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Correlation between Low Birth Weight and Social-Emotional Development in Toddlers

Aisyah Nourma Andini[1], Ira Rahmawati[2*], Eka Afdi Septiyono[2]

[1]Faculty of Nursing, Universitas Jember, Indonesia
[2]Department of Child and Maternity Nursing, Faculty of Nursing, Universitas Jember, Indonesia;
ira.rahmawati@unej.ac.id (Corresponding Author)

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ABSTRACT

Low birth weight can be one of the factors that can affect the social-emotional development of toddlers. Previous research has indicated that LBW toddlers are more likely to have issues with their social-emotional development. Since this developmental domain influences cognitive function, motor function, and linguistic abilities, it may have an effect on children's performance in the future. This study aims to determine whether the history of low birth weight is related to the social-emotional development of toddlers in the UPT Puskesmas Kalisat Working Area, Jember. Cross-sectional study with the quantitative analysis used in this study. The number of samples is 125 respondents using a multistage cluster random sampling technique. Data was collected using the MCH (Maternal and Child Health) book to find out the history of birth weight and the PPSC (Pediatric Preschool Symptom Checklist) questionnaire. The results showed that 66 children (52.8%) did not have a history of LBW. The social-emotional development of toddlers is mostly not at risk of experiencing social-emotional development disorders, with a total of 69 toddlers (57.2%). Chi-square test analysis obtained a p-value of 0.147 > 0.05, which means that there is no significant relationship between LBW history and social-emotional development in toddlers. However, it is important to underline that social-emotional development is influenced by various factors. This study shows that factors of nutritional status, age of mother/caregiver, and educational status of mother/caregiver statistically affect social-emotional development ($p<0.05$).

Keywords: low birth weight; social-emotional development; toddler

INTRODUCTION

Childhood (0-6 years) is the Golden Age in human life. During this time, individuals experience very rapid and complex physical and mental growth and development (Rohmadi et al., 2020). High brain plasticity at this age strongly affects cognitive, social-emotional development, health, and even brain structure (Wang et al., 2022). Human development consists of 4 main domains: physical, cognitive, and social-emotional. The social-emotional aspect is a crucial aspect of child development because it can affect cognition, motor function, and language skills which have a major impact on a child's future performance both in the school environment and in everyday life (Peralta-Carcelen et al., 2017).

Globally, the National Institute of Mental Health (NIMH) reports that emotional and behavioral disorders affect 10-15% of children in the world (KMHO, 2019). Subdirektorat Statistik Pendidikan dan Kesejahteraan Sosial (2020) reveals that the achievement of child development in Indonesia in the dimension of social-emotional abilities is still below 70%, namely only 69.90% where the average of the total Indonesian child development index is 88.3%. This needs to be a concern because the inability of children to achieve social-emotional development can indicate social-emotional disorders such as autism, behavioral disorders, social anxiety disorders, and others in the future (Malik & Marwaha, 2022).

Several factors, including birth weight, can influence social-emotional development in children. Babies with low birth weight (LBW) due to premature birth or IUGR (Intrauterine Growth Retardation) are more at risk of experiencing growth and development disorders in the future (Khayati & Sundari, 2019; Jember, 2020). This is because the fetus's growth is hampered or cannot develop optimally during pregnancy, so some of the baby's body systems are still immature at birth, such as immature brain blood vessels and central nervous system, small respiratory system lumen, alveoli not functioning optimally, thin skin structure, less subcutaneous fat, and so on, causing the baby to experience abnormalities and difficulties in adaptation when transitioning from the inner to the outer environment (Hillman et al., 2012; Peralta-Carcelen

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et al., 2017; Sacchi et al., 2020). These conditions cause stress in infants which can affect the vulnerability of neurodevelopment in the baby's brain during critical periods of development that occur in the early years of life.

