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Original Research Article

The Relationship between Maternal Anemia History and Nutritional Status of 0-12 Month Infants in West Kupang District

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Abstract: ***Background:*** Maternal anemia has a high prevalence in Indonesia, where this condition can affect the fulfillment of nutritional intake for both mother and fetus and if not handled properly can affect nutritional status and cause metabolic problems in the baby. ***Aim:*** Analyzing the relationship between a history of maternal anemia and nutritional status in infants aged 0-12 months in West Kupang District, Kupang Regency. ***Method:*** This study involved 67 subjects aged 0-12 months who had MCH books and were fully stocked and obtained approval from biological mothers for their children to be the subjects of this study. The type of research design used by researchers is cross- sectional research. In this study, researchers analyzed the relationship of anemia that occurs in mothers during pregnancy with the nutritional status of 0-12 months infants using a retrospective approach by looking at the history of Antenatal Care (ANC) in the mother's MCH book, as well as making anthropometric measurements on the subjects. Data analysis used the Shapiro-Wilk test for the normality test and the Spearman's rho test for the correlation test. ***Results:*** There was no significant correlation between a history of maternal anemia with the nutritional status of babies 0-12 months at WHZ with p value = 0.5, WAZ with p value = 0.1, HAZ with p value = 0.7, BAZ with p value = 0.8. ***Conclusion:*** There is no relationship between the history of maternal anemia and the nutritional status of babies 0-12 months in West Kupang District.

Keywords: Anemia, Maternal, Nutritional Status, Infant.

INTRODUCTION

Anemia in pregnancy occurs when the low concentration of hemoglobin (Hb) and the number of red blood cells cannot meet the needs of both the mother and the fetus being conceived (J. Switz World Heal Organ, Geneva., 2016). The condition of anemia in pregnancy can be caused by several causes such as nutritional deficiencies, infections, thalassemia, and pregnancy in adolescence (Fadli & Fatmawati, 2020; Tanziha *et al.*, 2016). Anemia that occurs in pregnancy can be diagnosed with Hb levels < 11 g / dL in the I and III trimesters or Hb levels < 10.5 in the II trimester, this is due to because normal hemodilution occurs in pregnancy (Astriana, 2017; J. Switz World Heal Organ, Geneva., 2016). The World Health Organization (WHO) in 2019, recorded that around 40% of pregnant women in the world suffered from anemia during their pregnancy, while in Indonesia according to Basic Health Research in 2018 around 48.9% of pregnant women suffered from anemia conditions (Kemenkes RI, 2018; WHO, 2021). The impact of anemia conditions during pregnancy can affect premature delivery, miscarriage, and the risk of low birth weight (LBW) and short birth length (SBL) which if not intervened properly can affects the nutritional status of infants (Aditianti & Djaiman, 2020; Lada, 2019).

The incidence of anemia in pregnant women also affects the growth and development of the fetus during the first 1,000 days of life, which is the most important period for physical growth and cognitive development for babies (Demsa Simbolon, 2019). The conception period is the initial period of 1,000 first days of life, then continued until the baby is 24 months old. Growth inhibition in the first 270 days of the first 1,000 days of life can continue into infancy, where there can be a worsening of the nutritional status of infants (Husnah, 2017). WHO studies in 2021 showed that around 45.4 million children in the world suffer from wasting and 149.2 million children suffer from stunting,

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of which Indonesia has 31.8% malnutrition (WHZ) and 10.2% (Kemenkes RI, 2018).

East Nusa Tenggara Province is the province with the highest percentage of under-five malnutrition incidence in Indonesia, namely 29.5% (Kementrian Kesehatan, 2021). Data from the Indonesian Nutritional Status Study by the Ministry of Health of the Republic of Indonesia in 2021 shows that Kupang Regency has a stunting incidence rate of 40.9%, wasting as much as 19% and underweight as much as 41.5%. Nutritional status data collection conducted by the Batakte Health Center in February 2022 showed that 8.6% of babies in Kuanheun Village had malnourished and malnourished status, while 25% of babies in Kuanheun Village suffered from stunting.

