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The association between wasting nutritional status and delayed of child development in children age 12 – 60 months in Wangaya General Hospital, Denpasar, Bali

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ABSTRACT

Background: Sub-optimal nutritional status in Indonesia is still a continuing problem. There is no significant change in the prevalence of sub-optimal nutritional status. First 1000 days of life is a golden period of brain development. Failure of providing adequate nutrition can lead to the deviation of child development.

Objective: To investigate the association between wasting nutritional status and delayed child development

Methods: A cross sectional study was conducted in this study. Fifty eligible subjects were taken from April 2018 to July 2018 using consecutive sampling methods. Characteristics such as child age, sex, exclusive breastfeeding status, birth weight, birth height, current weight, current height, nutritional status, prematurity, and mother's working status recorded. Child nutritional status was recorded and

assessed with the WHO growth chart. Child developmental status was measured with the pre-screening development questionnaire (KPSP). Score ≤ 8 was assumed as a deviation in child developmental status.

Results: Wasting nutritional status is significantly associated with child development ($p=0.041$, CI -0.013-0.096). Prevalence ratio is 3.5 shows that wasting nutritional status is a risk factor for delayed child development. Domain for child developmental delay was 54,5% has language & speech delay, 36,4% has a gross motor delay, and 9,1% has social & independency delay.

Conclusion: There is an association between wasting nutritional status and delayed child development. The most often child developmental delay found is speech delay.

Keywords: Child developmental status, KPSP, nutritional status, wasting

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INTRODUCTION

In 2015, Millenium Developmental Goals (MDGs) had been changed into Sustainable Developmental Goals (SDGs). There is still an unsolved problem in health sectors about nutrition. Nutrition problem is a common problem in developing countries. Nutrition problem can be divided into wasting, stunting, and underweight.

Nationally, the prevalence of child wasting in 2007 was 18,4%, in 2010 it was 17,9%, in 2013 it was 19,6%. According to Riskesdas, prevalence of child wasting in Bali at 2014 was 10,2% which was the lowest among other provinces in Indonesia.^{1,2}

Undernutrition is one of the factors that can cause a disturbance in child growth that can lead to stunting, disruption of brain development, cognitive problem, less productivity, and others. Child development consists of gross motor aspect, fine motor aspect, language and speech, social & independence, cognitive, and daily activities.

Early detection of developmentally delayed in children is important to do an earlier intervention to optimize their next milestone in development.

Based on the aforementioned above, this study aims to know the association between wasting nutritional status and delayed child development.

METHODS

A cross sectional study was obtained to children age 12 until 60 months in the pediatric ward (Kaswari Ward) in Wangaya General Hospital from April 2018 to July 2018. Demographic information about sex, age at the examination date, exclusive breastfeeding status, birth weight, height at birth, current weight, current height, nutritional status, prematurity, and mother's working status were listed. Inclusion criteria were children age 12 until 60 months who was an inpatient in Kaswari Ward. Exclusion criteria were obesity, severely malnourished, congenital disease, syndromes, metabolic disease, and chronic disease. Nutritional status is assessed using the WHO growth chart. Child development was assessed with Kuesioner Pra Skrining Perkembangan (KPSP).

Data were analyzed statistically using SPSS 21.0 for Macbook. Fisher test was performed for the

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independent categorical data, using the significance level of 5% and a confidence interval of 95%.

RESULTS

Fifty-eight subjects were eligible include in this study. However 8 subjects were excluded (immunocompromised = 4 patients, chronic disease = 1 patient, severely malnourished = 1 patient). Total subjects analyzed were 50 (Table 1). There were 8 subjects had a wasting nutritional status, and 42 subjects had not wasted nutritional status.

To know the association between wasting nutritional status and delayed of child development hypothesis test using Fisher was done.

The Fisher-test found a statistically significantly difference between wasting nutritional status and delayed of child development ($p=0.041$, CI 95% = -0.013 – 0.096).