Even though until now they have survived without experiencing neuromotor abnormalities, children with a history of LBW are at risk of experiencing poor development, such as cognitive deficits, motor delays, socio-emotional and behavioral problems, to other psychological behavioral problems (Wulandari et al., 2017; Anil et al., 2020; Sacchi et al., 2020). Peralta-Carcelen et al. (2017) evaluated 2505 children with a history of premature birth, 35% (837) of whom had behavioral problems and 26% (637) showed a decrease in social-emotional abilities at the age of 18-22 months. Furthermore, research by Wang et al. (2022) concluded that children who experience delays in social-emotional development in the first 3 years of age experience social-emotional development problems which result in social difficulties, poor adjustment in the school environment, and impact on children's performance at school.

Based on data from the East Java Provincial Health Office (2021), East Java occupies the 3rd position with the highest LBW cases. Jember Regency is the district with the most LBW cases in East Java, namely 1,908 babies. Of all the public health centers in Jember Regency, the Kalisat Health Center is one of the top three highest contributors to LBW cases in Jember. Low birth weight is one of the factors that affect the social-emotional development of toddlers. Knowing the development at the age of five, especially in social-emotional development, is important to do. The different directions of social-emotional development, when toddlers are young, will have an impact on social-emotional development when children enter preschool age. Therefore, researchers are interested in knowing and analyzing the relationship between birth weight history and social-emotional development in toddlers in the agricultural area of Kalisat District, Jember Regency.

METHOD

This research is analytic correlation which is included in the type of quantitative research with a cross-sectional study design. The population in this study were mothers/caregivers with toddlers aged 18-36 in the Kalisat Health Center working area village. This study used a multistage sampling technique. The first stage of sampling used the cluster sampling method, the researchers chose 6 of 12 villages in Kalisat District as research sites, including Ajung Village, Kalisat Village, Plalangan Village, Sumber Ketempa Village, Sumber Jeruk Village, Gambiran Village The second stage uses the simple random sampling method to randomize the sample in each selected village. Researchers used inclusion and exclusion criteria for sampling. The inclusion criteria included mothers/caregivers with toddlers in the age range of 18-59 months, live in the village of Kalisat Health Center working area, and willing to participate in this study. Exclusion criteria included toddler who have chronically ill, toddlers with congenital defects, toddlers who have died. The data collection process was carried out door to door or at the posyandu within 3 weeks with a total sample of 125 respondents.

The data collection tool used the MCH handbook to look at the history of low birth weight and the PPSC (Preschool Pediatric Symptom Checklist) questionnaire to detect toddlers' social-emotional development. This questionnaire contains 18 questions of 4 subscales, including internalization, externalization, attention-focusing problems, and parenting challenges. The researcher translated the language from English to Indonesian, accompanied by adjustments to the context and contents of the questionnaire. CVI tested this questionnaire on 5 pediatric nursing experts at the Faculty of Nursing, University of Jember. The results of item assessment calculations by the five experts obtained the i-CVI value per item in the range of 0.80-1.00. Furthermore, the s-CVI/Ave value was 0.98 and the s-CVI/UA value was 0.94. The s-CVI value in the 0.80 < mean i-CVi < 1.00 is included in the very high validity criterion (Puspitasari and Febrinita, 2021). Meanwhile, the reliability test results on 20 samples obtained Cronbach's Alpha value of 0.747. The questionnaire using a Likert scale with three possible answers, 0 = never; 1 = sometimes; 2 = often, and for unanswered questions, a score of 0 is given. All the answer scores from the 18 questions are added up and become the total score of the measurement. If the PPSC total score is ≥9, it is considered an "at risk" child and requires further evaluation.

Data analysis using univariate analysis and bivariate analysis with SPSS. Univariate analysis to describe each variable characteristic of the respondents and the independent and dependent variables in the study. Bivariate analysis used the chi-square test (p-value <0.05) to determine the relationship between a history of low-birth-weight babies and toddlers' social-emotional development. Furthermore, bivariate analysis was done to determine the impact of each variable of the respondent's characteristics on toddlers' social and emotional development.

This research has received ethical approval from the Health Research Ethics Committee of the University of Jember, Faculty of Nursing with number 050/UN25.1.14/KEPK/2023.

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RESULT

Respondent Characteristics

Respondent characteristic data consisted of toddlers and mothers/caregivers, including age of toddlers, history of breastfeeding, duration of breastfeeding, gender of toddlers, nutritional status, age of mothers/caregiver, level of formal education of mothers/caregiver, occupational status of mother/caregiver, and family income.