In a study conducted by Warsini *et al.,* (2016) it was found that a history of anemia in pregnancy has an influence on the nutritional status of babies of body length index compared to the age of the baby (Warsini *et al.,* 2016). The results of a study conducted by Prabandari *et al.,* (2016) found that there was a relationship of history of anemia that occurs in the third trimester pregnancy to the nutritional status of babies weight index compared to body length, however, there was no association of a history of anemia in mothers during the third trimester of pregnancy with the nutritional status of infants of body length index against age or weight to age (Prabandari *et al.,* 2017).

Based on the description above, researchers are interested in conducting research on the analysis of the relationship between anemia history in pregnancy and the nutritional status of babies 0-12 months in West Kupang District, Kupang Regency.

METHODS

Design, Location and Time

This cross-sectional research was conducted in Kuanheun Village and Bolok Village, West Kupang District. The study was conducted in August - September 2022.

Sampling

The sample in this study was selected by probability sampling, with a total number of respondents of 67 people. The inclusion criteria of the respondent had infants aged 0-12 months, carried Maternal and Child Health (MCH) book, and being willing to follow the course of the research process.

Data Collection

The research will begin with a brief explanation of the data collection that will be carried out, after which respondents will be selected based on inclusion criteria. Respondents who meet the inclusion criteria will then be asked for approval to follow the course of the study. If they agree, respondents will be interviewed, and researchers will examine MCH books to explore maternal and child health histories. After that, the baby will be measured in weight and length using the Onemed OD231B.

Data Analysis

The analysis data techniques used are univariate and bivariate analysis. Univariate analysis was used to look at the distribution of characteristics in both the respondent and the subject. Bivariate analysis used Spearman's rho test to test the correlation between the relationship between the history of anemia in mothers and the nutritional status of babies 0-12 months in West Kupang District. Data analysis using JASP (Jeffrey's Amazing Statistics Program) version 0.16.3.

RESULT

Univariate Analysis

Characteristics of Subjects

This study took 67 subjects of infants aged 0-12 months who were domiciled in Kuanheun Village and Bolok Village, Kupang Regency. The subjects from Kuanheun Village were 26 babies while in Bolok Village, 41 babies aged 0-12 months were obtained. All subjects were selected based on inclusion and exclusion criteria. The characteristics of the subjects taken in this study included gender and age.

Table 1: Characteristics of Subject

Characteristics	Frequency (n = 67)	Percentage (%)
Sex		
Male	33	49,3
Female	34	50,7
Age (month)		
0 – 3	16	23,8
4 – 6	20	29,9
7 – 9	13	19,4
10 – 12	18	26,9

Based on the sex characteristics in Table 1, the number of male subjects was 33 subjects with a percentage of 49.3%, while female subjects were 34 subjects with a percentage of 50.7%. Characteristics of subjects based on the age of the subjects when participating in the study found that most of the subjects were at the age of 4 – 6 months, which was 20 people (29.9%). The age of the subjects with the least number

was at the age of 7 - 9 months totaling 13 people (19.4%). Babies aged 0–3 months totaled 16 people (23.8%), while babies aged 10–12 months totaled 18 people (26.9%). The subjects in this study aged 0-12 months belonged to the category of infants.

Characteristics of Respondents

This study involved 67 respondents, namely biological mothers of infant subjects 0-12 months in Kuanheun Village and in Bolok Village who were selected based on inclusion criteria and exclusion criteria. The characteristics of respondents taken in this study include age, occupation, educational status, status of residence, marital status, average family income.

Table 2: Characteristics of Respondents

Characteristics	Frequency (n=67)	Percentage (%)
Research Location		
Kuanheun Village	41	61,1
Bolok Village	26	38,9
Age During Pregnancy (year)		
< 20	4	5,9
20 – 25	22	32,8
26 – 30	19	28,3
30 – 35	16	23,8
> 35	6	8,9
Employment		
Employed	15	22,4
Unemployed	52	77,6
Education Background		
Did not finished Primary	1	1,5
Primary School	9	13,4
Junior High School	6	9,0
Senior High School	35	52,2
Diploma III	1	1,5
Diploma IV	1	1,5
Bachelor	14	20,9
Status of Residence		
Private House	38	56,7
Family House	28	41,8
Rent House	1	1,5
Marital Status		
Married	43	64,2
Unmarried	24	35,8
Family Average Income		
Less than minimum wage	41	61,2
More than minimum wage	26	38,8

Based on Table 2, it was found that of the 67 respondents, 41 (61.1%) of them were from Kuanheun Village and 26 (38.9%) respondents were from Bolok Village. The respondents in the study were mostly aged 20-25 years with 22 people or 32.8% of respondents, while the majority of respondents were not working, namely 52 people with a percentage of 77.6% of respondents.

