JCHR (2023) 13(1), 1175-185

Journal of Chemical Health Risks

www.jchr.org

ORIGINAL ARTICLE

Relationship of Giving Pill/Syrup Fe (Iron) Complex, Parity, ANC Examination, and the Age of Women Giving Birth to BBLR

Indang Dewata[*1], Teguh Widodo[2], Aprizon Putra[3]

[1]*Professor of Environmental Sciences in Universitas Negeri Padang (UNP), Padang, Indonesia*

[2]*Researchers of in The National Research and Innovation Agency (BRIN), Jakarta, Indonesia*

[3]*Student Doctoral of Environmental Sciences in Universitas Negeri Padang (UNP), Padang, Indonesia*

(Received: 31 January 2021 Accepted: 13 August 2022)

KEYWORDS

BBLR;

Stunting;

Parity;

ANC

ABSTRACT: This research focuses on the correlation among underweight Babies at Birth (BBLR) with giving Fe pills, parity, Ante Natal Care (ANC), and the age women of giving birth. Though the cause of stunting is multi-factorial, BBLR is one of the causes of stunting. So it is important to investigate deeply BBLR itself. Based on any references, BBLR is caused by many factors as well. Anemia acute happened to pregnant women, long stress the pregnant women which make them lost appetite and age of women relatively takes effect of BBLR. This research uses Demographic and Health Surveys (DHS) 2018 as secondary data. Based on it, there were 340 respondents and 355 births. The total population who suffered stunting is 5,4% of 355 births. From 5,4% of BBLR occurred at under 20 old women, birth order (parity). The result of the research, there is no correlation between the Fe pill, parity, ANC, and age of women at first-time birth to the BBLR even though in many references four variables are closely related. As a follow-up, this secondary data research should be verified by primary data.

INTRODUCTION

Around 7.8 million babies in Indonesia suffer from stunting [1]. This means that 36% of the total 23 million babies suffer from stunting. Stunting problems have declined in 2013 but unfortunately, tend to increase in 2018. Based on data from the International Food Policy Research Institute (IFPRI) in 2014 there were 161 million stunting children under the age of five and wasting suffered by 51 million children under five. This condition is of concern to the Indonesian government in terms of stunting completion.

World Health Organization (WHO) classifies stunting as one of the most significant barriers to human growth. For those who do not know, stunting itself is a nutrient-related disorder that affects an individual's height growth. In this case, toddlers or babies are the most potentially stunted. This health problem must be considered because the danger level is quite high. The United Nations International Children's Emergency Fund (UNICEF) notes that half of the child deaths are caused by chronic malnutrition such as stunting. Based on data from the IDN times research results explaining several factors that cause stunting include 1) feeding but malnutrition; 2) Infection from the environment; 3) BBLR; 4) Poor income; 5) lack of precautionary measures in early pregnancy.

The BBLR frequency in developed countries ranges from 3.6 - 10.8%, in developing countries, it ranges between 10-43%. That is, the ratio between developed and developing

*Corresponding author: indangdewata@fmipa.unp.ac.id (I. Dewata)
DOI: 10.22034/jchr.2021.1922244.1253

countries is 1:4. In other words, there will be 4 times more BBLR events in developing countries compared to developed countries and Indonesia is a developing country, so there needs to be an increase in health that requires enormous costs. So effective and efficient strategies need to be applied. One of them is to promote ANC screening, which is expected to save costs.

Previous studies have shown that the risk of stunting is higher in short mothers (145 cm) [2]. Maternal height <150 cm is one of the risks of the stunted growth of children aged 0-23 months in Bali, West Java, and East Nusa Tenggara [3]. Research in Ethiopia shows risk factors for stunting include maternal age >30 years, mothers without formal education, mothers who work every day, mothers who do not do PNC, and mothers who are sick during their pregnancy [4]. Research in Bhutan shows that the risk factor for stunting in children 6 - 23 months is the ANC factor ≤3 times, not doing ANC on doctors, nurses and midwives, and mothers aged <18 years. Breastfeeding status is a factor that can prevent stunting [5].

Many causes of babies suffering from stunting. For example, based on research in Zambia, showing risk factors for stunting are maternal age, and children who are not breastfeeding, while factors that can prevent it are ANC visits and intake of maternal Fe tablets during pregnancy [6]. Short-range labor increases the risk of depletion of maternal reserves in subsequent pregnancies and has negative consequences for both mother and child [7]. Early detection of stunting is from live birth weight. Based on Demographic and Health Survey data [8], among live births in the five years before the survey, 94 % reported birth weight, 7% of whom had underweight birth (Table 1). The average prevalence of live birth weight for mothers aged less than 20 years is 9%, the order of first births is 8%, their mothers who have no education are 12% and their mothers with the lowest quintile income is 9%. Based on that data, this research is more interested in clarifying the relationship of BBLR with the administration of complete Fe pills, parity, age of first marriage, and ANC.

