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Modelling for The Risk Factors Early Introduction to Complementary Food for A Baby Under Six Months Old in the Working Area of Kambaniru Public Health Center in East Sumba Districts

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ABSTRACT

Complementary foods are foods/drinks that were given to complement breastfeeding in order to fulfil the nutritional of baby from 6-24 months old. However, have been given to several babies under six months which may increase the mortality risk. Early introduction of complementary foods to the baby are influenced by factors education, occupation, income, tradition, myths, familial support, and knowledge. This study aims to analyze the factors that resulted in the early introduction to complementary foods in the working area of Kambaniru Public Health Center. This was an observational analytic study with cross sectional design. The samples were 89 mothers. Partial correlation between the risk factor was analyzed using the simple logistic regression test, while the modelling for the risk factors was analyzed using the multiple logistic regression test. The result showed that there were 51.7% of the mothers that gave an early complementary foods to the babies, there was a correlation between knowledge ($p=0.000$), income ($p=0.026$), myths ($p=0.016$) and familial support ($p=0.000$), while education ($p=0.089$), occupation ($p=0.0307$) and tradition ($p=0.374$) did not correlate. The conclusion of this study was that familial support and knowledge factors were the models to predict the early introduction to complementary food with 44.2% contributing factors.

Keywords: complementary foods; familial support; knowledge; myths; tradition

INTRODUCTION

Background

The infant mortality rate in Indonesia was still high. This was used as one of the indicators that showed the low degree of health in Indonesia. The infant mortality rate was declining; however, the declining rate tends to get slower and was still under the target set by the government^{(1),(2)}. Infant mortality rate in 2017 was 24 per 1000 live births⁽³⁾. One of the contributing factors for high infant mortality rate (IMR) is the introduction to complementary foods to the babies under 6 months old in which the mothers was the main contributing factors for the early introduction to complementary food⁽⁴⁾. World Health Organization stated that 40% of babies in the world was given an exclusive breast feeding while the other 60% was given a complementary food before they were 6 months old⁽⁵⁾.

The scope of the early introduction to complementary food tends to increase in the following years. In 2016, 36% of the babies was given an exclusive breast feeding and 64% of the babies was given early introduction to complementary food before 6 months old⁽⁶⁾. Similar condition was found in Indonesia. The result of⁽⁷⁾ found that percentage of the babies under 6 months which had been given an early introduction to complementary food was 69.8% from the total number of babies in Indonesia, and slightly decreased to 62.7%

in 2017⁽³⁾. This showed that the practice of giving an exclusive breast feeding for babies under 6 months old was still low while the practice of giving an early introduction to complementary food was still high.

The high rate of early introduction to complementary food was spreading in several districts/cities in Indonesia. East Sumba as one of the districts in East Nusa Tenggara, has a high 86.5% of early introduction to complementary food practice for babies under 6 months old. The habit of introducing the complementary food early in East Sumba was not only found in the mothers that live in the rural area but also in the mothers in the urban areas. In Waingapu city, the scope of early introduction to complementary food was still high in the working areas of three Public Health Center, including the working area of Kambaniru Public Health Center. It was recorded in 2019, that the coverage of early introduction to complementary food in this working area was 59.4%.

Early introduction to complementary food may resulted in a negative impact to the infant health which may include a respiratory system or digestive system abnormalities. The incidence of digestive or respiratory system infection due to the early introduction to complementary food is one of the major contributing factors for high infant mortality rate in Indonesia^{(8), (9)} explained that the main factor that inhibit exclusive breast feeding is the insufficient knowledge of the mother in prior to exclusive breast feeding and complementary foods.⁽¹⁰⁾ also explained that the risk factor that affect the incidence of early introduction to complementary food is familial socio-economic factors (48.3%), education (21.8%), and parity (12.9%). Insufficient familial support and increasing advertisement in the television and other electronic media in prior to formulated milk also affect the declining of the practice of exclusive breast feeding. Also, cultural factors from generation to generation, and myths, also affect the perception and the attitude of the mother in giving their baby a formulated milk without medical indication⁽⁴⁾. However, the interaction between these risk factors needs to be further evaluated in the mother that lives in different regional and cultural characteristics, including in East Sumba.