Respondents generally have the latest educational status in Senior High School or equivalent, which is 35 people with a percentage of 52.2% of respondents, besides that most live in private houses, namely 38 people or 56.7% of respondents. The number of respondents married and registered in the civil registry was 43 people with a percentage of 64.2%, while the majority of respondents had an average family income below the minimum wage of 41 people with a percentage of 61.2% of respondents.

The background picture in the respondents of this study was done to see the distribution of the history of anemia experienced by the mother in pregnancy and the nutritional status of babies aged 0-12 months in Kuanheun Village and Bolok Village as well as the nutritional intake of breast milk in infants.

Table 3: Distribution of History of Anemia in Pregnancy

History of Anemia in Third Trimester Pregnancy	N	Percentage (%)
Anemic (Hb < 11 gr/dL)	32	47,7
Normal (Hb ≥ 11 gr/dL)	35	52,3
Total	**67**	**100**

Based on the data in Table 3, it was obtained from the number of respondents of 67 respondents, 32 of whom had a history of anemia in trimester pregnancy with a percentage of 47.7%, while 35 respondents or 52.3% of respondents had no history of anemia in pregnancy.

Distribution of Subjects

Table 4: Distribution of Weight-for-Length Nutritional Status of Infants 0-12 Months

Nutritional Status (WHZ)	N	Percentage (%)
Moderate Wasted (-3 SD s.d. < -2 SD)	2	3,0
Normal (-2 SD s.d. + 1 SD)	32	47,8
Risk of Overweight (> +1 SD s.d. +2 SD)	12	17,9
Overweight (> +2 SD s.d. +3 SD)	8	11,9
Obese (> +3 SD)	13	19,4
Total	**67**	**100**

Based on the data in Table 4 above, it shows that most of the subjects had good nutritional status, namely 32 babies with a percentage of 47.8%, followed by babies with obese nutritional status with a total of 13 babies or 19.4%. The number of babies with malnutrition status is 2 babies with a percentage of 3.0%, while babies with more nutritional risk have 12 babies, namely 17.9% and babies with more nutritional status are 8 babies or 11.9%. In this study, there were no subjects with poor nutritional status.

Table 5: Distribution of Weight-for-Age Nutritional Status of Infants 0-12 Months

Nutritional Status (WAZ)	N	Percentage (%)
Underweight (-3 SD s.d. < -2 SD)	7	10,4
Normal (-2 SD s.d. + 1 SD)	41	61,2
Overweight (> +1 SD)	19	28,4
Total	**67**	**100**

The data in Table 5 shows that of the 67 subjects in the study, 41 of them were normal weight with a percentage of 61.2%, while babies with a risk of overweight were 19 babies or 28.4% and 7 babies or 10.4% of subjects were underweight.

Table 6: Distribution of Length-for-Age Nutritional Status of Infants 0-12 Months

Nutritional Status (HAZ)	N	Percentage (%)
Severe Stunted (< -3 SD)	9	13,4
Stunted (-3 SD s.d. < -2 SD)	3	4,5
Normal (-2 SD s.d. + 3 SD)	55	82,1
Total	**67**	**100**

Based on the distribution of subjects in Table 6, most subjects had a normal body length according to age, which was 55 babies or 82.1%. Subjects who had very short body lengths totaled 9 babies with a percentage of 13.4%, while 3 babies or 4.5% of subjects had short body lengths according to their age.

Table 7: Distribution of BMI-for-Age Nutritional Status of Infants 0-12 Months

Nutritional Status (BAZ)	N	Percentage (%)
Moderate Wasted (-3 SD s.d. < -2 SD)	4	6,0
Normal (-2 SD s.d. + 1 SD)	34	50,7
Risk of Overweight (> +1 SD s.d. +2 SD)	10	14,9
Overweight (> +2 SD s.d. +3 SD)	4	6,0
Obese (> +3 SD)	15	22,4
Total	**67**	**100**

Based on Table 7, it was found that most of the subjects had good nutrition based on the body mass index compared to their age, which was 34 babies or 50.7%, while a small percentage had undernourished status and more nutritional status each amounted to 4 babies or 6.0% of the subjects. Subjects with more nutritional risk amounted to 10 babies with a percentage of 14.9% while 15 babies or 22.4% of subjects had obese nutritional status.