Table 1. Child's weight and size at birth

Background characteristics	(%) age of having a reported birth weight at all births*	(%) age of distribution of births with child weight reported			Total of births	(%) age of distribution of all live births based on child size at birth					Total of births
		Less than 2.5 kg	2.5 kg or more	Total		Very low	Lower than average	Average or more	Don't know	Total	
Mother's age at birth											
<20	93,3	11,8	88,2	100,0	16	0,0	7,0	93,0	0,0	100,0	17
20-34	98,6	5,4	94,6	100,0	264	0,9	8,6	90,2	0,4	100,0	268
35-49	100,0	3,6	96,4	100,0	56	0,0	16,9	83,1	0,0	100,0	56
Birth order											
1	97,8	9,0	91,0	100,0	94	2,4	8,9	87,7	1,0	100,0	96
2-3	98,5	4,3	95,7	100,0	186	0,0	9,6	90,4	0,0	100,0	189
4-5	100,0	3,7	96,3	100,0	44	0,0	14,4	85,6	0,0	100,0	44
6+	100,0	0,0	100,0	100,0	11	0,0	5,0	95,0	0,0	100,0	11
Mother's smoking status											
Smoking/tobacco	100,0	14,0	86,0	100,0	4	0,0	14,0	86,0	0,0	100,0	4
Do not smoke	98,5	5,3	94,7	100,0	331	0,7	9,8	89,2	0,3	100,0	336
Residential area											
Urban	100,0	6,4	93,6	100,0	109	1,1	9,2	89,7	0,0	100,0	109
Rural	97,9	4,9	95,1	100,0	226	0,5	10,2	88,9	0,4	100,0	231
Mother's education											

No school	100,0	0,0	100,0	100,0	1	0,0	0,0	100,0	0,0	100,0	1
Not completed in primary school	100,0	0,0	100,0	100,0	18	0,0	12,8	87,2	0,0	100,0	18
Graduated from elementary school	96,2	4,9	95,1	100,0	29	0,0	5,6	94,4	0,0	100,0	30
Not graduated from high school	96,9	8,1	91,9	100,0	86	0,0	15,2	84,8	0,0	100,0	89
Graduated from high school	99,1	4,7	95,3	100,0	111	0,0	10,7	88,4	0,9	100,0	112
College	100,0	5,0	95,0	100,0	90	2,5	4,4	93,0	0,0	100,0	90
Quintile of wealth											
The Lowest	98,5	6,9	93,1	100,0	73	0,0	12,1	87,9	0,0	100,0	74
Low	97,2	5,7	94,3	100,0	82	0,0	12,2	86,6	1,2	100,0	85
Intermediate	98,4	3,7	96,3	100,0	86	0,0	10,5	89,5	0,0	100,0	88
Hight	100,0	8,3	91,7	100,0	57	3,1	7,1	89,8	0,0	100,0	57
The highest	100,0	1,4	98,6	100,0	37	1,4	2,9	95,6	0,0	100,0	37
Total	**98,5**	**5,4**	**94,6**	**100,0**	**335**	**0,7**	**9,9**	**89,2**	**0,3**	**100,0**	**340**

% age of live births in the 5 years before the survey with birth weight reports, among live births in the 5 years before the survey that had a birth report, %age distribution by birth weight, and distribution of the % age of all live births in the 5 years before the survey according to the mother's estimate of baby size at birth and background characteristics, West Sumatra 2018.
Note: The amount includes one child with missing information on the mother's smoking status.
* Based on both the written notes and memories (recognition) of the mother in Agency of National Family Planning Coordinating (BKKBN) the Republic of Indonesia, 2018.