A study conducted by⁽¹¹⁾ only showed the modelling of the early introduction to complementary food with baby's health status which explained that there was a significant correlation between the early introduction to complementary food and baby's health status, and vice versa, and also the study conducted by⁽¹²⁾ only showed the modelling between knowledge and the action of the mother in prior to the practice of early introduction to complementary food. The focus of this study was to understand the risk factors and its modelling in correlation with the early introduction to complementary food in the working areas of Kambaniru Public Health Center.

METHODS

This was a cross sectional study. This study was done in the working area of Kambaniru Public Health Center in Sumba district. The study was conducted in January 2020. The population was 89 mothers, so the determination of the sample used total sampling, with 89 mothers who had 0-6 months old babies which meets the criteria of inclusion and doesn't meet the criteria of exclusion.

The research variables studied were knowledge, education level, occupation, family support, myth and culture. The way to collect data in this study was by interviewing respondents directly to get answers, when the Integrated Health Center in the work area of the Kambaniru Public Health Center in Sumba District used a questionnaire. Partial and simultaneous correlation between the risk factors and the early introduction to complementary food was analyzed using the simple logistic regression and the multiple logistic regression test. Multiple logistic regression test was also used to obtain the modelling of the risk factors and to determine the most dominant factors that contributes to early introduction to complementary food. This study was approved by the ethical clearance Faculty of Medicine, Universitas Nusa Cendana, letter number: 13/UN15.16/KEPK/2020, with registration number UN021912107.

RESULTS

Characteristic of Samples

The characteristic of the samples are observed in the mother's age, marital status, religion, tribe, parity, baby's age and baby's sex. Table 1 shows that most of the samples, which was 66.3% from the total samples were 20-35 years old and 87.6% of them had married. Most of the samples, which was 71.9%, was a Christian, and were from the original Sumba tribe. The highest parity of the samples was 2 parities, with 31.5% of percentage. Most of the babies were between 5 and 6 months old with each percentage of 21.3% and most of the babies were female with the percentage of 64%.

Tabel 1. Characteristics of samples

Characteristics of sample	Category	Frequency	Percentage
Mother's age	<20 Years old	5	5.60
	20-35 Years old	59	66.30
	> 35 Years old	25	28.10
Marital status	Married	78	87.60
	Single	11	12.40
Religion	Christian	64	71.90
	Catholic	25	28.10
Tribe	Sumba	67	75.30
	Sabu	21	23.60
	Timor	1	1.10
Parity	1 Person	25	28.10
	2 Person	28	31.50
	3 People	22	24.70
	4 People	10	11.20
	>4 People	4	4.50
Baby's age	0 month	2	2.20
	1 month old	9	10.10
	2 month old	14	15.70
	3 month old	10	11.20
	4 month old	16	18.00
	5 month old	19	21.30
	6 month old	19	21.30
Baby's sex	Male	32	36.00
	Female	57	64.00

The Correlation of Early Introduction to Complementary Food Risk Factor

The risk factors for early introduction to complementary food analyzed was the level of education, occupation, rate of income, tradition, myth, familial support and knowledge. The correlation of each risk factors with the early introduction to complementary food for babies under 6 months old may be seen in table 2.

Tabel 2. The correlation of independent variables with the early introduction to complementary food

Dependent Variable	Category	Frequency	Percentage	p-value
Early Introduction to Complementary Food	Not Giving	43	48.30	
	Give	46	51.70	
Education	High (College)	15	16.90	0.089
	Medium (Senior High School)	41	46.10	
	Low (Primary school, Junior high school)	33	37.00	
Occupation	Working	13	14.60	0.307
	Does Not Working	76	85.40	
Income rate	High (>1.010.000)	33	37.10	0.026
	Low (<1.010.000)	56	62.90	
Tradition (Negative Habit)	Good	31	34.80	0.374
	Bad	58	65.20	
Myths (Negative Believes)	Do not believe	15	16.90	0.016
	Believe	74	83.10	
Familial Support (early introduction complementary food)	High	56	62.90	0.000
	Low	33	37.10	
Knowledge	Good	21	23.60	0.000
	Fair	16	18.00	
	Poor	52	58.40	

Table 2. Showed that 51.7% of the mothers gave an early introduction to complementary food to the babies whose are less than 6 months old, which are higher than the mothers who were implementing exclusive breast feeding which was 48.3%. Based on the risk factors, it was known that 46.1% of the samples, had an educational level of up to Senior High School (SHS), 85.4% were unoccupied, 62.9% were having a low rate of income, 65.2% had and followed a tradition which was mediocre, 83.1% still had a belief to the myth that inhibit exclusive breast feeding, and 62.9% had a familial support which is suggesting the early introduction to complementary food for the babies and 58.4% had a poor knowledge regarding to exclusive breast feeding.

