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The Relationship between History of Providing Fe Supplementation to Mothers during Pregnancy with Low Birth Weight Rate in Toddlers Age 0-59 Months in Mekarbakti Village, Sumedang Regency, West Java in 2020

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***Abstract*:**
Low birth weight (LBW) continues to be a globally significant public health problem because of its short and long term effects on health. Many risk factors can cause LBW events. The nutritional factors that cause LBW, such as a low nutritional diet and inadequate weight gain during pregnancy, contribute to the low intake of nutrients that are important for fetal growth, such as vitamin B and iron. Ionic iron is a mineral that plays a role in the formation of new haemoglobin and is the main source of energy and oxygen transportation to the organs of the body. Decreased haemoglobin levels support changes in placental angiogenesis, limiting the availability of oxygen to the fetus and, consequently, potentially causing intrauterine growth retardation and low birth weight. This type of research is analytic with a case study research design with a cross-sectional approach, where factors are studied using a retrospective approach. This study is an analytic study to find out "The Relationship of Giving Tablets with Blood to Mothers with 0-59 Months Infants to LBW in Mekarbakti Village, Sumedang Regency, West Java in 2020". Based on the results of the study, the probability value (p-value) is greater than 0.005, meaning that there is a relationship of giving blood-added tablets to mothers who have babies aged 0-59 months to the blood in Mekarbakti village, Sumedang Regency, West Java in 2020.
Keywords: LBW, Iron Tablet, Ionic Iron, Pregnancy.

1. INTRODUCTION

Low birth weight (LBW) continues to be a significant public health problem globally because of its short and long term effects on health. According to the World Health Organization (WHO), LBW is defined as birth weight less than 2500 g [1;2]. In 2011, 15% of babies worldwide (more than 20 million people) were born with LBW and WHO estimates that there are around 25 million infants with LBW every year, and almost 95% of them are in developing countries [3]. The prevalence of low birth weight in developing countries (16.5%) is doubled compared to developed countries (7%) [4;5]. Asia has the lowest average birth weight in the world. Nearly a third of babies in the Southeast Asian region are born with low body weight [6]. Health problems that can arise in newborn LBW infants are hypothermia, hypoglycemia and impaired electrolyte and fluid balance, hyperbilirubinemia, infants more susceptible to infection, and respiratory problems, which can threaten the lives of babies. While the long-term problems that can be caused are hearing loss, cognitive impairment and health problems when LBW babies have become adults namely hypertension, type 2 diabetes and heart disease [7].

In a study conducted in 2014 stated that LBW can be caused by several factors such as maternal factors (nutritional status, age, parity, economic status), history of poor pregnancy (having given birth to LBW, abortion), antenatal care poor care, fetal condition [8;9;10]. The results of the Sagung Adi Sresti Mahayana study showed evidence that one of the effects of anaemia on pregnant women gave birth to premature LBW infants (56.7%) [11;12]. Research conducted by Bharati, Bandyopadhyay, and others, in Nepal in 2018, the prevalence of low birth weight was 23.6% (with 95% CI 21.88 to 25.32%) of which almost all (95.45%) respondents received iron tablets and folic acid with 95% CI (94.60 to 96.30). 4 Research conducted in 2016 at H. Boejasin Hospital, the proportion of LBW was 20.2% of the total live births and the death rate was 17.3% where the death rate according to birth weight category was 96% in the <1000 g, 62% group in the 1,000-1,499 g group, 19% in the 1,500-1,999 g group, and 4% in the 2,000-2,499 g group [9]. Babies born with low birth weight babies have a morbidity and mortality rate of 20-30 times higher than babies born with normal birth weight babies. LBW also causes a global infant mortality rate of more than 30% [13;14].

The prevalence of LBW per 100 births in the world reached 14.6% in 2015. This figure is lower than the prevalence of LBW in 2000, which is 17.5%. However, the highest incidence of LBW is still dominated by countries in Sub-Saharan Africa and Southeast Asia. The number of LBW infants in Southeast Asian countries reaches 9,807,400 babies [15;16] Indonesia, one of the countries in Southeast Asia, is still haunted by the LBW problem. The percentage of LBW babies in Indonesia according to the Indonesian Demographic and Health Survey is 7.1% of the birth rate of 17019 babies. In West Java, there is a percentage of LBW infants as much as 7.1% of the 3331 birth rates [17].