Based on the same survey conducted in 2018, it was reported that 98.5% of respondents stated birth weight. Among them, 5.4% of birth weight is less than 2.5 kg. Most babies under 2.5 kg occur because their mothers are smokers and/or under 20 years. They are the first birth order and most of them live in urban areas (see Table 1). Some information that should be clarified from the survey is as follows: 1) the survey has not shown an association between birth weight and the administration of Fe tablets before and during pregnancy. While there is a theory that taking Fe pills before and throughout pregnancy can prevent BBLR. Based on that theory, DHS also investigated female respondents who had used the Fe pill but unfortunately were not associated with stunting. Therefore, it will also be followed up with a correlation analysis between BBLR and taking the Fe pill. The results of a 2017 UNICEF research report in Mozambique stated that iron is a micronutrient that supports children's growth. Iron deficiency in a woman is better known as anemia. When this anemia occurs in pregnant women will cause BBLR. To overcome this deficiency in pregnant women, usually given pills/syrup Fe [9 – 12]; 2) Table 1 shows the incidence of BBLR occurred at the highest % age in the parity of the order of the first child compared to the order of the second or more children; 3) Table 1 also shows the highest %age of BBLR occurrence in children whose parents gave birth to a child less than 20 years old; 4) Some previous survey results show that with ANC each trimester, whether one to three trimesters of gestational age can prevent BBLR. For this reason, it is possible to have a relationship between ANC and BBLR.

This research discusses clarifying the relationship between Complete Fe giving, Parity, ANC Examination, and the age of women at the time of receiving BBLR in West Sumatra through Indonesian Demographic and Health Survey data. Related to this research, related agencies also require many risks such as those born premature babies, women who have high blood pressure, and women with chronic anemia.

MATERIALS AND METHODS

This research besides using secondary data from the DHS 2018. Respondents as samples were live births within 5 years of continuing the survey which had birth weight reports, both written records, and maternal memory. Stunting due to intrauterine causes is characterized by birth weights of less than 2.5 kilograms. The dependent variable of this research is BBLR infants. Understanding the condition of babies born in Indonesia which is said to be stunting is caused by various factors. Theorists and experts agree to divide into three major groups of causes of

stunting, i.e preconception, conception (intrauterine), and extrauterine [13].

The analysis of this research uses simple linear regression to find out whether taking Fe pills and the possibility of stunting in children. The application used for this analysis uses an Excel spreadsheet. The research hypothesis proposed is:

H_0: There is no relationship between the provision of complete Fe, parity, ANC examination, and the age of women having children to BBLR in West Sumatra based on the 2018 DHS.

H_1: There is a relationship between the provision of complete Fe, parity, ANC examination, and the age of women having children to BBLR in West Sumatra based on the 2018 DHS.

The mathematical formulation of the hypothesis is as follows:

H_0: $\beta1= \beta2= \beta3= \beta4=0$ (variable $\beta1$, $\beta2$, $\beta3$ and $\beta4$ no effect on Y)

H_1: $\beta1\neq \beta2\neq \beta3\neq \beta4\neq0$ (variable $\beta1$, $\beta2$,$\beta3$ and $\beta4$ effect on Y)

BBLR and Stunting

BBLR are babies whose birth weight is less than 2500 grams regardless of gestational age. BBLR is a concern of nutritionists because it is one of the triggers of stunting which is currently a priority for health sector interventions. Stunting is indeed a lot of causes, but this BBLR is a forerunner to intrauterine stunting. To find out how BBLR is weight at birth be weighed within 1 hour after birth [14, 15]. Other references in BBLR measurements are also found in the Nutrition Regional Monitoring Guidelines. In the guidelines, BBLR are babies born weighing less than 2500 grams measured at birth or until the seventh day after birth [15, 16].

BBLR is another term for premature babies until 1961. BBLR can occur when a baby is born prematurely with a gestational period of fewer than 37 weeks (not enough months), or the baby has developmental disorders in the womb. BBLR occurs due to low pregnancy, inadequate weight gain during pregnancy, malnutrition, history of pregnancy with low birth weight, adolescents, short bodies, already frequently pregnant, anemia [17], in mothers during pregnancy, low socioeconomic, and maternal stress can also cause BBLR birth [18]. Fetal and placental factors that can cause BBLR include multiple pregnancies, hydroamination, and congenital defects [19].

Characteristics and Symptoms of BBLR

In addition to having a lower birth weight than a normal baby, BBLR infants will appear visibly: 1) Thinner; 2) Having less body fat; 3) Have a large head size compared to other body sizes? Further explored the state of their health, BBLR infants have characteristics such as a) low blood sugar levels (hypoglycemia); b) Having problems in breastfeeding; c) the occurrence of obstacles in increasing body weight; d) Difficulty maintaining the temperature of the body to keep warm at normal temperatures, and e) too many red blood cells that make the blood too thick (polycythemia).

Causes of BBLR

Many conditions cause babies to be born with a low weight. The main and most common cause is premature birth, which is labor that occurs before 37 weeks of gestation. Premature babies do not have time to experience the rapid growth that occurs in the final trimester of pregnancy. Therefore, these babies tend to have low weight and small stature.