Table 8: Distribution of Subjects Based on Exclusive Breastfeeding History

Exclusive Breastfeeding History	N	Percentage (%)
Received Exclusive Breastfeed	57	85,1
Not Received Exclusive Breastfeed	10	14,9
Total	**67**	**100**

The data in Table 8 shows that most of the subjects breastfed exclusively 57 babies or 85.1% of the subjects, while 10 babies or 14.9% of the subjects did not get exclusively breast milk. Breast milk is not given exclusively mostly due to the lack of milk production, mothers are busy due to work and college.

Cross-tabulation of Subjects Characteristics and Nutritional Status

The background picture of respondents based on nutritional status is indicated by the cross-tabulation of the characteristics of the subject with the nutritional status of the baby. The tables below show nutritional status based on the subject's age, sex and history of exclusion milk.

Table 9: Cross-tabulation of Subject Characteristics and Weight-for-Length Nutritional Status

Characteristics	WHZ Nutritional Status (n = 67)									
	Moderate Wasted		Normal		Risk of Overweight		Overweight		Obese	
	N	%	N	%	N	%	N	%	N	%
Age (months)										
0 – 3	1	50,0	9	27,2	3	25,0	3	42,8	0	0
4 – 6	0	0	10	30,3	2	16,6	3	42,8	5	38,4
7 – 9	0	0	7	21,2	3	25,0	1	14,4	4	30,8
10 – 12	1	50,0	7	21,2	4	33,4	0	0	4	30,8
Sex										
Male	1	50,0	15	45,5	6	50,0	4	57,1	7	53,8
Female	1	50,0	18	54,5	6	50,0	3	42,9	6	46,2
Exclusive Breastfeeding History										
Yes	2	100	29	87,9	10	83,3	5	71,4	11	84,6
No	0	0	4	12,1	2	16,7	2	28,6	2	15,4
LBW History										
Yes	1	50,0	1	3,0	5	41,7	1	14,3	2	15,4
No	1	50,0	32	97,0	7	58,3	6	85,7	11	84,6
SBL History										
Yes	0	0	9	27,3	4	33,3	2	28,6	4	30,8
No	2	100	24	72,7	8	66,7	5	71,4	9	69,2

According to the cross-tabulation in Table 9, it shows that 2 subjects suffered from malnutrition according to the WHZ index, which was divided into age groups of 0-3 months and 10-12 months and received exclusively breast milk. Most of the subjects had normal nutrition, totaling 33 subjects divided from the age group of 0-3 months as many as 9 (27.2%), ages 4-6 months 10 (30.3%), ages 7-9 months and 10-12 months each as many as 7 (21.2%) subjects. The data in Table 9 illustrates that the majority of subjects had normal nutritional status with distribution according to sex, namely 15 (45.5%) male subjects and 18 (54.4%) in female subjects, while most subjects with normal nutritional status exclusively breastfed 29 (87.9%) subjects. Cross-tabulation 9 also describes most subjects who had a history of LBW as having more nutritional risk, while the majority of subjects who had no history of LBW had normal nutritional status. The majority of subjects with normal nutritional status had no history of SBL.

Table 10: Cross-Tabulation of Subject Characteristics and Weight-for-Age Nutritional Status

Characteristics	WAZ Nutritional Status (n = 67)					
	Underweight		Normal		Overweight	
	N	%	N	%	N	%
Age (months)						
0 – 3	0	0	15	36,6	1	5,3
4 – 6	3	43,0	10	24,4	7	36,8
7 – 9	2	28,5	8	19,5	5	26,3
10 – 12	2	28,5	8	19,5	6	31,6
Sex						
Male	3	42,5	22	53,7	8	42,1
Female	4	57,1	19	46,3	11	57,9
Exclusive Breastfeeding History						
Yes	7	100	36	87,8	14	73,7
No	0	0	5	12,2	5	26,3
LBW History						
Yes	1	14,3	6	14,6	3	15,8
No	6	85,7	35	85,4	16	84,2
SBL History						
Yes	2	28,6	12	29,3	5	26,3
No	5	71,4	29	70,7	14	73,7