LBW is one of the Sustainable Development Goals (SDGs) targets that are included in the second sustainable development goal of eliminating hunger and all forms of malnutrition by 2030 and achieving food security. The target is set by reducing the LBW rate to 30% by 2025. This means a relative reduction of up to 3% for each year between 2012 and 2025, and a reduction of around 20 million LBW infants to 14 LBW babies [18]. According to the National Reference Book for Maternal and Neonatal Health Services, LBW is a newborn whose birth weight is less than 2,500 grams (up to 2,499 grams). Concerning handling and life expectancy, low birth weight babies are distinguished as follows: a) Extremely low birth weight (ELBW), ie babies with birth weight < 1000 grams; b) Very low birth weight (VLBW), ie babies with birth weights < 1500 grams; and c) Low birthweight (LBW), ie babies with birth weights < 2500 grams [19;20].

Factors that can influence the birth weight of a baby are classified as follows: a) Internal environmental factors, which include maternal age, parietal, birth spacing, maternal health, maternal haemoglobin levels and anthropometric measurements of pregnant women; b) External environmental factors, which include environmental conditions, mother's food input during pregnancy, type of work the mother, mother and father's education level (head of a family), nutritional knowledge and socioeconomic level; DNA c) Health service use factors are frequency of antenatal care (ANC) [21;22]. Many risk factors can cause LBW events, including maternal factors (maternal age, level of education, psychological stress, socioeconomic status, ANC, parity, pregnancy distance, nutritional status, nutritional intake, alcohol consumption, pregnancy diseases such as anaemia, preeclampsia), eclampsia, hypertension) and environmental factors (culture, highland residence, exposure to toxic substances) [23;24]. The nutritional factors that cause LBW, such as a low-nutrition diet and inadequate weight gain during pregnancy, contribute to the low intake of nutrients that are important for fetal growth, such as vitamin B and iron.

Ionic iron is a mineral that plays a role in the formation of new haemoglobin and is a major source of energy and oxygen transportation to the organs of the body. Maternal anaemia can occur due to the unavailability of this element in the extracellular environment for erythropoiesis and the presence of an infection process, which can affect the metabolism of new haemoglobin. Decreased haemoglobin levels support changes in placental angiogenesis, limiting the availability of oxygen to the fetus and, consequently, potentially causing intrauterine growth retardation and low birth weight. Pregnant women with haemoglobin levels below 11 g/dL have a higher risk of having children with low birth weight compared to women who do not suffer from anaemia during pregnancy. Therefore, consumption of blood-added tablets has a very large impact on reducing the risk of maternal anaemia [25;26].

From the description above, the need for consumption of blood-added tablets during pregnancy to reduce LBW rates. For this reason, this study was conducted to determine the relationship between the history of supplementation of blood-added tablets to mothers during gestational age with low birth weight (BLB) rates in toddlers aged 0-59 years in Mekarbakti Village, Sumedang Regency, West Java in 2020.

2. METHOD

This type of research is analytic with a case study research design with the cross-sectional approach, where factors are studied using a retrospective approach. The location of this research is in Mekarbakti Village, Sumedang Regency, West Java in 2020 and carried out for 10 days. The population of this study is mothers who have babies aged 0-59 months and have low birth weight as many as 440 people. The sample used was 88 people. The instruments used in this study were: a) Stationery (pencils, pens, erasers, road boards); b) Maternal and Child Health Book (MCH); c) Inform Consent Sheet; d) Questionnaire Sheet; and e) SPSS. Data processing is carried out with a computerized system through several processes as follows: a) Editing, to ensure that the data obtained is complete or complete and can be read properly, relevantly, and consistently; b) Coding, can be obtained from data sources that have been checked for completeness then coding before processing with a computer; c) Data entry, encoded data processed with the help of a computer program; and d) Cleaning, the process of checking data back that has been entered if there are errors or errors.

