

Infant's Birth History and Low Birth Weight Increases Risk of Stunting Cases

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Abstract— A nutrition-related problem that profoundly affects the quality of human resources is the high cases of children with stunting. One of the risk factors of children with stunting is low birth weight history. The research aims to analyze the relations between lowbirth weight history with stunting cases. The research used case-control retrospective and involved 188 children as the sample, divided into a case group and a control group, in which each group was composed of 94 children selected by cluster sampling. The univariate data analysis was conducted with frequency distribution, while the bivariate analysis was carried out with a chi-square test. The chi-square test showed a p-value of 0,000 ($\alpha < 0,05$) and OR value of 9,615, implying the relationship between low birth weight and stunting cases. Children with low birth weight were nine-time higher to be prone to suffer from stunting, as opposed to children with healthy birthweight. Health workers, therefore, are urged to enhance the understanding of pregnant mothers and their families concerning the risk of lowbirth weight stop revent stunting as early as possible.

Keywords— *Low birth weight, infant, stunting*

I. INTRODUCTION

Stunting is a global malnutrition problem that is experienced by children all around the world. In 2017, data showed that 22,2% or around 150,8 million children in the world suffered fromstunting, and more than half anda-third of stunting cases were from Asia (55%) and Africa (39%), respectively[1]. In terms of stunting, Indonesia is the third most prevalent country in southeast Asia. On average, the Indonesianprevalencecasesfrom2005to2017were 36,4%, and the rate tended to be static. A study by Basic Health in 2013 demonstrated that the Indonesian stunting prevalence cases accounted for 37,2%. In 2016, data on the assessment of nutritional status showed that the prevalence of stunting reached 27,5% while the WHO's upper limit is only < 20%. In other words, more than 8,9 million Indonesian children do not experience maximal growth; or, 1of 3 Indonesian children suffer from stunting. Specifically, more than one-third of the height of Indonesian children under five years old is below average [2]. According to the 2018 Indonesian

Report of Basic Health Research (Riskesdas), of 30,8% of stunting cases, 16,9% were categorized short, and 6,7 were very short [3].

A risk factor that affects stunting on children is the lowbirth weight. Aninfant with lowbirth weight tends to have slower growth because, since in the womb, the infant has experienced intrauterine growth retardation (IUGR). Mostly, this effect lasts until the infant's subsequent development. Infants with lowbirth weight are prone to have slower growth and development, and they often fail in keeping up with child growth standards compared to infants who are born healthy. The majority of infants with low birth weight also suffer from digestive tract disorder, such as incapability in absorbing fats and processing protein, leading to lack of nutritional reserves within the infant bodies, and, eventually, impediment in the development of the infant growth weight. If this condition subsists, along with frequent infections and insufficient feeding and health treatments, the children will be likely to suffer from stunting[1].

Stunting has a significant consequence on the children's development and future Indonesian economy. Regarding children's health and development, stunting is harmful. Stunting can disturb the children development, primarily on children under two year sold. Asarule, children with stunting are likely to suffer from cognitive and motoric inhibition in their development and reduce their adult lives' productivity. In their adult lives, children with stunting are also prone to suffer from non-communicable diseases, such as diabetes, obesity, and heart attack [2]. Children with stunting are different from other children of the same age. They show numerous deficiencies, ranging from slow child growth, weak immunity, less intelligence, and low productivity. In this case, showing the characteristics of children that do not suffer from stunting but impede the children to develop will be useful [3].

II. RESEARCH METHOD

The research aims to analyze the relationship between infants' lowbirth weight with stuntingin the Public Health Center (Puskesmas) of Semawung Daleman, Purworejo Regency, Central Java Indonesia, in 2019, and, in light of that, the research used case-control retrospective method. The population in the research was all infants in the area, namely 1494 children. The research involved 188 children as the sample, divided into acase group and a control group.

Each group amounted to 94 children, and they were selected with cluster sampling. The inclusion criteria were that the case group consisted of children with stunting, which were seen according to their nutrition status and height rather than ages, while the control group was children without stunting that have complete data. The exclusive criteria were the children with under nutrition, infectious diseases, short stature, and mother who suffered from chronic energy deficiency (KEK). The data was collected by using secondary data, while the analysis used a chi-squared test (CI:95%).

