subjects of this study population were all mothers who had babies aged < 6 months in the Work Area of Garuda Health Center in 2016. - Adjusted variable: Trust
						Health care support	Support Not support	0.444 (0.163-1.215), p-value = 0.181	
8.	Yuliani	2019	Bogor, West Java	95 Person	19 Person	Knowledge	Good Less good	10.5 p-value = 0.000	<ul style="list-style-type: none"> - The subjects of this study were all mothers who had babies 0-6 months as many as 95 people. - Adjusted variables = age, occupation and parity - Articles included in meta-analysis
						Education	High Low	3.714 p-value = 0.023	
9.	Usmiyati et al	2015	Tegal city, Central Java	57 Person	49 Person	Education	High Moderate low	p-value = 1	<ul style="list-style-type: none"> - The subjects of this study were mothers who had infants aged 0-6 months who came to Margadana Health Center in 2014 - Adjusted variables are age, work, family influence and parity. - The result is in the form of OR calculated from existing data - Articles are included in meta-analyses except educational variables
						Education	Good Less good	p-value = 0.698	
						Cultural role	Yes No	p-value = 0.05	

No.	Name of Research	Year	Location	Total of subject	Total of case	Risk Factor	Risk factor Definition	PR/OR/p-value	Comments
10.	Hurek et al	2020	Kupang city, East Nusa Tenggara	135 Person	70 Person	Education of mother	High Low	2.149 (1.078-4.285), p-value = 0.038	because they have different cut-off points - The subjects of this study were mothers who had babies aged 0-6 months in Oesapa Health Center in Kupang City.
						Knowledge of mother	Good Less good	4.066 (1.962-8.424), p-value = 0.000	- Adjusted variable: family income - Article included in meta-analysis
11.	Zuiatna et al	2018	Tanjung Balai city, North Sumatera	79 Person	60 Person	Support of family	Support Not Support	5.747 (1.338-24.679) p-value = 0.001	- The subject of this study was a mother who had a baby aged over 6-12 months in the Work Area of Sipori-Pori Health Center, Tanjung Balai City. - Adjusted variables: socio-cultural and health care workers - Articles included in meta-analysis
12.	Herlina dkk (Herlina & Siagian, 2018)	2018	Pekanbaru, Riau	135 Person	79 Person	Education of mother	Good Less good	10.599 (4.656-24.127) p-value = 0.0011	- The subject of the study was a mother who had a baby of 0-6 months in the working area of Tampan subdistrict. - Entered into meta-analysis
13.	Rohmin dkk	2015	Palembang, South Sumatera	100 Person	27 Person	Mother's knowledge	Good Less good	3.405 p-value = 0.015	- The subjects of the study were mothers who gave birth in Bukit Kecil District, Palembang City.
						Support out	Yes No	5.910 p-value = 0.001	- Family support variables have different operational defects - Adjusted variables: maternal age, attitude, income, early initiation breastfeeding and ANC frequency.
						Health care	Yes	p-value =	- Articles included in meta-analysis

No.	Name of Research	Year	Location	Total of subject	Total of case	Risk Factor	Risk factor Definition	PR/OR/p-value	Comments
14.	Sari	2019	East Jakarta, Jakarta	95 Person	43 Person	support	No	0.229	- The study subjects were nursing mothers - Adjusted variables = age, occupation, economic status, frequency of visits antenatal care, parity and socio-cultural. - Articles enter meta-analyses except for family support and education variables because they have different operational definitions and cut-off points.
						Tradition	Yes	11.667	
						Mother's knowledge	No	p-value = 0.000	
							Good	3.3 (1.3- 8.6) p-value = 0.019	
15.	Triatmaja	2015	Bogor, East Java	82 Person	28 Person	Education	College and middle Primary education and not school	1.8 (0.8-3.9) p-value = 0.24	- The study subjects were mothers who had babies aged 7-12 months. - Adjusted variables: parity, age, occupation, socioeconomic level, early initiation breastfeeding application, breastfeeding issues and health care advice. - Article included in meta-analysis
						Family support	Positive	1.1 (0.5-2.6)	
						Education	Negative	P-value = 0.952	
							Low	1.238 (0.049-4.352)	
					High		p-value = 0.649		

The results of the analysis using RevMan showed mothers' knowledge, level of education, family support, health care support, and culture. Based on Table 2, it

can be seen that the result of the analysis with random effects models results in a pooled odds ratio.

Table 1. Comparison of Pooled Odds Ratio Estimate between Fixed Effect Model and Random Effect Model

No	Research Variables	N	Fixed Effect Model		P-Heterogeneity	Random Effect Model	
			OR	95% CI		OR	95% CI
1.	Mother's knowledge	10	2.77	2.07-3.07	<0.00001	2.63	1.14-6.09
2.	Level of education	6	1.96	1.36-2.81	0.005	1.97	0.95-4.08
3.	Family support	5	1.13	0.73-1.76	<0.00001	0.56	0.05-6.30
4.	Health care support	2	1.05	0.55-2.02	0.05	1.12	0.29-4.23
5.	Culture	2	4.55	1.54-13.44	0.05	4.16	0.49-35.19

The relationship of maternal knowledge with early complementary feeding administration is analyzed using a random effect model of pooled odds ratio of 2.63 (95% CI 1.14-6.09) from these results it can be concluded that mothers who have low knowledge / less have a risk of giving early complementary feeding of 2.63 times greater than mothers who have high knowledge good. The results of the analysis showed a significant relationship between maternal knowledge factors and early complementary feeding administration, as evidenced by the value ($p < 0.05$) of mothers who have good knowledge, especially about how to feed the baby well and correctly,

namely, by giving exclusive breast milk from birth to 6 months of age and starting to provide complementary feeding after the baby is 6 months old tend not to provide early complementary feeding. This finding is consistent with Agumasie Semahegn study (2014) and Malgorzata Kostecka study (2021) (15)(16). Moreover, Malgorzata Kostecka found that mothers with good nutritional knowledge scores were more likely to adapt food consistency to the skills manifested by the child and were less likely to delay the introduction of new foods that required chewing and biting.