Statistical analysis showed that the rate of income ($p = 0.026$), myth ($p = 0.016$), familial support ($p = 0.000$) and knowledge ($p = 0.000$) had a correlation with the early introduction to complementary food while the level of education ($p = 0.089$), occupation ($p = 0.037$), and tradition ($p = 0.374$) did not had a correlation with the early introduction to complementary food.

Tabel 3. The result of multivariate analysis

Variable	β	Sig	Exp (β)	95% C.I for Exp (β)	
				Lower	Upper
Constant	-6,549	0.011	0.001		
Education	0.180	0.666	1.197	0.529	2.709
Occupation	0.901	0.144	2.462	0.735	8.254
Myths	-.324	0.685	0.723	0.151	3.456
Familial Support	2.070	0.000	7.921	2.522	24.878
Knowledge	0.817	0.020	2.264	1.140	4.500

The result of Multivariate analysis showed that the knowledge and familial support were simultaneously correlates with the early introduction to complementary food in the working areas of Kambaniru Public Health Center ($p < 0.005$). The most dominant factors that contribute to the early introduction to complementary food upon those two factors were the familial support with OR value of 7.921. This means, that the mothers who had a familial support to apply the complementary food will have 7.921 higher chance of applying the early introduction to complementary food compared to mothers who didn't.

To obtain the risk factor modelling which correlates to the early introduction to complementary food, the analysis below were performed.

$$\ln\left(\frac{p}{1-p}\right) = -6.549 + 7.921 (X_1) + 2.264 (X_2)$$

$$p = \frac{1}{1 + e^{-(-6.549 + (7.921)(\text{Familial Support}) + (2.264)(\text{Knowledge}))}}$$

p = 44,2%

The result showed that the mother's knowledge and familial support contributes simultaneously to the early introduction to complementary food to the babies less than 6 months old with the percentage of 44.2% and the rest are to the other variables.

DISCUSSION

The Lawrence Green theory (1991) in ⁽¹³⁾ explained three factors which may influence a change of habit including the mothers who had babies which were the predisposing factors, reinforcing factors and enabling factors. In this study two contributing factors which affect the mothers habit of giving an early introduction to complementary food for the babies were observed which were the predisposing factor which is the mother's knowledge and the reinforcing factor which included the rate of income, support from the husband and other family members. Exclusive breast feeding may prevent morbidities such as diarrhea, protein intolerance and baby's growth and developmental problem. However, most of the mothers tends to give an early introduction to complementary food for the babies which were less than 6 months old. This habit contradicts to the government's advice through the Government Decree ⁽¹⁴⁾ which require all mothers who had babies under 6 months old to apply exclusive breast feeding to their babies.

The result of this study showed that the 51.7% of the mothers were giving an early introduction to complementary food for babies under 6 months old. The complementary foods given was fine porridge, water, starch water with sugar, tea, biscuits and formulated milk with 3-4 times frequency daily. This habit was done following the habit of previous parenting habit by the mother's parent or mother/father in law. Their parents and husband even obligate the mother to give complementary food so that the baby may become healthier, fat, and less fuss. Complementary food was believed as the source of many nutrition that the baby needs when they were under 6 months old.

The Correlation of Education with Early Introduction to Complementary Food

The level of education increases the ability to think and creates decision more rationally. individuals with higher level of education tends to be more open to accept changes, or to decline any irrational information compared to those individuals with lower level of education.

The result of this study showed that did not correlate significantly to the early introduction to complementary food. Education may change the mother's habit in nursing the baby including the habit of breast feeding the baby, but this change of habit is not only achieved through education obtained from formal education system. Knowledge upon breast feeding may also be obtained from an informal education, such as health information media, publication from the Integrated Health Center, and the family and from previous experience of nursing baby.

The result of this study was different with previous study that found that babies which had been introduce to complementary food which was formulated milk (61.6%) and other foods (23.4%) before they were 6 months old were significantly found in mothers with lower level of education ⁽¹⁵⁾.

The Correlation of Occupation with Early Introduction to Complementary Food

Occupation are activities done every day by an individual for specific purpose such as to obtain an income. Mother who had babies had a variety of occupation such as a farmer, honorary employee, entrepreneur, and civil servants, and are commonly worked not from home. While unemployed mother are usually housewives which stayed with their baby all day. the type of occupation and distance from house to their workplace, affect the mother's habit in nursing their babies, including the frequency of breastfeeding.