Besides premature birth, other conditions that can put babies at risk of being born with a low body west are: 1) Intrauterine growth restriction. In this condition, the baby does not grow well when in the womb. This problem can be triggered by disorders of the placenta that inhibit the growth of the baby due to not getting an adequate supply of oxygen and nutrients; 2) Complications during pregnancy, for example, pregnant women experiencing high blood pressure; 3) The fetus has a congenital medical condition; 4) Twins. Twins are often born with low weight and premature because there is not much room in the uterus for

both fetuses; 5) The age of pregnant women is still young. Pregnant women less than 15 years of age are at high risk of having a baby; 6) Pregnant women experiencing malnutrition; 7) Pregnant women using drugs or drinking alcoholic drinks; 8) Pregnant women have emotional problems during pregnancy [20].

Ordinary people view stunting and BBLR as the same thing, but health practitioners view things differently. BBLR layman's understanding is not a problem when the child is not sick after birth and his body is fat and even looks plump, so the child can be said to be healthy. There is another who understands the child's health condition is not determined by the height/length factor because height is a genetic factor.

While the understanding of academics views a proportional growth between age, weight and height can be one indicator of healthy growth and development of their children. Even the growth and development of children is not just a matter of physical condition the concept of healthy growth emerges according to cognitive, physical, and psychomotor growth according to their age.

Healthy growth is a term that has gained attention as the policy shifts from previous major concerns by reducing weight shortages to focusing on reducing stunting linear growth [21]. The term stunting can also include the absence of excessive weight gain or obesity. However, for this research, researchers focus on linear growth. [22] Regard linear growth in early childhood as a marker of healthy growth because it has to do with the risk of short-term morbidity and mortality, non-communicable diseases later in life, and learning capacity and productivity. Linear growth is also closely related to child development in several domains including cognitive, language, and sensory-motor capacity [23]. An adequate supply of nutrition, infection prevention, and opportunities for social interaction, play, and stimulation are some of the factors that contribute positively to achieving the full potential of a child to grow and develop. Stunting (short body) is a very short body state that exceeds 2 SD deficits below the median length or height. Stunting describes a state of under-nutrition that has been running for a long time and requires time for the child to develop and recover.

Chronic stunting or malnutrition is another form of growth failure. Another definition states that stunting is a nutritional status based on body length index by age (PB/U) or height by age (TB/U). Nutrition status categories based on body length index according to age (PB/U) or height according to age (TB/U) are divided into very short, short, normal, and high. Very short if Z-score <-3 SD, short if Z-score -3 SD up to -2 SD is normal if Z-score -2 SD is up to 2 SD and high if Z-score> 2 SD. Stunting has started before birth due to maternal nutrition during poor pregnancy, poor diet, poor food quality, and frequent frequency of illness. Stunting describes growth failures that occur over a long period, and are associated with a decrease in physical and psychological capacity, a decrease in physical growth, and achievement in the field of low education.

All nutritionists agree that the cause of stunting is multi-factorial. Factors causing stunting are categorized into five i.e 1) household and family factors; 2) inadequate feeding; 3) Inappropriate breastfeeding practices; 4) Infection. The five causes are greatly influenced by conditions related to the local community and social situation such as a) political economy; b) health and health protection; c) education; d) community and culture; e) agriculture and food systems; and f) water, sanitation, and the environment.

Stunting is possible in toddlers who often suffer illness due to infections such as diarrhea, acute respiratory problems, malaria, AIDS, smallpox, and other infections [24]. Besides, stunting also occurs due to acute micronutrient nutritional deficiencies such as vitamin E, A, and D deficiency - and also mineral deficiencies such as zinc and iron. Other contributing factors beyond food shortages are social factors. As stated by [25] that nutritional supplements, psychosocial stimulation, and mental development also influence stunting.

The relationship between Fe pills and BBLR

As stated in the previous reference, BBLR causes are also multifactorial, and one of them is BBLR occurs in mothers who suffer from chronic anemia. This means that women with a condition of blood deficiency (anemia) repeatedly when pregnant will endanger the condition of the fetus they

are carrying and one of them is the occurrence of BBLR. So it is very important for mothers who are preparing for pregnancy should check their hemoglobin (Hb) levels. WHO has provided a benchmark of what levels of normal Hb in pregnant women, as well as providing a category limit for mild and severe anemia during pregnancy: Normal: Hb> 11 m m^{-1}. Mild anemia: Hb 8-11 m m^{-1} Severe anemia: Hb <8 m m^{-1}.