Table 1. Distribution of Data Based on the Characteristics of Toddlers and the Characteristics of Mothers/Caregivers in Kalisat District, Jember Regency (March-April 2023; n=125)

Characteristics		Frequency	Percentage	Mean ± SD
Age of the child	18-36 months	65	52	38.08 ± 12.294
	37-59 months	60	48	
Ever breast feed	No	18	14.4	
	Yes	107	85.6	
Duration of breastfeeding	0 months	18	15.2	
	<6 months	7	5.6	
	≥6 months	99	79.2	
Sex of the child	Male	58	46.4	
	Female	67	53.6	
Nutritional status (BB/TB)	Wasted	13	10.4	-0.2901 ± 1.276
	Normal	91	72.8	
	Overweight	21	16.8	
Age of mother/caregiver	14-24 years	25	20	31.84 ± 7.741
	25-34 years	59	47.2	
	≥ 35 years	41	32.8	
Formal education	Basic education	48	38.4	
	Middle education	73	58.4	
	High education	4	3.2	
Occupation status	Yes	17	13.6	
	No	108	86.4	
Family income (Jember average salary 2023 = Rp 2.555.662)	<Average	109	87.2	
	≥Average	16	12.8	

Table 1 shows that more than 50% of toddlers are 18-36 months (52%). The majority had a history of breastfeeding (85.6%), with the duration of breastfeeding being mostly done for ≥ 6 months (79.2%). There are more female toddlers than male toddlers (67%). Most toddlers have good nutritional status (72.8%). The age of mothers/caregivers was more in the age range of 25-34 years (47.2%). More than 50% of mothers/caregivers have a secondary level of education (58.4%). Most mothers/caregivers did not work (86.4%), and the family income was under regional minimum wage (87.2%).

Description of LBW History and Social-Emotional Development in Toddlers and

Data collection for this variable is done by looking at the birth weight of the toddler in the MCH book. In this tabel also show the social-emotional development among toddlers. Univariate analysis will be presented in terms of frequency and percentage.

Table 2. Distribution of Respondents based on History of Low Birth Weight (LBW) and Social-Emotional Development in Kalisat District, Jember Regency (March-April 2023; n=125)

Characteristics	Frequency	Percentage
History of Low Birth Weight		
Yes	59	47.2
No	66	52.8
Social-Emotional Development		
Risk	56	44.8
Not at risk	69	55.2

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Table 2 shows that more than 50% of the under-fives in the respondents to this study did not experience low birth weight (LBW), with a total of 66 under-fives (52.8%), while 59 under-fives (47.2%) experienced low birth weight. Based on Table 3, more toddlers are not at risk of experiencing social-emotional development problems than those who are at risk (55.2%).

Correlation of History of Low Birth Weight (LBW) and Toddler Social-Emotional Development

The analysis used to see the correlation between the history of low birth weight (LBW) and the social-emotional development of toddlers is the Chi-Square test.

Table 3. Correlation between History of Low Birth Weight (LBW) and Toddler Social-Emotional Development in Kalisat District, Jember Regency (March-April 2023; n=125)

Variable	Social-Emotional Development				Total		p-value
	Risk		Not at Risk				
	n	%	n	%	n	%	
Low Birth Weight (LBW)							
Yes	29	23.2	30	24	59	47.2	0.456
No	27	21.6	39	31.2	66	52.8	
Total	56	44.8	69	55.2	125	100	

The chi-square test results yielded a p-value of 0.456 = 0.05, as shown in Table 3. These findings imply no connection between a history of low birth weight and toddler social-emotional development.

Analysis of Respondent Characteristics on Social-Emotional Development in Toddlers

Analysis of the correlation between the characteristics of respondents and social-emotional development in toddlers was analyzed using the chi-square test. Respondent characteristic variables to be analyzed include the history of breastfeeding, duration of breastfeeding, gender, nutritional status, formal education, work status, and total family income.