3. RESULT AND DISCUSSION

The variables studied that were described included the LBW incidence rate, and Fe supplementation included blood added tablets which included a history of giving blood added tablets, the number of blood added tablets obtained, the number of blood added tablets taken, the reason the mother did not consume all the added blood tablets obtained, the relationship between the number of tablets added blood obtained, the number of tablets added blood taken with the incidence of LBW in Mekarbakti Village, Sumedang, West Java in 2020. Univariate analysis is an analysis conducted to analyze each variable of research aimed at explaining and describing the characteristics of each variable. In this study, univariate analysis is a description of the characteristics of respondents and the variables studied and displayed in the form of frequency distribution tables and percentages (%).

Table 1 Frequency Distribution of Infant Birth Weight Frequencies in Children 0-59 Months in Mekarbakti Village, Sumedang, West Java in 2020

Description	Frequency	%
LBW	7	8
No LBW	81	92
Total	**88**	**100**

Table 1 above shows the number of samples that experienced LBW and did not experience LBW. From the above table, it is found that of 88 toddlers, there are 7 toddlers (8%) born with LBW, and there are 81 toddlers (92%) who were not born with LBW in Mekarbakti village in 2020. Based on available data.

Table 2 Historical Distribution of Fe Supplementation (Blood Added Tablets) during Pregnancy to Mothers with Toddlers Aged 0-59 Months in Mekarbakti Village, Sumedang, West Java in 2020

Description	Frequency	%
Yes	88	100
No	0	0
Total	**88**	**100**

Table 2 above shows that of 88 respondents, all respondents (100%) received blood-added tablets during pregnancy. This shows that all mothers with children aged 0-59 months in Mekarbakti village in 2020 received blood-added tablets during pregnancy.

Table 3. Frequency Distribution of the Amount of Fe Supplementation (Tablets Plus Blood) Obtained during Pregnancy for Mothers with Children Aged 0-59 Months in Mekarbakti Village, Sumedang, West Java in 2020

Description	Frequency	%
Get tablets to add less blood	7	8
Get tablets to add enough blood	81	92
Total	**88**	**100**

Table 3 above shows that of the 88 respondents, the majority of respondents with 81 respondents (92%) received an adequate amount of Fe supplementation (tablets plus blood). The amount of blood added tablets obtained is quite as much as more than 90 tablets added blood, whereas 7 respondents (8%) get less amount of Fe supplementation (tablets plus blood). The number of tablets plus blood obtained is less the same as less than 90 tablets added with blood.

Table 4 Frequency Distribution of the Total Consumption of Fe Supplementation (Tablets Plus Blood) Obtained during Pregnancy in Mothers with Toddlers Aged 0-59 Months in Mekarbakti Village, Sumedang, West Java in 2020

Description	Frequency	%
Get tablets to add less blood	10	11,4
Get tablets to add enough blood	78	79,6
Total	**88**	**100**

Table 4 above shows that of the 88 respondents, the majority of respondents with 78 respondents (79.6%) consumed a sufficient amount of Fe supplementation (tablets plus blood). The number of tablets plus blood consumed is enough as much as more than 90 tablets added blood. Whereas 10 respondents (11.4%) consume less amount of Fe supplementation (tablets plus blood). The number of blood-added tablets consumed is less than the amount of less than 90 blood-added tablets.

Table 5. Frequency distribution of reasons for supplementation of Fe (Tablets Plus Blood) not Consumed during Pregnancy in Mothers with Toddlers Aged 0-59 Months in Mekarbakti Village, Sumedang, West Java in 2020

Reason	Frequency	%
Bored	3	3,4
Side effects (nausea / constipation)	1	1,1
Forget	8	9,1
Nauseous vomit	12	13,6
Not Yet Time Out	0	0
Do not like	1	1,1
Total	**25**	**28,4**

Table 5 above shows that of the 88 respondents, the majority of respondents with 63 (71.6%) respondents consumed the amount of Fe supplementation (tablets plus blood) according to the amount obtained [36]. Whereas 25 respondents (28.4%) consume less blood added tablets than the number of added blood tablets. Three respondents (3.4%) did not routinely consume blood-added tablets because they were bored. One respondent (1.1%) did not routinely consume blood-added tablets because of the side effect of nausea. Eight respondents (9.1%) did not routinely consume blood tablets because they forgot. Twelve respondents (13.6%) did not routinely consume blood tablets because of nausea/vomiting. One respondent (1.1%) did not routinely consume blood-added tablets because he did not like it.