According to the cross-tabulation in Table 10, it shows that most of the subjects were of normal weight, namely 41 subjects where the distribution according to age was 15 (36.6%) subjects aged 0-3 months, 10 (24.4%) subjects aged 4-6 months, while the age groups of 7-9 months and 10-12 months each amounted to 8 (19.5) subjects, while according to gender the subjects were male sex more were 22 (53.7%) and subjects with female sex were 19 (46.3%) subject. The majority of subjects who were of normal weight exclusively breastfed were 36 (87.8%) subjects. Table 10 also describes most subjects who had no history of LBW and SBL had normal weight.

Table 11: Cross-Tabulation of Subject Characteristics and Length-for-Age Nutritional Status

Characteristics	HAZ Nutritional Status (n = 67)					
	Severe Stunted		Stunted		Normal	
	N	%	N	%	N	%
Age (months)						
0 – 3	2	22,2	0	0	14	25,5
4 – 6	1	11,1	2	66,7	17	30,9
7 – 9	3	33,3	1	33,3	11	20,0
10 – 12	3	33,3	0	0	13	23,6
Sex						
Male	4	44,4	3	100	26	47,3
Female	5	55,6	0	0	29	52,7
Exclusive Breastfeeding History						
Yes	8	88,9	3	100	46	83,6
No	1	11,1	0	0	9	16,4
LBW History						
Yes	4	44,4	0	0	6	10,9
No	5	55,6	3	100	49	89,1
SBL History						
Yes	5	44,4	0	0	14	25,5
No	4	55,6	3	100	41	74,5

According to the cross-tabulation in Table 11, it shows that most subjects have a normal body length of 55 subjects where the distribution according to age is 14 (25.5%) subjects aged 0-3 months, 17 (30.9%) subjects aged 4-6 months, 11 (20.0%) subjects aged 7-9 months, and 13 (23.6%) subjects aged 10-12 months, while according to gender the subjects of the female sex are more numerous which is 26 (47.3%) and subjects with the male sex are 29 (52.7%) subjects. The majority of subjects who had a normal body length received

exclusively breast milk, amounting to 46 (83.6%) subjects. Most very short-bodied subjects do not have a history of LBW but have a history of SBL, while subjects who have a normal body length majority do not experience LBW or SBL at birth.

Table 12: Cross-Tabulation of Subject Characteristics and BMI-for-Age Nutritional Status

Characteristics	BAZ Nutritional Status (n = 67)									
	Moderate Wasted		Normal		Risk of Overweight		Overweight		Obese	
	N	%	N	%	N	%	N	%	N	%
Age (months)										
0 – 3	2	50,0	11	32,4	2	20,0	0	0	1	6,7
4 – 6	1	25,0	10	29,4	1	10,0	3	75,0	5	33,3
7 – 9	0	0	5	14,7	4	40,0	1	25,0	5	33,3
10 – 12	1	25,0	8	23,5	3	30,0	0	0	4	26,7
Sex										
Male	3	75,0	14	41,2	6	60,0	2	50,0	8	53,3
Female	1	25,0	20	58,8	4	40,0	2	40,0	7	46,7
Exclusive Breastfeeding History										
Yes	4	100	30	88,2	8	80,0	3	75,0	12	80,0
No	0	0	4	11,8	2	20,0	1	25,0	3	20,0
LBW History										
Yes	1	25,0	2	5,9	5	50	0	0	2	86,7
No	3	75,0	32	94,1	5	50	4	100	13	13,3
SBL History										
Yes	0	0	9	26,5	4	40,0	0	0	6	40,0
No	4	100	25	73,5	6	60,0	4	100	9	60,0

According to the cross-tabulation in Table 12, it shows that most of the subjects had normal body nutrition, which was 34 subjects where the distribution according to age was 11 (32.4%) subjects aged 0-3 months, 10 (29.4%) subjects aged 4-6 months, 5 (14.7%) subjects aged 7-9 months, and 8 (23.5%) aged 10-12 months, according to sex subjects of the female sex were more numerous which was 20 (58.8%) and subjects with male sex were 14 (41.2%) subjects. Nutritional status is more or less experienced by male subjects, namely 3 (75%) subjects. Table 12 also describes most subjects who had a history of LBW having more nutritional risk, while the majority of subjects who did not have a history of LBW had normal nutritional status. The majority of subjects with normal nutritional status had no history of SBL.