The help that is considered to help increase this hemoglobin level in pregnant women is the provision of Fe pills. But the problem is that pregnant women rarely check the condition of the pregnancy to health workers, so the detection of anemia occurs or not a pregnant woman can not be known. The provision of this Fe pill will not help pregnant women who suffer from anemia if it is not accompanied by foods that are nutritious and rich in Fe, folic acid, vitamin B12, and other mineral sources.

The importance of ANC in preventing BBLR

The results of the research [26] showed a significant influence on the incidence of BBLR and ANC in the amount of 70% of the 12.5 control variables. Of course, with routine pregnant women checking the content, it will be detected early if there are pregnancy abnormalities, including the detection of the weight of a pregnant woman. Antenatal care is an examination of pregnancy to optimize the mental and physical health of pregnant women so that they can face childbirth, the puerperal period, preparation for breastfeeding, and the return of reproductive health properly [13]. By doing ANC periodically, it will become safe motherhood. Antenatal care is an examination of pregnancy to optimize the mental and physical health of pregnant women so that they can face childbirth, the puerperal period, preparation for breastfeeding, and the return of reproductive health properly [27].

First order parity possible occurrence of BBLR

There are two most likely treatments for a mother in welcoming her first pregnancy. The first possibility is highly expected, so that a woman and her partner take care of their pregnancy, maintaining the health of the fetus with highly nutritious food. But on the other hand, there is a psychological impact that appears in his behavior. Some of them are experiencing stress so there is interference in eating patterns. Disorders in the first trimester generally occur in a woman who is pregnant, such as nausea and vomiting that disrupt her appetite. Although nausea disorders in pregnancy (emesis gravidarum) almost entirely occur in pregnant women, the first pregnancy will make a woman more or less experience stress. Even among those who experience interference in eating throughout the life of the womb. These conditions make pregnant women experience bed rest.

Pregnancy for women under the age of 20 increases BBLR risk

Pregnant women under the age of 20 are Vulnerable to giving birth to BBLR. The results of the research [28] state that child marriage will significantly give birth to children who are stunting and BBLR. The so-called child marriage is a woman under 20 years old has a pregnancy at a young age. Pregnant women under 20 years will cause the mother to experience anemia. This is because the mother herself is still growing physically so she needs more nutrients for herself. This is certainly one of them that will cause unhealthy babies and tend to lose weight at birth.

RESULTS

Because the secondary data on the DHS sample is quite large, which is 340 samples and includes more than the required sample, there is no need to conduct a normality test. But another requirement that must be met before conducting a regression is the bivariate test of each variable as the results can be seen in the following Table 2, and based on the results of the analysis using SPSS, the output produced by looking at the t-test is whether there is a real effect of the syrup/Fe pill variable on the Birth weight in kilograms variable, by looking at the significance value obtained at 0.861 greater alpha value of 0.05 means that there is no significant relationship between giving days tablets to birth weight. The day's tablet variable is only able to explain its effect by 0.01% and the rest is explained by

other variables (Table 3). The coefficient of the regression direction and the average change of the variable day's tablet to birth weight is added due to a positive relationship that is explained by the positive direction coefficient of the regression. Thus, H_0 from this hypothesis is accepted and H_1 is rejected.

Table 2. Results of correlation of birth weight and days tablets or syrup

Correlations		Birth weight in kilograms (3 decimals)	Days tablets or syrup is taken
Birth weight in kilograms (3 decimals)	Pearson Correlation	1	0.010
	Sig. (2-tailed)		0.861
	N	317	288
Days tablets or syrup is taken	Pearson Correlation	0.010	1
	Sig. (2-tailed)	0.861	
	N	288	288

Source: Data analysis, 2020.

Table 3. Results of correlation of birth weight and number of antenatal visits during pregnancy

Correlations		Birth weight in kilograms (3 decimals)	Number of antenatal visits during pregnancy
Birth weight in kilograms (3 decimals)	Pearson Correlation	1	0.046
	Sig. (2-tailed)		0.419
	N	317	317
Number of antenatal visits during pregnancy	Pearson Correlation	-0.046	1
	Sig. (2-tailed)	0.419	
	N	317	317

Source: Data analysis, 2020.

Likewise, for the ANC examination frequency, the significance is only 0.42, wherein in the two-way analysis, the relationship is inversely proportional. This means that the ANC examination does not contribute to BBLR incidents. Thus, H0 from this hypothesis is accepted and H_1 is rejected. As for the relationship with parity where the secondary data is available there are very few samples so it cannot be analyzed further. More details can be seen in Table 4 below.