Bivariate analysis was carried out to see the relationship between the independent variable (Fe supplementation ie the number of tablets added to blood obtained and the number of tablets added to blood taken) with the dependent variable (LBW events). The statistical test used was the Chi-Square test with a degree of confidence of 95% (α = 0.05). The provisions of the Chi-Square test according to Hastono and Sabri (2010) are as follows: a) The Chi-Square test is very well used for tables with large degrees of freedom (df); b) If the table used is 2x2 and no cells have Expected Count (E) <5, then the test used should be Continuity Correction; c) If the 2x2 table is found cells have an E value <5, then the test used is the Fisher Exact Test, and if the table is more than 2x2 using Pearson Chi-Square; and d) Decisions made from the Chi-Square results are if p> α (0.05), Ho is rejected.

Table 6 Relationship of Giving Tablets Added to Blood Drunk by LBW Incidence Rate

The category of Tablets Add blood	LBW				Total		P	
	Experiencing LBW		Did not experience LBW					OR 95% CI
	N	%	N	%	N	%		
Giving tablets added less blood	5	5,7	5	5,7	10	11,4	0,000	2,714
Giving tablets added enough blood	2	2,3	76	86,4	78	88,6		
Total	**7**	**8**	**81**	**92,**	**88**	**100,0**		

Table 6 above shows that from 8 mothers who consumed less blood added tablets, there was 1 toddler who experienced LBW and 7 toddlers who did not have LBW. Meanwhile, of the 80 mothers who consumed enough added blood tablets, 4 toddlers experienced LBW and 76 toddlers who did not have LBW. Thus it is known that toddlers who did not experience the most LBW events in mothers who consumed enough blood added tablets as many as 76 people. Whereas toddlers who experienced the most LBW occurrence in mothers who consumed less added blood tablets were 4 toddlers. P-value 0,000 indicates that the p-value <α, where α value is 0.005. So there is a significant difference between the number of tablets added blood consumed with LBW events, and the relationship between the number of tablets added blood consumed with LBW events. The OR value is indicated by the "estimate" value of 2.714, meaning that mothers who get blood-added tablets tend to have a 2.7-fold risk of giving birth to infants with LBW events compared to those who get enough blood-added tablets.

Based on available data, it was found that out of 88 toddlers, 7 toddlers (8%) were born with LBW, and there were 81 toddlers (92%) who were not born with LBW in Mekarbakti village in 2020. This is comparable to Ayesha Khan's research, involving 947 single live births at term stated during the study period that a small percentage (10.6%) of patients delivered LBW infants [27;28]. Data obtained from this study show that all mothers with children aged 0-59 months in Mekarbakti village in 2020 received blood-added tablets during pregnancy. This is in line with Tumaji's research in 2014, which stated that as many as 85% of pregnant women in urban slums in West Java Province and as many as 96% of pregnant women in urban slums in DIY received iron tablets when checking their pregnancy in health workers. The percentage shows that the coverage of iron tablets in the province has exceeded the minimum percentage set by the government [29;30]. Data obtained during the study showed that almost the majority (81 respondents) received sufficient amounts of Fe supplementation (tablets plus blood). The number of tablets added with blood that is enough is more than equal to 90 tablets added with blood [31;32].

Our research data found that 78 respondents (79.6%) consumed an adequate amount of Fe supplementation (tablets plus blood). The number of tablets plus blood consumed is enough as much as more than 90 tablets added blood [33]. The number of tablets plus blood obtained is less the same as less than 90 tablets added with blood. This study is not comparable with the Iryani K study that the number of consumption of Fe tablets < 90 tablets during pregnancy in the case group was 44 people (37.9%) more than the riskless pregnancy (consumption of Fe tablets ≥ 90 tablets during pregnancy) as many as 14 people (12.1%) [34;35]. From the research data, we found there were 25 respondents (28.4%) consuming less blood added tablets than the number of added blood tablets. Three respondents (3.4%) did not routinely consume blood-added tablets because they were bored. One respondent (1.1%) did not routinely consume blood-added tablets because of the side effect of nausea, eight respondents (9.1%) did not routinely take blood-added tablets because they forgot. Twelve respondents (13.6%) did not routinely consume blood tablets because of nausea/vomiting. One respondent (1.1%) did not routinely consume blood-added tablets because he did not like it. This is not following the results of the previous Ratna Juwita study which showed that pregnant women who were not compliant to consume Fe tablets were 37 mothers (82.2%). Based on a questionnaire distributed to respondents of non-compliance with pregnant women consuming Fe tablets including nausea/vomiting due to pregnancy which was 85.7%, because of the side effects of Fe tablets as much as 70% some respondents took Fe tablets if they felt unwell and stopped if they felt well which is 42.8%. But in general, the respondents stated that the Fe tablets were very good at 91.4%, and felt better and healthier by taking 75.7% Fe tablets [36;37].