Table 4. Correlation between Respondent Characteristics and Social-Emotional Development among Toddlers in Kalisat District, Jember Regency (March-April 2023; n=125)

Characteristics		Social-Emotional Development		p-value
		Risk	Not at risk	
Age of the child	18-36 months	27 (21.6%)	38 (30.4%)	0.445
	37-59 months	29 (23.2%)	31 (24.8%)	
Ever breast feed	No	5 (4%)	13 (10.4%)	0.189
	Yes	51 (40.8%)	56 (44.8%)	
Duration of breastfeeding	0 months	6 (4.8%)	13 (10.4%)	0.088
	<6 months	1 (0.8%)	6 (4.8%)	
	≥6 months	49 (39.2%)	50 (40%)	
Sex of the child	Male	29 (23.2%)	29 (23.2%)	0.364
	Female	27 (21.6%)	40 (32%)	
Nutritional status (BB/TB)	Wasted	9 (7.2%)	4 (3.2%)	0.031
	Normal	42 (33.6%)	49 (39.2%)	
	Overweight	5 (4%)	16 (12.8%)	
Age of mother/caregiver	14-24 years	18 (14.4%)	7 (5.6%)	0.008
	25-34 years	24 (19.2%)	35 (28%)	
	≥ 35 years	14 (11.2%)	27 (21.6%)	
Formal education	Basic education	27 (21.6%)	21 (16.8%)	0.038
	Middle education	29 (23.2%)	44 (35.2%)	
	High education	0 (0.0%)	4 (3.2%)	
Occupation status	Yes	7 (5.6%)	10 (8%)	0.951
	No	49 (39.2%)	59 (47.2%)	
Family income (Jember average salary 2023 = Rp 2.555.662)	<Average	52 (41.6%)	57 (45.6%)	0.151
	≥Average	4 (3.2%)	12 (9.6%)	

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DISCUSSION

Overview of LBW and Social-Emotional Development of Toddlers

More than 50% of the toddlers in this study had no history of LBW. In line with research by Khasanah et al. (2022) that most of the respondents did not have a history of LBW. Based on a literature review by Lestari et al. (2021) one of the maternal risk factors contributing to the incidence of LBW is the mother's age. Mothers aged <20 years and >34 years have a higher risk of giving birth to LBW babies than mothers aged 20-34 years. Maternal age is associated with its effect on fertility. Mothers at a young age still do not have physiological conditions such as an underdeveloped endometrium and immature emotional conditions. In older mothers, the endometrial condition becomes less fertile and the risk of experiencing chromosomal anomalies, pregnancy complications such as preeclampsia, diabetes which will result in LBW events (Badalyan, 2014; Rahfiludin and Dharmawan, 2018 in Lestari et al., 2021). Most of the ages of the mothers under five in this study were in the range of 25-34 years, the age of the mothers during pregnancy was likely in the range of 20-34 years more compared to mothers who were pregnant at the age of <20 years or> 34 years. Therefore, the possible risk of giving birth to a LBW baby is lower. Apart from age, there are many other risk factors for LBW, including parity, gestational age, complications during pregnancy and others, but were not examined in this study.

The social-emotional development of all toddlers in this study were more who were not at risk of experiencing social-emotional development disorders compared to those who were at risk. In line with research by (Aslamiyah et al., 2022) that the majority of toddlers in their research respondents had no problems with social-emotional development. Based on the history of LBW, both toddlers who have a history of LBW or not, more are not at risk of social-emotional development. According to de Souza and Veríssimo (2015), child development is influenced by various factors, both from aspects of pregnancy, children, and parenting. Researchers argue that these aspects influence how toddlers' social-emotional development is more that are not at risk than are at risk.

Correlation between Low Birth Weight and Social-Emotional Development

Table 4 shows the results of the analysis of the two variables show that there is no significant relationship between LBW history and social-emotional development (0.456> 0.05). Furthermore, 69 out of 125 toddlers (55.2%) in this study were not at risk of having social-emotional developmental disorders. It is known that 30 out of 59 toddlers who are LBW are not at risk of experiencing social-emotional development disorders. Whereas in infants who are not LBW, 39 out of 66 infants are not at risk of experiencing social-emotional development disorders.