Table 4. Results of correlation of birth weight and age of respondent at 1st birth

Correlations		Birth weight in kilograms (3 decimals)	Age of respondent at 1st birth
Birth weight in kilograms (3 decimals)	Pearson Correlation	1	-0.049
	Sig. (2-tailed)		0.386
	N	317	317
Age of respondent at 1st birth	Pearson Correlation	-0.049	1
	Sig. (2-tailed)	0.386	
	N	317	684

Source: Data analysis, 2020.

The final analysis for the age of women who gave birth according to age groups to BBLR was 0.386. This means that there is no strong evidence that states there is a relationship between BBLR events and the age of women at birth. Thus, H_0 from this hypothesis is accepted and H_1 is rejected. More details can be seen in Table 5 below.

Table 5. Coefficient of determination test results (model summary)

Mode	R	R Square	Adjusted R Square	Std. error of the Estimate
1	0.063a	0.004	-0.007	749.271

a. Predictors: (Constant), Days tables or syrup was taken, number of antenatal visits during pregnancy, age of respondent at 1st birth.

Source: Data analysis, 2020.

The simultaneous effect between variables X1, X2, and X3 on BBLR is only 0.04% and the rest is influenced by other factors of 99.96%. More details can be seen in Table 6 below.

Table 6. ANOVA Test Results (ANOVA)$_{b.}$

Model	Sum of Squares	df	Men Square	F	Sig.
Regression	631361.727	3	210453.909	.375	.771a
Residual	1.594E8	284	561407.041		
Total	1.601E8	287			

a.Predictors: (Constant), Days tables or syrup was taken, several antenatal visits during pregnancy, age of respondent at 1st birth.
b.Dependent Variable: Birth weight in kilograms (3 decimals)
Source: Data analysis, 2020.

Based on the results of ANOVA analysis, it can be concluded that there is not enough evidence to state that there is a relationship between BBLR and ANC, the provision of female pills, or the woman's age at delivery because the significance level is 0.771 where the value is greater than 0.05. Thus 0.771> 0.05, then H_1 is rejected, and H_0 is accepted. More details can be seen in the following Table 7 below:

Table 7. Multiple Regression Test Results (Coefficients)$_a$

Model	Unstandardized		Standardized Coefficients	t	Sig.
	B	Std.Error	Beta		
(Constant)	3251.059	255.609		12.719	0.000
Age of respondent at 1st birth	-4.977	10.701	-0.028	-0.465	0.642
Number of antenatal visits during pregnancy	14.330	14.074	-.0.062	1.018	0.309
Days tablets or syrup taken	0.042	0.211	0.012	0.199	0.842

a. Dependent Variable: Birth weight in kilograms (3 decimals); Source: Data analysis, 2020.

Based on the results of secondary data, it can be explained as follows, BBLR causes multifactorial. Providing Fe with pills does not mean anything to women who are pregnant if the pill is not taken. Likewise, these pills only help restore the Hb if the uterus is more than 8 months old.

Likewise, the ANC examination also will not have any meaning if it has been diagnosed that the weight of the woman who is pregnant does not increase, but the participation of pregnant women to improve the quality of food does not want to because it is possible not to taste (food tastes lost). These results have differences from previous studies. Some other related studies are studies conducted that there is a relationship between ANC with preterm [28-30] and other studies that there is a relationship between ANC and BBLR-preterm visits with an or value of 7 [31].

The relationship of parity itself is not continued, because the available secondary data is a very small sample. However, the results of the research [32] found that mothers with a parity of 1 child at risk of giving birth BBLR 1.82 times greater than mothers with parity> 2 children. There is a difference in the magnitude of the likelihood of risk due to differences in determining the cutoff points of the operational definitions in this research for risk groups are 1 or > 3 children. Biologically for mothers who first give birth the likelihood of a baby's

weight will be smaller than for mothers who gave birth to a second or more child, but mothers who gave birth with high parity (more than 3 children) tend to experience complications in pregnancy which can ultimately affect the pregnancy products [33]. While women who have children under 20 years have a chance of developing BBLR if they woman does not want a pregnancy. However, from the results of secondary data processing, it lacks a relationship because the woman may be supported by the readiness of the couple to have children so that they have the willingness to maintain and maintain the womb. Some other factors causing BBLR to occur include pregnant women experiencing chronic energy shortages, experiencing anemia, lack of supply of nutrients for pregnant women, pregnancy complications, and birth spacing [34, 35].

CONCLUSIONS

Based on the results of the research shows there is no correlation between Fe pill, parity, ANC, and age of women at first-time birth to the BBLR even though in many references four variables are closely related. As a follow-up, this secondary data research should be verified by primary data. Given that no significant relationship was found between BBLR and its four independent variables, while in many references the four variables had a relationship to BBLR, the suggestion was to conduct primary research on the four variables separately. Besides that, there is still a need for a marriage age maturity program, HB examination in pregnant women, and periodic obstetrical examination (ANC).