Bivariate Analysis

Bivariate analysis is an analysis used to determine the correlation between independent variables and dependent variables, which in this study is the history of anemia in pregnancy and the nutritional status of babies 0-12 months. Before conducting data analysis, a normality test was carried out with the Shapiro-Wilk Statistical Test. The Saphiro- Wilk statistical test describes an abnormal data distribution where the p-value < 0.05. Based on the results of the normality test carried out, the bivariate analysis in this study was carried out using a non-parametic statistical technique of Spearman's rho statistical test. The relationship between anemia history in the nutritional status of babies 0-12 months in Kuanheun Village and Bolok Village can be seen in the following tables.

Table 13: Spearman's rho Test Results Related to History of Anemia in Pregnancy with Weight-for-Length Nutritional Status in Infants 0-12 Months

WHZ Nutritional Status Classification	Anemia in Pregnancy History (n = 67)				*p*
	Normal		Anemia		
	N	%	N	%	
Obese	6	46,2	7	53,8	0,5
Overweight	3	42,9	4	57,1	
Risk of Overweight	8	66,7	4	33,3	
Normal	17	51,5	16	48,5	
Moderate Wasted	2	100	0	0	

[a]Spearman's rho Test: *p > 0,05

The data in Table 13 shows the results of statistical tests using Spearman's rho test are insignificant (p > 0.05) with a p value of p = 0.5.

Table 14: Spearman's rho Test Results Related to History of Anemia in Pregnancy with Weight-for-Age Nutritional Status in Infants 0-12 Months

WAZ Nutritional Status Classification	Anemia in Pregnancy History (n = 67)				*p*
	Normal		Anemia		
	N	%	N	%	
Overweight	8	42,1	11	57,9	0,1
Normal	23	56,1	18	43,9	
Underweight	5	71,4	2	28,6	

[a]Spearman's rho Test: *p > 0,05

The data in Table 14 shows the results of statistical tests using Spearman's rho test are insignificant (p > 0.05) with a p value of p = 0.1.

Table 15: Spearman's rho Test Results Related to History of Anemia in Pregnancy with Length-for-Age Nutritional Status in Infants 0-12 Months

HAZ Nutritional Status Classification	Anemia in Pregnancy History (n = 67)				*p*
	Normal		Anemia		
	N	%	N	%	
Normal	29	52,7	26	47,3	0,7
Stunted	2	60,0	1	40,0	
Severe Stunted	5	57,1	4	42,9	

[a]Spearman's rho Test: *p > 0,05

The data in Table 15 shows the results of statistical tests using Spearman's rho test are insignificant (p > 0.05) with a p value of p = 0.7.

Table 16: Spearman's rho Test Results Related to History of Anemia in Pregnancy with BMI-for-Age Nutritional Status in Infants 0-12 Months

BAZ Nutritional Status Classification	Anemia in Pregnancy History (n = 67)				*p*
	Normal		Anemia		
	N	%	N	%	
Obese	6	40,0	9	60,0	0,8
Overweight	2	50,0	2	50,0	
Risk of Overweight	8	80,0	2	20,0	
Normal	20	58,8	16	41,2	
Moderate Wasted	0	0	4	100	

[a]Spearman's rho Test: *p > 0,05

The data in Table 16 shows the results of statistical tests using Spearman's rho test are insignificant (p > 0.05) with a p value of p = 0.8.