There were 10 subjects who had a delay in child development. 1 subject had 2 domains of developmental delay which made there were 11 total of delays. That one subject had delayed in both language & speech and gross motor according to the KPSP for age 12 months. 4 subjects had a delay in language & speech according to the KPSP for age 12 months. 1 subject had a delayed in language & speech according to the KPSP for age 48 months. 3 subjects had a delay in a gross motor according to the KPSP for age 24 months, 30 months, and

Table 1 Baseline characteristic of respondents

Characteristics	Total (n)	Percentage (%)
Sex		
Male	28	56.0
Female	22	44.0
Age		
12 – 24 months	26	52.0
25 – 36 months	12	24.0
37 – 60 months	12	24.0
KPSP Age		
12 – 24 months	31	62.0
25 – 36 months	12	24.0
37 – 60 months	7	14.0
Nutritional status		
Not wasted	42	84.0
Wasted	8	16.0
Exclusive breastfeeding status		
Yes	29	58.0
No	21	42.0
Birth weight		
< 2500 gram	5	10.0
>= 2500 gram	45	90.0
Prematurity		
Aterm	46	92.0
Preterm	4	8.0
Mother's status		
Working	27	54.0
Not working	23	46.0

Table 2 Association between wasting nutritional status and delayed of child developmental

Nutritional status	Delayed	Not delayed	P-Value	CI 95%
Wasted	4 (8.0%)	4 (8.0%)	0.041	-0.013 – 0.096
Not wasted	6 (12.0%)	36 (72.0%)		

Table 3 A domain of developmental delay in Kaswari Ward

Domain	Total (n)	Percentage (%)
Language & speech	6	54.5
Gross motor	4	36.4
Fine motor	0	0.0
Social & independency	1	9.1
Total	11	100.0

36 months. 1 subject had a delayed in social & independency according to KPSP for age 42 months.

The group age that had the most delayed was group age 12 – 24 months. 6 subjects had delayed in this group age. There were 2 subjects in the group age 25 – 36 months that had delayed. There were also 2 subjects in the group age 37 – 60 months who had delayed.

Prevalence ratio was 3.5 which shows wasting nutritional status increased the risk 3.5 times more to had a delay in child developmental.

DISCUSSION

It is well known that the golden period for child developmental is during the first 1000 days of life. Lack of nutrition, infection, and inflammation are some factors that can affect child development, especially in the developing countries.³ According to research in RSCM global developmental delayed can be caused by microcephaly, wasting nutritional status, and severely malnourished.⁴ In some research in Bandung, factors that can affect child development are age, mother's formal education, family income, and living place.⁵ In an analysis in Kudus Region, exclusive breastfeeding status and maternal risk factor while pregnant are a significant risk factor for developmental delayed in children.

In this study, there is a significant association between wasting nutritional status and delayed in developmental in children. This result is consistent with the earlier findings from Suhartiningsih etc., Kasenda, etc, Sholicha, etc, and Humaira etc.⁶⁻⁹ Different results seen in the findings of Gunawan, etc which found there is no association between developmental delay and wasting nutritional status in children.¹⁰

The domain of developmental delay found in this study from the most common to the least is language & speech, gross motor delay, and social & independence. No fine motor delay was found in this study. A study from Suwarba etc. in child neurology clinic in RSCM found the most common case in child developmental delay is the delay in walking and speaking.⁴ This result is also consistent with the study from Fadlyana etc. which distinguish

the difference of developmental delay in children in rural and urban area which found language & speech as the most common delay either in the urban or rural area.⁵ According to a study from Gunawan etc. the most common delay found in children is gross motor delay.¹⁰

In this study, the most delayed found in group age 12 – 24 months. A study from Fadlyana etc. found delayed in developmental mostly found in children below 2 years old.⁵ This is a crucial age which nutrition, infection, and inflammation has an important role that can affect a child's development in this period.^{3,11}

From this study, we can conduct that wasting nutritional status can increase the risk 3.5 times to have a delayed in child development. It is consistent with the theory that child developmental is affected by adequate nutrition in the first 1000 days of life.^{3,6,12-15}

In this study, weight for height (WFH) is used to assess the nutritional status in children which more likely to show an acute nutrition status more than a chronic nutrition status. Acute nutrition status can be influenced by recent child's condition such as a climbdown in weight because of acute illness. For further study, height for age (HFA) is more appropriate to assess children nutritional status for a chronic assessment.

CONCLUSION

There is an association between wasting nutritional status and delayed child development.

ETHICAL CLEARANCE

Ethical approval has been obtained from ethics of committee prior to the study conducted.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding manuscript.

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AUTHOR CONTRIBUTION

All authors are equally contributed in this study from main concept, statistical analysis, until data synthesis, and manuscript preparation.

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