ACKNOWLEDGEMENTS

The author would like to thank the subjects and respondents, friends, and all parties who have helped in the collection of data to the preparation of this Scientific Writing. Thank you, the authors also convey the Center for Population and BKKBN of West Sumatra Province for their input, financial assistance, criticism, and advice.

Conflict of interests

The authors declare no conflict of interest. The authors declare that they have no known competing interests or personal relationships that could have appeared to influence the work reported in this paper.

REFERENCES

1. Ismawati R, Soeyonoa R.D, Romadhoni I.F, Dwijayanti I., 2020. Nutrition intake and causative factor of stunting among children aged under-5 years in Lamongan city. Enfermeria Clinica. 30, 71-74.

2. Hayati A. Hardinsyah Jalal F., Madanijah Briawan D., 2012, Faktor-faktor Risiko Stunting, Pola Asupan Pangan, Asupan Energi dan Zat Gizi Anak 0-23 Bulan, Jurnal Gizi dan Pangan. 7(2), 73-80.

3. Fajariyah R.N., Hidajah A.C., 2020. Correlation between immunization status and mother's height, and stunting in children 2–5 years in Indonesia. Jurnal Berkala Epidemiologi. 8(1), 89-96.

4. Agedew E., Chane T., 2015. Prevalence of stunting among children aged 6–23 months in Kemba Woreda, Southern Ethiopia: a community based cross-sectional study. Advances in Public Health. https://doi.org/10.1155/2015/164670

5. Aguayo V.M., Badgaiyan N., Paintal K., 2015. Determinants of child stunting in the R oyal K ingdom of B hutan: an in-depth analysis of nationally representative data. Maternal & Child Nutrition. 11(3), 333-345.

6. Bwalya B.B., Lemba M., Mapoma C.C., Mutombo N., 2015. Factors associated with stunting among children aged 6-23 months in Zambian: evidence from the 2007 Zambia demographic and health survey. Int J Adv Nutr Health Sci. 3(1), 116-31.

7. Dewey K.G., Begum K., 2011. Long-term educational and economic consequences of child stunting. Blackwell Publishing Ltd Maternal and Child Nutrition. 7, 5-18.

8. Lozoff B., Beard J., Connor J., Felt B., Georgieff M., Schallert T., 2006. Long-lasting neural and behavioral effects of iron deficiency in infancy. Nutrition Reviews. 64(suppl_2), S34-S43.

9. Georgieff M.K., 2008. The role of iron in neurodevelopment: fetal iron deficiency and the developing hippocampus. Biochemical Society Transactions. 36(6), 1267-1271.

10. Beard J.L., Unger E.L., Bianco L.E., Paul T., Rundle S.E., Jones B.C., 2007. Early postnatal iron repletion overcomes lasting effects of gestational iron deficiency in rats. Journal of Nutrition. 137(5), 1176-1182.

11. Lukowski A.F., Koss M., Burden M.J., Jonides J., Nelson C.A., Kaciroti N., Lozoff B., 2010. Iron deficiency in infancy and neurocognitive functioning at 19 years: evidence of long-term deficits in executive function and recognition memory. Nutritional Neuroscience. 13(2), 54-70.

12. Batubara J.R., Bardosono S., Irawati A., Salimar S., 2019. Comparing The Anthropometric Measurements of Intra-Extra Uterine Period between Stunting and Non-stunting Children Aged 6-24 Months Old in Bogor Tengah Subdistrict, Bogor City, West Java. World Nutrition Journal. 3(1), 1-7.

13. Manuaba I.B.G., 1998. Ilmu kebidanan, penyakit kandungan & keluarga berencana untuk pendidikan bidan. Egc.

14. Damanik S.M.,2008. Klasifikasi bayi menurut berat lahir rendah dan masa gestasi. Dalam: Kosim MS, Yunanto A, Dewi R, Sarosa GI, Usman A, penyunting. Jakarta: Badan Penerbit IDAI. pp. 11-30.

15. Putra I.W.G.A.E., 2012. Pengaruh perawatan metode kanguru terhadap pencapaian berat normal pada bayi berat lahir rendah di kabupaten temanggung tahun 2011. Thesis. Universitas Indonesia.

16. Hanum S., 2014. Gambaran Morbiditas Bayi dengan Berat Badan Lahir Rendah (BBLR) di Ruang Perinatologi RSUD Arifin Achmad Pekanbaru (Doctoral dissertation), Riau University.