The relationship between the history of iron supplementation with LBW events (p = 0,000, OR = 2,714) where the value of P> α indicates a relationship between the number of tablets added with blood obtained with LBW events. Ika Saptarini's research results, in 2015, about factors related to the consumption of iron tablets in pregnant women, iron tablets in pregnant women can be obtained every time they do antenatal care or pregnancy checks. A qualitative study in West Java found that some mothers did receive iron tablets every ANC visit, but because the amount received varied (15 tablets to 30 tablets), not all mothers received a total of at least 90 iron tablets during pregnancy. Where ANC visits as recommended (K4) did not show an association with the number of iron tablets consumed by pregnant women during pregnancy. This is also possible because the iron tablets obtained during the visit are indeed inadequate. The results of the qualitative study also found that some respondents received a large number of tablets varying between 7-15 tablets per visit, as well as according to the midwife public health centre. This is because the supply of iron tablets in the public health centre is often limited [38;39]. The results of the Demographic and Health Survey (Demographic Health Survey) in several countries in 2004-2007 also showed that 20-60% of mothers with ANC visits 3 times or more received less than 90 iron tablets [41]. Sulistianingsih A's research, in 2017, showed that the lowest number of Fe tablets consumed by pregnant women who consumed iron tablets during the day was 37 people. If Fe tablets are given according to antenatal care service standards ie 90 tablets during pregnancy and good diet it will have a significant influence on the Hb status of pregnant women [42].

The need for Fe during pregnancy is approximately 1000 mg, of which 500 mg is needed to increase the mass of red blood cells, 300 mg for transportation to the fetus in a 12-week pregnancy and 200 mg again to replace the fluid that comes out of the body. The need for Fe during the first trimester is relatively slightly around 0.8 mg a day which then increases sharply during the second and third trimesters, which is 6.3 mg a day. This is because during pregnancy there is a progressive increase in blood volume from the 6th to the 8th week of pregnancy and reaches a peak in the 32nd to 34th week with minor changes after that week. Supplementation of Fe tablets is one of the most effective iron deficiency anaemia prevention and management programs that can increase haemoglobin levels in pregnant women and can reduce the prevalence of anaemia in pregnant women by 20-25%. Fe tablets contain 200 mg of ferrous sulfate and 0.25 mg of folic acid which is bound with lactose. Pregnant women are advised to consume Fe tablets of at least 90 tablets at a dose of 1 tablet per day in a row for 90 days of pregnancy [43].

In this study also obtained P 0,000 with an OR value of 2.714 which shows the relationship between the number of tablets added by blood consumed with LBW events. In this study, only a few mothers had babies with LBW but OR was declared significant, although only 8 toddlers were born with LBW of 88 toddlers in Mekarbakti village, Sumedang Regency, West Java Province. This study is in line with Pratiwi A's research, in 2018 about the relationship of anaemia in pregnant women with LBW events, which showed that the relationship between Fe tablets and LBW events did not have a meaningful value, indicated by the value of $p = 0.1$ and the OR value obtained was 0.52 which can be interpreted that giving Fe tablets to pregnant women is a factor that reduces the occurrence of LBW [44]. The Fatimatasari study, in 2013, regarding compliance with consuming Fe tablets during pregnancy, was related to the incidence of Low Birth Weight Babies (LBW), which showed that there was a relationship between the level of adherence to consuming Fe tablets during pregnancy with the incidence of low birthweight babies (LBW). There was 46.7 per cent of respondents claimed to consume iron tablets as recommended (a minimum of 90 tablets during pregnancy) [44]. Wiwit H's research, in 2012, about the relationship of compliance of pregnant women consuming Fe tablets with anaemia, showed that pregnant women who were obedient in consuming Fe tablets were more (50.9%) than those who were not (49.1%) [39].