This result contradict several other studies, Setyaningrum et al. (2018) showed that there was a significant relationship between the incidence of LBW and social-emotional development in toddlers with 3.6 times the risk of experiencing social-emotional development disorders. Furthermore, (Olsen et al., 2022) revealed that social-emotional developmental delays or problems were more common in the LBW toddler group than in the normal birth weight group. According to (Utami & Hanifah, 2021), several factors can influence social-emotional development, namely internal factors (mother's occupation, mother's education, family income) and external factors (age, gender). In addition, other factors can affect children's development in general, including internal factors, namely the age of the toddler and gender as well as external (postnatal) factors including nutrition and socioeconomic status c (Yuliastati and Amelia, 2016); (de Souza and Veríssimo, 2015).

Researcher believes that the existence of these factors may influence the results of research on the relationship between a history of LBW and social-emotional development in toddlers. In this study, these factors are categorized as the characteristics of the respondents. The statistical analysis of the 9 variable characteristics of the respondents is summarised in Table 5. The results indicate that 3 of these variables, including nutritional status, age of the mother or carer, and education level of the mother or carer, have a relationship with the social-emotional development of toddlers (p 0.05).

Table 5 shows that there is a relationship between nutritional status and social-emotional development of toddlers (0.031 <α 0.05). Furthermore, most toddlers have good nutritional status (72.8%) with an average z-score based on the toddler's weight/height, which is -0.2901 where the overall z-score mean for toddlers is in the range of good nutritional status values. Overall child development is directly related to the nutritional status of toddlers (Workie et al., 2020). Research by Khulafa'ur and Harsiwi (2019) revealed that nutritional status affects development in toddlers, most toddlers with good nutritional status have appropriate development. Nutritional status is also positively correlated with developmental domains. Children with indicators of malnutrition show impaired social behavior compared to children who have adequate nutritional status (Liu & Raine, 2017).

Analysis of the chi-square test between the age of the mother/caregiver and social-emotional development shows that there is a significant relationship between the age of the mother/caregiver and the social-emotional development of toddlers (0.008 < α 0.05). Most of the mothers/caregivers in this study were 25-34 years old, namely 59 respondents

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(47.2%). This age range is categorized as young adults. The characteristics of early adulthood, according to Hurlock (1996) are marked by forming a household, where a woman is ready to accept responsibility as a mother (Putri, 2018). In this age range, mothers are likely to have optimal capabilities in terms of health, physical abilities, mindset, and mature readiness to be responsible for their role as mothers/caregivers so that it impacts parenting patterns that will affect toddlers' social-emotional development.

The results showed that the majority of the education level of the mothers/caregivers in this study was the middle level which consisted of junior high school/equivalent and high school/equivalent (56.7%). Analysis of the two variables shows that there is a significant relationship between the education level of the mother/caregiver and the social-emotional development of the toddler, (0.038 < α 0.05). The higher a person's education level, the more mature a person is in making a decision (Setyarini et al., 2015). Low parental education has 1.74 times the risk of experiencing mental and emotional problems compared to children with high maternal education (Utami and Hanifah, 2021). Low maternal education correlated strongly with maternal responsiveness and high maternal education with high responsiveness. Responsiveness is a part of parenting style that refers to how parents respond and provide for a child's needs. Cumulatively, previous research supports that the mother's responsiveness plays an important role in the child's development. Children of more responsive mothers develop better social skills, and experience fewer emotional and behavioral problems (Warren and Brady, 2007).

Analysis of Respondents' Characteristics of Social-Emotional Development in Toddlers

The discussion at this point is to examine the characteristics of the respondents which statistically have nothing to do with social-emotional development. However, theoretically, there is still a possibility that these variables can affect social-emotional development. These variables include the age of the child, history of breastfeeding, duration of breastfeeding, gender, occupational status of mother/caregiver, and family income.