The result of this study showed that the mother's occupation did not correlated to the early introduction to complementary food. This means that either having an occupation or not, the mothers had the similar habit of giving complementary foods to their babies. Mother who had an occupation tends to leave their babies to their family or close neighbor and during launch time, she will return home to give breast feed. However, due to the limited time to breast feed, their caregiver tends to give complementary foods to the babies to fulfill the baby's need. This was given several hours after their mothers went to the office or several hours after their mother return to the office. This is similar with unemployed mother. Even though they were with their babies all the time, the data showed that most of these unemployed mothers also gave an early introduction to complementary food to their babies. The reason for this practice of giving an early introduction to complementary food was thought to be because the other factors such as strong familial support the complementary food and local cultures.

The result of this study was different with the previous study by ⁽¹⁶⁾ which stated that the prevalence of exclusive breast feeding in babies with 0-6 months old was low (29%) due to the mother's occupation which resulted in the babies being given a complementary food when they were two months old.

The Correlation of the Rate of Income with Early Introduction to Complementary Food

The rate of income affects the capability of the family to fulfil daily needs including the ability to give complementary foods to the baby. Family with low rate of income will struggle more to fulfill their daily needs, including to give complementary foods to their baby.

The result of this study showed that there was a significant correlation between the rate of income with the early introduction to complementary food. However, the mothers who had lower rate of income were found to be giving early introduction to complementary food more than mothers with higher rate of income. This probably was caused because the mother with low rate of income is struggling to obtain a healthy food which may increase the production of breast milk. During breast feeding period, the mothers need a lot of energy and protein intake. Low nutritional intake may decrease the production of breast milk, which deplete the amount of breast milk which supposedly was given to the babies, this will suggest the mother to give a complementary food to the babies ⁽¹⁷⁾.

The Correlation Between Tradition (Negative Habit) with Early Introduction to Complementary Food

The result of this study showed that there was no significant correlation between tradition and the early introduction to complementary food for the babies under 6 months old. Mother with good habit said that they obtain the information in prior to the importance of exclusive breast feeding through health officers, the mothers also assume that she was not oblige to the suggestion from her family, parents, or parents in law in prior to giving their babies an early introduction to complementary food, which had become a habit from generations to generations which resulted in the mothers opted for exclusive breast feeding.

The result of this study was contradicting to the previous study by ⁽¹⁸⁾ which explained that from all babies that had been breast fed, only 20.2% were having an exclusive breast feeding and the majority of the babies (79.8%) has had prelactal food such as liquid, solids or semi liquids, which was introduce as early as possible after birth.

The Correlation of Myths (Negative Believes) with the Early Introduction to Complementary Foods

The result of this study showed that there is a significant correlation between myth and the early introduction to complementary food for the babies under 6 months old. The mother have this believe that babies under 6 months old if only receives breast feeding without complementary food, then the babies wouldn't have an optimal growth, the mothers thought that if the babies were fussy or when they were crying, that means that the babies were hungry and therefore they needed complementary foods such as fine porridge, tea, or other soft food. Whether there was any information from the health officers or not, if the mother didn't see the early introduction to complementary food as a thread which would cause a disease to the baby, then this kind of behavior will continue to exist.

The result of this study was different with the previous study by ⁽¹⁹⁾ which stated that the mother's perception about the inability of the breast milk alone to fulfill the baby's nutritional needs will become an obstacle that becomes one of the reason that the mother wouldn't breast feed the baby, it wasn't from the health service provider, nor from the socio-cultural factors such as the mothers believe that was becoming the obstacle.

The Correlation of Familial Support with The Early Introduction to Complementary Food

The familial supportfor early introduction to complementary food affects the mother's breast feeding behavior which makes the exclusive breast feeding not well optimized due to the less concern from the family in prior to exclusive breast feeding and from the impression of neighbor, suggestion from friends or mass media which suggest the practice of early introduction to complementary food.