The results of the above study support the theory that pregnant women need more iron than non-pregnant women so they have to get additional iron supplements. Iron tablets are associated with an increase in haemoglobin levels in the blood which functions to bind and distribute oxygen to body cells, including fetal tissue cells. If the Hb level is < 11gr%, this means that it shows anaemia during pregnancy, then the distribution of oxygen to the tissue will be reduced so that tissue metabolism decreases, including in the fetus, so growth will be stunted and result in low infant weight [45].

From the 88 respondents, after a statistical test, a P value of 0,000 was obtained which indicates a relationship between the number of tablets added with blood obtained with LBW events. The need for Fe during pregnancy is approximately 1000 mg, of which 500 mg is needed to increase the mass of red blood cells, 300 mg for transportation to the fetus in a 12-week pregnancy and 200 mg again to replace the fluid that comes out of the body. The need for Fe during the first trimester is relatively slightly around 0.8 mg a day which then increases sharply during the second and third trimesters, which is 6.3 mg a day. This is because during pregnancy there is a progressive increase in blood volume from the 6th to the 8th week of pregnancy and reaches a peak in the 32nd to 34th week with minor changes after that week. Supplementation of Fe tablets is one of the most effective iron deficiency anaemia prevention and management programs that can increase haemoglobin levels in pregnant women and can reduce the prevalence of anaemia in pregnant women by 20-25%. Fe tablets contain 200 mg of ferrous sulfate and 0.25 mg of folic acid which is bound with lactose. Pregnant women are advised to consume Fe tablets of at least 90 tablets at a dose of 1 tablet per day in a row for 90 days of pregnancy [25].

In this study also obtained a P-value of 0,000 with an OR value of 2.714 which indicates a relationship that has a meaningful value between the number of tablets added by blood consumed with LBW events. This study is in line with the 2018 Pratiwi A study about the relationship of anaemia in pregnant women with LBW events, which shows that the relationship between Fe tablets and LBW events has a significant value, indicated by the value of p = 0,000 and the OR value obtained is 2.714 which can be interpreted that giving Fe tablets to pregnant women is a factor that reduces the occurrence of LBW. In this study, only a few mothers had babies with LBW, so the OR was declared insignificant, only 8 toddlers born with LBW of 88 toddlers in Mekarbakti village, Sumedang Regency, West Java Province. The Fatimatasari study, in 2013, regarding compliance with consuming Fe tablets during pregnancy, was related to the incidence of Low Birth Weight Babies (LBW), which showed that there was a relationship between the level of adherence to consuming Fe tablets during pregnancy with the incidence of low birthweight babies (LBW). There is 46.7 per cent of respondents claimed to consume iron tablets as recommended (a minimum of 90 tablets during pregnancy). Ika Saptarini research results, in 2015, about factors related to consumption of iron tablets in pregnant women, from 66 cases and 66 controls showed that 46.7 per cent of respondents claimed to consume iron tablets as recommended (at least 90 tablets during pregnancy) and 53, 3% of respondents consume iron tablets poorly during pregnancy [41].

The results of the above study are similar to the theory which says that pregnant women need more iron than women who are not pregnant so they must get an additional form of iron supplements. Iron tablets are associated with an increase in haemoglobin levels in the blood which functions to bind and distribute oxygen to body cells, including fetal tissue cells. If the Hb level <11gr%, this means anaemia during pregnancy, then the distribution of oxygen to the tissue will be reduced so that tissue metabolism decreases, including the fetus, growth will be stunted and result in low infant weight [46;47].

4. CONCLUSION

Based on the results of research and discussion in the previous chapter, the following conclusions can be drawn: a) Of 88 respondents, including 7 toddlers with LBW (8%); b) All respondents received Fe supplementation during pregnancy (100%); c) Of the 88 respondents, there were 81 respondents receiving iron supplementation of > 90 items during pregnancy (92%); c) Of 88 respondents, there were 78 respondents (79.6%) consuming an adequate amount of Fe supplementation (tablets plus blood); d) Respondents did not consume Fe supplementation due to nausea/vomiting (13.2%); and e) There is a significant relationship between Fe supplementation for mothers with infants aged 0-59 months and LBW in Mekarbakti Village, Sumedang Regency in 2020.

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