The results showed that most of the toddlers in this study were in the range of 18-36 months (52%). In this age range, more toddlers are not at risk of experiencing social-emotional developmental disorders. Between the ages of 18-30 months, the stage of development of autonomy or independence in toddlers begins to appear. At this age, children will manifest their temperament more by carrying out extreme, unpleasant, to aggressive behavior in response to frustration or anger which is called tantrums (Sisterhen and Wy., 2023). Tantrum behavior is almost similar to the problem behavior of externalizing and internalizing social-emotional developmental disorders. However, children aged > 36 months learn how to manage their emotional skills so that the possibility of tantrum frequency is reduced thereby reducing the bias in identifying children's social-emotional development through their behavior. In addition, the social scope of children aged >36 months is wider than children aged <36 months. This can help in identifying the social-emotional abilities of toddlers whether they are at risk of experiencing disturbances or not.

An overview of the history of breastfeeding in this study showed that most of the toddlers had a history of breastfeeding with a total of 107 respondents (85.6%). Toddlers who are given ASI are more likely to experience no risk of impaired social-emotional development compared to toddlers who are at risk. This is because breast milk contains taurine, a type of amino acid that functions as a neurotransmitter and plays a role in the maturation process of brain cells so that breast milk can be the best source for optimizing brain development, nervous tissue in the brain, and visual tissue. in infants (Ruhana et al., 2016); (Febrianti, 2018); (Lukman et al., 2020). A systematic review by Turner et al. (2019) showed that 6 out of 13 studies described a positive relationship between breastfeeding and social-emotional development. Setyarini et al. (2015) in their research revealed that children who do not consume exclusive breastfeeding tend to have emotional and mental problems. Furthermore, research by Aslamiyah et al. (2022) showed that there was a relationship between exclusive breastfeeding and the social-emotional development of preschool-age children.

Table 5 shows that there are more toddlers with female sex than boys (53.6%). Table 5. shows that the social-emotional development of male toddlers is balanced between those who are at risk and not at risk, whereas there are more female toddlers who are not at risk of experiencing social-emotional development disorders. Girls tend to have emotional expressions that are more neutral, calm, or peaceful than boys who tend to express a lot of surprise, curiosity, anger, or frustration-related emotions (Veijalainen et al., 2021). Girls have higher social-emotional skills than boys (Sitorus, 2023). The results of research by Jovita (2022) reveal that children with male sex have the possibility of emotional and mental problems higher than women.

The results of this study indicate that 86.4% of mothers/caregivers in this study were not working. More children's social-emotional development is not at risk for mothers/caregivers who do not work. Mothers who don't work will spend more time with their children so that emotional bonds get stronger and have an impact on social-emotional development while working mothers will have less time to interact with their children. This is supported by the research of Simanjuntak et al. (2022) who revealed that mothers who don't work tend to have much free time to communicate with their children so that children receive a lot of attention and affection from their mothers. The mother's physical presence and the length of

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time spent with the child are very important in creating a good bond and attachment between mother and child (Ali and Rattani, 2015).

Most of the respondents in this study had a total income <average (87.2%). In toddlers with family income below the average, more toddlers are not at risk of experiencing social-emotional development disorders than toddlers who are at risk of experiencing disorders. Family income indirectly influences the child-rearing process, the higher the parents' income, the more able they are to provide facilities and infrastructure that support toddler development to be more optimal (Nuzuliana and Ismail, 2016). However, there are other opinions regarding the effect of family income on the growth and development of toddlers. Latifah et al. (2010) revealed that there was a tendency that as a family's income increased, the duration of breastfeeding decreased. Mothers with high incomes can increase the purchasing power of formula milk, while mothers with low socioeconomic levels have 4.6 times the chance to breastfeed exclusively (Setyarini et al., 2015).

CONCLUSION

Based on the results of the study, it can be concluded that there is no significant relationship between a history of LBW and social-emotional development in toddlers in the working area of the Kalisat Health Center. However, it is important to underline that various factors influence social-emotional development. Factors of nutritional status, age of mother/caregiver, and educational status of mother/caregiver statistically affect social-emotional development, while other factors in the characteristics of the respondents studied do not have a significant relationship but theoretically have the possibility to influence social-emotional development. It is recommended for further research to examine risk factors that can affect social-emotional development in toddlers, one of which is the parenting style of parents in toddlers which has not been studied in this study. Future research can also utilize more precise statistical test methods to determine the relationship and forecast how the value of one risk factor that affects social-emotional development depends on other risk factors.

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