The result of this study showed that there was a significant correlation between familial supportwith the early introduction to complementary food. The mothers said that their husband never remind them about exclusive breast feeding, most of the time there was suggestion from the family such as husband or parents that is suggesting them to give a complementary food, which result in a difficult situation to achieve exclusive breast feeding. While the support from close relatives plays an important role in the successful exclusive breastfeeding. The result of this study was in line with the previous study from ⁽²⁰⁾ which stated that there was a significant correlation between familial supportand the early introduction to complementary food, in which 34 respondents which gave an early introduction to complementary food for their babies about 61.76% and the majority of the mother who gave an early introduction to complementary food were mothers with families who didn't suggest an exclusive breast feeding.

The Correlation Between Knowledge with Early Introduction to Complementary Foods

Knowledge affect behavior. Sufficient knowledge regarding exclusive breast feeding will encourage the mother to give an exclusive breast feeding for their baby who was 0-6 months old. On the contrary, insufficient knowledge regarding exclusive breast feeding will encourage the mother to give complementary foods to complement breast feeding which they believe will give a satisfactory feel to the baby.

There was a significant correlation between knowledge and an early introduction to complementary food for babies under 6 months old. Mother with insufficient knowledge tends to introduce complementary foods earlier to babies who were 0-6 months old. The result of this study was in line with the previous study from ⁽²¹⁾ in Mozambique which stated that insufficient knowledge may affect the practice of giving an early introduction to complementary food to the babies before 6 months old, and this may also be influenced by the attitude, familial support and culture.

Mother which had sufficient knowledge or insufficient knowledge had a less understanding about the importance of exclusive breast feeding, in which the mother didn't understand the steps of giving a complementary food and the impact which might happen due to the practice of early introduction to complementary food, so that these mothers introduce an early introduction to complementary food before the babies were 6 months old. These mothers thought that the baby's growth will be better if they were given a complementary food, the mothers knowledge was also influenced from their source of information such as culture, myth and mass media. Environmental, familial, cultural and mass media factors still dominantly influence the mothers perception regarding to exclusive breast feeding and an early introduction to complementary food.

The Model for the Correlation of the Risk Factors of Early Introduction to Complementary Food

There are several factors that became the reason for the mothers to give an early introduction to complementary food for the babies under 6 months old, even though it was known that the practice of giving an early introduction to complementary food would result in negative impact for the baby's health. The interaction between the risk factors with the incidence of giving an early introduction to complementary food from the mothers might differ due to the difference in the characteristic of the risk factors itself or due to the socio-demographical characteristics of the samples.

The result of this study showed that familial support and knowledge interact in influencing the mothers to give an early introduction to complementary food for their babies. This means that mother with insufficient knowledge and was suggested by her family to give an early introduction to complementary food have had a 44.2% of chances to give an early introduction to complementary food for their babies. Suggestion from the mother's closest relatives may result in positive impact for the baby's growth and development but could also lead to a negative impact which will result in low health status of the baby if those suggestions were not in conjunction with the promotive and preventive efforts. Familial support for giving a complementary food is a form of suggestion which may increase the mortality rate for the baby. Familial support for the mother to give an early introduction to complementary food will be more likely to be responded by the mothers who had an insufficient knowledge regarding the harmful effects of the early introduction to complementary food. This response will motivate the mother to be more frequent in giving the complementary foods to the baby which are 0-6 months old. This will be different if the mothers did not receive a full suggestion from the family to give an early introduction to complementary food although she had a sufficient knowledge. Sufficient knowledge alone is not enough to encourage the mother to not give an early introduction to complementary food if it was not supported by her family. This showed that familial support is the most dominant factor that contributes to the practice of giving an early introduction to complementary food by the mothers to their babies in the working area of Kambaniru Public Health Center.

This study was in line with the previous study which stated that insufficient support from the family regarding exclusive breast feeding may impact the practice of giving the complementary foods to the Baby⁽¹⁵⁾. Insufficient support from the family to the mother's effort to give an exclusive breast feeding to the baby and insufficient knowledge regarding the benefits of exclusive breast feeding, will lower the mother's motivation for giving an exclusive breast feeding. On the other hand, mothers who had received a motivation and support from the family tend to have a better passion psychologically in giving their babies an exclusive breast feeding and this, physiologically will stimulate the nerves which will increase the production of breast milk⁽²²⁾.

CONCLUSION

The rate of income, myths, familial support, and mothers' knowledge were partially correlated with the early introduction to complementary foods for the babies with 0-6 months old, however, simultaneously, only familial support and knowledge were correlated with the early introduction to complementary foods with the contributing factor of 44.5%. The most dominant factors that contribute to the mother in giving and early introduction to complementary foods is the familial support.

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