DISCUSSION

The results of the study conducted by researchers through anthropometric measurements in infants and data collection on MCH books and interviews with the subject's biological mother face-to-face found that out of 67 respondents studied, 35 respondents or 52.3% of respondents did not experience anemia when pregnant with the subject. As many as 4 (5.9%) respondents to the study were adolescents who were still experiencing growth, namely less than 20 years old and 6 (8.9%) respondents had an age of more than 35 years which is a high risk age for pregnancy, which risks causing LBW in infants and increasing the risk of pre-eclampsia (Manafe *et al.*, 2018). Most respondents do not work so as to maximize parenting in the subject and can increase bonding between mother and child and can pay attention to the adequacy of nutrients from the subject through breast milk and complementary food, but this affects the average income of families under the minimum wage which can affect the growth of the baby's body length (Scheffler *et al.*, 2021). In this study, there were 24 (35.8%) respondents who had not registered their marriage with the Population and Civil Registration Service; this would affect the requirements in making health insurance where administrative requirements such as Family Cards are needed. As a result of the absence of health insurance, children with parents who have not been registered in a legal marriage cannot experience maximum health services. Children with parents who are not registered in a legal marriage if sick do not have health insurance then do not recover optimally which will affect the nutritional status of the child acutely (WAZ) (Finkelstein *et al.*, 2020). The results of the univariate analysis in the study subjects, most of the subjects had good nutritional status according to the WHZ nutritional status, namely 33 subjects (47.8%), while 2 subjects (3.0%) had malnutrition, 12 subjects

(17.9%) were at risk of having more nutrition, 7 subjects (11.9%) had more nutrition and 13 subjects (19.4%) were obese. Data on the distribution of subjects according to nutritional status of body weight according to age were obtained most samples had normal weight, amounting to 41 subjects (61.2%), while 19 subjects (28.9%) had overweight and 7 subjects (10.4%) had underweight.

Based on the distribution of HAZ nutritional status in the subjects, the majority of subjects had normal body lengths of which amounted to 55 (82.1%) subjects, while 9 (13.4%) subjects were very short and 3 (4.5%) were short. According to the distribution of subjects based on BAZ nutritional status, most subjects were well nourished with a total of 34 (50.7%) subjects, 4 (6.0%) subjects were malnourished, 10 (14.9%) subjects were at risk of overweight, 4 (6.0%) had overweight and 15 (22.4%) subjects were obese.

The subjects in this study mostly had normal nutrition, namely 33 subjects divided from the age group of 0-3 months as many as 9 (27.2%), ages 4-6 months 10 (30.3%), ages 7-9 months and 10-12 months each as many as 7 (21.2%) subjects, besides that it was found that the majority of subjects had normal nutritional status with distribution according to sex, namely 15 (45.5%) male subjects and 18 (54.4%) in female subjects, while most of the subjects with normal nutritional status received exclusively breast milk, amounting to 29 (87.9%) subjects. This data is in accordance with a previous study by Yuliana *et al.,* (2019) which explained that babies who get exclusive breastfeeding have more normal nutritional status than those who do not get exclusive breastfeeding (Yuliana & Melyani, 2019). Some subjects who have a normal weight get exclusively breast milk, which is 36 (87.8%) subjects. These results are in accordance with previous research by Satyorini *et al.,* (2021) where most babies have a normal weight, which is related to the golden age which is a period of rapid growth that occurs in infants (Satyorini & Lieskusumastuti, 2021). Malnutrition status is also found in children who get exclusive breastfeeding; this can be caused by other factors such as heredity, child metabolism and the quality of breast milk in the mother. Children with poor nutritional status also affect the child's weight, because if the child's nutritional status is less or below normal, it allows the child to lose weight because they do not get enough nutrition (Rahayu *et al.*, 2018).

Most of the subjects in this study had a normal body length of 55 subjects where the distribution according to age was 14 (25.5%) subjects aged 0-3 months, 17 (30.9%) subjects aged 4-6 months, 11 (20.0%) subjects aged 7-9 months, and 13 (23.6%) subjects aged 10-12 months, while according to gender subjects of the female sex were more numerous were 29 (47.3%) and subjects with male sex were 26 (52.7%) subjects, Meanwhile, the majority of subjects who experienced stunting conditions were male with a total of 7 (53.8%) subjects. This data is in line with research conducted by Syahruddin *et al.,* (2022) and Dessie *et al.,* (2019) where stunting events are more common in male babies, this can be caused by faster gross motor development in male babies requiring greater energy than female babies (Dessie *et al.,* 2019; Syahruddin *et al.,* 2022). The majority of subjects who had normal body lengths received exclusive breastfeeding, amounting to 30 (88.2%) subjects, this data is in line with research conducted by Yuliana *et al.,* (2019) where babies who get exclusive breastfeeding have a better nutritional status compared to those who do not get exclusively breast milk (Yuliana & Melyani, 2019). Malnutrition is more commonly experienced by male subjects, which is in accordance with research conducted by Satyorini *et al.,* (2021) and Dessie *et al.,* (2019), because male babies have a caloric need to grow larger than female babies (Dessie *et al.,* 2019; Satyorini & Lieskusumastuti, 2021).