The relationship of education level with early complementary feeding administration

can be seen that with random effect model analysis resulted in a pooled odds ratio of 1.97 (95% CI 0.95-4.08) of these results it can be concluded that there is no relationship between education level factors and early complementary feeding provision evidenced by the value ($p > 0.05$) which is $p = 0.07$.

The analysis conducted on the relationship between education level and early complementary feeding administration using a random effects model showed an insignificant relationship between education level and early complementary feeding administration. In the results of this study there was no significant association between the level of education and the provision of early complementary feeding. This finding is not in line with Lu Wang study (2019) and Monika study (2019) which found that lower maternal education was independently associated with both early introduction of complementary feeding (14)(17). Owen Nkoka (2018) from analysis of the Demographic and Health Survey 2015 - 2016 found that mothers with secondary or post-secondary were significantly more likely to have timely introduction to solid or semi-solid food to their children in Malawi

(18). Education is one of the efforts needed to get information. With the existence of education, one can easily obtain information and cause an increase in one's knowledge. The reason why this factor was not related to early complementary feeding in this study might be another factor, such as knowledge regarding complementary feeding being more influential than educational level. Mothers with good knowledge might have more information about the time of introducing complementary feeding and the disadvantages too early to introduce complementary feeding to a baby. This Knowledge could get from many sources, such as relatives or family, health professional and mass media.

A total of 5 research articles were combined in analyzing family support relationships with early complementary feeding administration. that by random effect analysis the model produces a pooled odds ratio of 0.56 (95% CI 0.05-6.30). The results of the analysis showed no association between family support and early complementary feeding administration evidenced by a p value in the test for overall effect greater than 0.05 ($p > 0.05$) which is $p = 0.64$. The analysis of family support

relationships with early complementary feeding administration using the Random Effect Model analysis model showed no association between family support and early complementary feeding administration. The results of the analysis on this study are different from the studies. Others such as research by Batubara NA, 2016 that mentions there is a relationship between family support and early complementary feeding administration. Family support is the actions, attitudes and acceptance of the family towards family members who are supportive always ready to provide the necessary help and assistance. Forms of family support are informational support, instrumental support, assessment support and emotional support (8)(19).

In the relationship of health worker support with early complementary feeding administration using random effect model analysis resulted in a pooled odds ratio of 1.12 (95% CI 0.29-4.23). The results of the analysis showed no association between the support of health workers and the provision of early complementary feeding evidenced by a value of p on the test for overall effect greater than 0.05 ($p > 0.05$) which is $p = 0.87$. Analysis of health care support early

complementary feeding administration using Random Effect Model analysis showed an insignificant relationship. In research the relationship of health worker support with the provision of early complementary feeding the relationship between health workers and early complementary feeding administration. In theory, health workers can have an influence on health actions including in terms of preventing early delivery of complementary feeding to the baby by the mother through supporting of the health care. Exclusive breastfeeding to infants after the law. But the influence depends on how persuasive communication is given by the health worker to the mother consisting of attention, understanding, memory of the recipient and changes in behavior. So it takes a good interaction between the mother and the officer (9).

A total of two (2) research articles were combined in analyzing cultural relationships with early complementary feeding giving. Data analysis results using the random effect model showed that there was no significant relationship between culture and early complementary feeding giving with a test overall effect ($p > 0.05$) of 0.19. The analysis of the relationship of cultural influences

with early complementary feeding administration using the Random Effect Model showed an insignificant relationship between cultural influences and early complementary feeding administration. Unlike other research who found that there is a cultural relationship with the provision of early complementary feeding as in Javanese, Sundanese and Betawi customs (3).

From table 2 above, it can be seen that there is a difference in the value of pooled odds ratio in the analysis using the fixed effect model test and random effect model. On the relationship of education level with early complementary feeding and health care support with the provision of early complementary feeding there is an increase in the value of OR in the pooled odd ratio from the fixed effect test model to the random effect model. In addition, it can be seen that there is a widening of the value of confident intervals. In the relationship of maternal knowledge with early complementary feeding giving, family support with early complementary feeding and culture with early complementary feeding provision can be seen a decrease in the value of OR in the pooled odd ratio from

the fixed effect model test to the random effect model. In addition, it can be seen that there is a widening of the value of confident intervals.

In the table above it can be concluded that the results of studies on the relationship of all variables with early complementary feeding administration are heterogeneous and have significant variations between studies. Heterogeneity assessment is needed to determine the test to be applied to obtain the value of P value and pooled odds ratio value in the results of the study. Heterogeneous data is also interpreted that in each research article analyzed has different results so that the difference shows that the same research can be different when done on different populations, times, places or condition.

CONCLUSION AND RECOMMENDATION

Obtained as many as 15 research articles that can be included in a systematic study using cross sectional study design. All 15 articles were included in a meta-analysis with variables in maternal knowledge, education level, family support, health care and cultural support. There is a significant relationship between maternal knowledge

and early complementary feeding giving and there is no relationship between the level of education, family support, health care support, and culture with early complementary feeding. For the health service and related agencies, it is expected that the results of this study can be used as one of the considerations and information used to continue to increase maternal knowledge about the provision of complementary feeding and the importance of providing exclusive breast milk to babies by doing counseling or counseling starting from pregnant women, postpartum to breastfeeding mothers and accompanied by family members by further optimizing the baby implementation of programs and policies regarding breast milk that have been made by the government.

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