17. Santoso O., Aditya W., Retnoningrum D., 2009. Hubungan Kebersihan Mulut dan Gingivitis Ibu Hamil Terhadap Kejadian Bayi Berat Badan Lahir Rendah Kurang Bulan di RSUP Dr. Kariadi Semarang dan Jejaringnya. Media Medika Indonesiana. 43(6), 288-293.

18. Surasmi A., Handayani S., Kusuma H.N., 2003. Perawatan bayi resiko tinggi. Jakarta: Egc.

19. Dewata I., Putra A., 2021. Kriging-GIS model for the spatial distribution of seawater heavy metals. Periodicals of Engineering and Natural Sciences (PEN). 9(2), 629-637.

20. Piwoz E.G., Huffman S.L., Quinn V.J., 2003. Promotion and advocacy for improved complementary feeding: Can we apply the lessons learned from breastfeeding?. Food and Nutrition Bulletin. 24(1), 29-44.

21. Black R.E., Victora C.G., Walker S.P., Bhutta Z.A., Christian P., De Onis M., Maternal and Child Nutrition Study Group. 2013. Maternal and child undernutrition and overweight in low-income and middle-income countries. The lancet. 382(9890), 427-451.

22. McDonald C.M., Manji K.P., Kupka R., Bellinger D.C., Spiegelman D., Kisenge R., Duggan C.P., 2013. Stunting and wasting are associated with poorer psychomotor and mntal development in HIV-exposed Tanzanian infants. The Journal of Nutrition. 143(2), 204-214.

23. Katona P., Katona-Apte J., 2008. The interaction between nutrition and infection. Clinical Infectious Diseases. 46(10), 1582-1588.

24. Grantham-McGregor S.M., Powell C.A., Walker S.P., Himes J.H., 1991. Nutritional supplementation, psychosocial stimulation, and mental development of stunted children: the Jamaican Study. The Lancet. 338(8758), 1-5.

25. Husein S., 2014. Pengaruh Antenatal care terhadap kejadian Berat Bayi Lahir Rendah (BBLR). Jurnal Biometrika dan Kependudukan. 3(2), 160-167.

26. Kementerian Kesehatan (KEMENKES) RI. 2013. Buku Saku Pelayanan Kesehatan Ibu di Fasilitas Kesehatan Dasar dan Rujukan". Jakarta; Direktur Jenderal Bina Kesehatan Masyarakat Kementrian Kesehatan RI.

27. Paul P., Chouhan P., Zaveri A., 2019. Impact of child marriage on nutritional status and anaemia of children under 5 years of age: empirical evidence from India. Public Health. 177, 95-101.

28. Alexander G.R., Tompkins M.E., Petersen D.J., Weiss J., 1991. Source of bias in prenatal care utilization indices: implications for evaluating the Medicaid expansion. American Journal of Public Health. 81(8), 1013-1016.

29. Muslimatun S., West C.E., Schultink W., Hautvast J.G., 2001. Vitamin A and iron supplementation of Indonesian

pregnant women benefits vitamin A status of their infants. British Journal of Nutrition. 86(5), 607-615.

30. Caulfield L.E., Zavaleta N., Figueroa A., Leon Z., 1999. Maternal zinc supplementation does not affect size at birth or pregnancy duration in Peru. The Journal of Nutrition. 129(8), 1563-1568.

31. Mavalankar D.V., Gray R.H., Trivedi C.R., 1992. Risk factors for preterm and term low birthweight in Ahmedabad, India. International Journal of Epidemiology. 21(2), 263-272.

32. Rosemary F., 1997. Hubungan Layanan Antenatal dengan Kejadian Berat Bayi Lahir Rendah di Kabupaten Bogor Propinsi Jawa Barat Tahun 1997, Thesis, Magister Ilmu Kesehatan Masyarakat Universitas Indonesia.

33. Mark A., Klebanoff M., Shiono P., Selby J.V., Trachtenberg A., Graubard B., 1990. Institute of Medicine. Nutrition during pregnancy.

34. Maryunani A., 2013. Asuhan Bayi Dengan Berat Badan Lahir Rendah. Jakarta timur: CV. Trans Info Media.

35. Haryanto C.P., Pradigdo S.F., Rahfiluddin M.Z., 2017. Faktor–Faktor yang Berhubungan dengan Kejadian Berat Badan Lahir Rendah (Bblr) di Kabupaten Kudus (Studi di Wilayah Kerja Puskesmas Undaan Kecamatan Undaan Kabupaten Kudus Tahun 2015). Jurnal Kesehatan Masyarakat (e-Journal). 5(1), 322-331.