III. RESULT AND DISCUSSION

The research was conducted in the Public Health Center (Puskesmas) of Semawung Daleman, Purworejo Regency, Central Java Indonesia, with 94 cases of children with stunting as the case samples and 94 cases of children without stunting as the control sample. The secondary data was obtained from a nutrition programmer by using supporting tables. Based on the classification in Table 1, as regards children with stunting, mostly the children were male, 59 respondents (62,8%), with term birth history, 85 respondents (90,4%), and in their 37-48 months, 38 respondents (40,4%). On the other hand, regarding children without stunting, the majority were female, 56 respondents (59,6%), with term birth history, 92 respondents (97,9%), and in their 49-60 months, 32 respondents(34%).

Previous studies mentioned that male children have a bigger chance, up to four times, to experience stunting and developmental delay, as opposed to female children [4]. As opposed to children without stunting, the research showed that children that suffer from stunting are typically premature. Premature infants are two time sriskier to suffer from stunting [5]. Older children, around 12-23monthswithdevelopmentaldelay,isstillpossible to suffer from because of limited screening capability in collecting data to detect developmental delays in children and lateness that is started to be seen in the older age[6].

Table 2 shows that of 94 children with stunting in the case group, 41 respondents (43,6%) had the histories of low birth weight, while theother 53 respondents (53,6%) did not. On the other hand, in the control group, of 94 children, 7 respondents (7,4%) had the histories of low birth weight, while the other 87 respondents (92,6%) had the inverse condition. The analysis of chi-square test (CI:95%) obtained p-value= 0,000 ($\alpha = < 0,05$). It demonstrated a correlation between a history of low birth weight and stunting cases with the value of OR 9,615, meaning that children with low birth weight history are nine times more likely to suffer from stunting, compared to children without low birth weight.

This result corroborated the previous research that found that children with stunting are related to low birth weight (pvalue=0.015). Children with lowerbirth weight are 5,87 times more likely to suffer from stunting. An essential risk factor concerning child development is that low birth weight is four times higher in causing mortality, compared to normal weight [5]. Stunting is a nutrition status, which is based on the weight of the body in proportion to age. Consequently, one's weight is indirectly related to the stunting index. Nevertheless, birth weight, as the infant characteristic, is inseparable from the birth height, which makes birth weight

can affect the growth of children's birth height, primarily in the early stage of the neonatal period. Birth weight is an essential risk factor towards the first-year nutrition status of the children[7]. Aninfant with lowbirth weight is prone to morbidity, mortality, infectious disease, underweight, and stunting in the early stage of the neonatal period [8]. However, many parents deem stunting as something typical. Many parents reckon that their children will be able to grow because the children are still under five years. The problem is if the stunting is not detected earlier, especially before two years, the nutritional improvement for the next years will experience a delay. Stunting has long-term consequences for the future of human resources. Therefore, preventing stunting in children is essential for protecting the learning ability of the children and the future human capital[9]

The mother's poor nutritional state can cause low birth weight during pregnancy, which eventually can also cause intrauterine growth retardation that is represented by low birth weight in delivery. In this situation, several conditions of the mother can highly affect low birth weight and premature, ranging from poor nutritional state, unsuitable ages (too old and too young), education, and particular diseases, such as anemia, asthma, hypertension, and HIV/AIDS[10]. A long term issue induced by low birth weight is developmental and growth delay, and it is considered a causing factor of undernutrition in the form of stunting in children. It is justified by research that showed that there is a correlation between infants' birth weight and development. Children with low birth weight are six times more likely to experience developmental delays. The parents, as the closest people, can stimulate the children's development in daily life to address this problem, as well as the guardians, other members of the family, and community groups in the neighborhood[11].

TABLE I. FREQUENCY DISTRIBUTION OF RESPONDENT CHARACTERISTICS

Variable	Stunting		not Stunting		Total	
	n	%	n	%	n	%
Sex						
Male	59	62,8	38	40,4	97	51,6
Female	35	37,2	56	59,6	91	48,4
Birth History						
Premature	9	9,6	2	2,1	11	9,9
Term	85	90,4	92	97,9	177	90,1
Children's age (months)						
0-12 months	7	7,4	8	9,6	16	8,5
13-24 months	21	22,3	17	18,1	38	20,2
25-36 months	20	20,2	19	20,2	39	20,7
37-48 months	38	40,4	17	18,1	55	29,3
49-60 months	8	8,5	32	34,0	40	21,3
Total	94	100	94	100	188	100,0

Source: Secondary data, 2019.

IV. CONCLUSION

There is a correlation between low birth weight and stunting cases. Children with low birth weight are nine times more prone to suffer from stunting than other children that have no history of low birth weight. Health workers are, therefore, urged to improve pregnant mothers and their families concerning the risk of low birth weight to prevent stunting cases as early as possible.

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