Most of the subjects in this study received good nutritional intake, where 57 (85.1%) subjects were exclusively breastfed for 6 months, while 10 (14.9%) subjects did not get exclusive breastfeeding due to lack of breast milk production or because of the mother's busy work environment.

In this study, a statistical test between a history of anemia in pregnancy and WHZ nutritional status had a p value = 0.5 which means that there is no relationship between the history of anemia suffered by mothers during pregnancy and the WHZ nutritional status in babies 0-12 months in Kuanheun Village and Bolok Village. These results are in line with previous research conducted by Heesemann *et al.,* (2021) but do not correspond to the results of research conducted by Prabandari *et al.,* (2016) (Heesemann *et al.,* 2021; Prabandari *et al.,* 2017).

Spearman's rho test between a history of anemia in pregnancy with WAZ nutritional status of babies 0-12 months produced a value of p = 0.1 which showed that there was no relationship between a history of anemia in pregnancy and WAZ nutritional status in babies 0-12 months in Kuanheun Village and Bolok Village, where these results were in line with the research of Prabandari *et al.,* (2016) and Dessie *et al.,* (2019) (Dessie *et al.,* 2019; Prabandari *et al.,* 2017).

As a result of this study, the relationship between the history of anemia that occurs when pregnant women have no effect on the HAZ nutritional status, where the p value = 0.7, so it can be concluded that there is no relationship between the history of anemia in pregnancy and the HAZ nutritional status in babies 0-12 months in Kuanheun Village and Bolok Village. This is in accordance with research conducted by Mantasia *et al.,* (2022) and Finkelstein *et al.,* (2020) (Finkelstein *et al.,* 2020; Mantasia & Sumarmi, 2022).

The results of this study show that a history of anemia in pregnancy with BAZ nutritional status has a p value = 0.8 which means that there is no relationship between a history of anemia and the nutritional status of babies 0-12 months in Kuanheun Village and Bolok Village. These results are not in line with research conducted by Prabandari *et al.*, (2016) (Prabandari *et al.*, 2017).

The worsening of nutritional status can be affected by several things either directly or indirectly. Factors that can directly affect the nutritional status of babies include nutritional intake, namely breast milk and complementary food and a history of chronic infections, while factors that can indirectly affect nutritional status are parenting and the living environment (Gusrianti *et al.*, 2020). In this study, most of the subjects received exclusive breastfeeding, amounting to 57 (85.1%) subjects. This is one of the factors that most babies in Kuanheun Village and Bolok Village have good nutritional status (Husnah, 2017).

Musculoskeletal growth of most subjects is seen from the normal HAZ nutritional status, which is a description of the chronic nutritional status of the subject, while the nutritional status of WAZ is an acute nutritional status which can change in a short period of time by factors such as nutritional intake and infection, so that the influence of anemia in pregnancy with WAZ nutritional status is not significant (Amik & Karawang, 2018).

The results in this study found that most of the subjects whose mothers suffered from anemia during pregnancy had body proportions assessed from the WHZ index and normal BAZ to obesity, which can be caused by insufficient intake for the fetus when the mother with anemia contains the subject. When the fetus receives insufficient nutritional intake, there will be permanent metabolic and endocrine adaptations, resulting in difficulties in the baby to adapt to nutrient-rich conditions that cause obesity and glucose tolerance problems (Pratiwi & Purwasari, 2020; Rahayu *et al.*, 2018).

Based on the discussion above, it can be concluded that there is no relationship between the history of anemia in pregnancy and the nutritional status of babies 0-12 months in Kuanheun Village and Bolok Village.

CONCLUSION

Based on the results in this study, it can be concluded that there is no correlation between anemia that occurs during pregnancy and the nutritional status of WHZ, WAZ, HAZ and BAZ in infants aged 0-12 months in West Kupang District. This can happen because of the fulfillment of nutrients through breast milk and complementary food obtained by babies so that it can support catch-up growth in babies.

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