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NUTRITIONAL AND DEVELOPMENTAL STATUS AMONG UNDER FIVE YEARS OLD CHILDREN IN TANJUNG KARANG, WEST NUSA TENGGARA

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ABSTRACT

To improve the human capacity in West Nusa Tenggara (WNT) province, a community-based intervention called Generasi Emas NTB (GEN) has been implemented in 2014. One of the programs is to ensure children's nutritional and developmental wellbeing. However, there remains limited information regarding the situation of nutritional and developmental status of the children living in the GEN villages. This study aimed to assess the nutritional and developmental situation of under-five years old children living in Tanjung Karang district, WNT. A cross-sectional study was conducted in Tanjung Karang district, one of the GEN villages in WNT, through integrated post service (posyandu). Children who met the sampling criteria were screened for their nutritional status using anthropometric measurement and developmental status using a prescreening developmental questionnaire (KPSP). A total of 638 children completed the demographic baseline assessment and were enrolled as participants. Most of the children were in the age group 7-12 months (19.1%) and 25-36 months (19.4%). The proportion of children who were underweight, stunting, and wasting were 19.4%, 32.2%, and 8.0%, respectively. The findings for developmental screening showed that 12.2% children had dubious development and 3.1% (20/638) children were suspect of having a developmental delay. The proportion of under-five years old children in Tanjung Karang district who were underweight, stunting, and wasting were still high but lower than the provincial average prevalence in 2017. Children who were found to have a doubtful result and suspect to have a developmental delay need to be evaluated further.

Keywords: developmental status, nutritional status, *posyandu,* under-five children

INTRODUCTION

Growth and developmental aspects play an essential role in children's life. Any disorders occurring in those two aspects could impact children's wellbeing and does not only affect in a short-term but also a long-term period (Stewart et al., 2013). Globally, it is estimated that 88% countries encounter severe burden in handling malnutrition, with 155 million children are stunting (length/height for age z-score/HAZ <-2SD) and 52 million children are wasting (weight for length/height z-score/WHZ <-2SD) (Development Initiatives, 2017). Although in the last five years (2013-2018) the prevalence of stunting and wasting among under five years old Indonesian children are declining, the proportion of these conditions are still high, accounting for 30.8% and 17.7%, respectively (Agency of Health Research and Development, 2018; The Indonesian National Health Research Council, 2013). Studies showed that the consequences of stunting include reduced cognitive function and physical development, lower health capacity, higher risk of obesity in the future, increased school absence, and lower annual income later in life (Bhutta et al., 2013; Pusat Data dan Informasi Kementerian Kesehatan RI, 2016; Stewart et al., 2013).

On the other side, developmental aspects are shown to be essential in children's lives, since this particular factor reflects the maturation process of an individual's neurological function. Globally, the prevalence of developmental disorder occurs in 1-3% children, with an estimated 1% of the children have autism spectrum disorder (Mackrides & Ryherd, 2011; Scharf et al., 2016). In Indonesia,

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data from the Indonesian Pediatric Association (2013) showed that 5-10% children have a developmental disorder and 1-3% under five years old children have a developmental disorder in two or more developmental aspects or widely known as global developmental delay (GDD). However, different with the nutritional status data, the current national data on children's developmental status is still limited and can only be accessed for those aged 3-5 years only (Agency of Health Research and Development, 2018).

The Indonesian Ministry of Health has already promoted screening for growth and development at primary care level by launching a screening guideline called "*Stimulasi, Deteksi, dan Intervensi Dini Tumbuh Kembang Anak*" (SDIDTK), aimed to increase the coverage of growth and developmental screening for under five years old and preschool children (Kementerian Kesehatan RI, 2016). However, until recently, there is no study aimed to describe the implementation of this program in Indonesia, making it harder to ensure if this program is routinely implemented. Drawing from the United States' experience, the implementation of regular developmental screening for children is still low at 20%, and only 19.5% children received a standardized developmental screening (Dobrez et al., 2001).

West Nusa Tenggara (WNT) is one of the provinces in Indonesia, which has high prevalence of stunting and wasting in 2013, accounted for 45.3% and 11.9%, respectively (The Indonesian National Health Research Council, 2013). To deal with this issue, in 2014 the Department of Health WNT initiated a program called *Generasi Emas NTB* (GEN) that integrates multisectoral endeavors and focuses on investing in the young, particularly in their growth and development (Dinas Kesehatan Provinsi Nusa Tenggara Barat, 2015; Tim Koordinasi Pengembangan GEN 2025, 2017). Compared to the proportions in 2013, the prevalence of children with stunting and wasting are declining in 2017 but still high at 37.2% and 8.6%, respectively (Kementerian Kesehatan RI, 2018). Meanwhile, data for developmental status for children screened using the SDIDTK kit remains none, which leads to difficulty in assessing the developmental status of the children in the region.

This study aimed to describe the profile of nutritional and developmental status among under five years old children living in Tanjung Karang district, Mataram, WNT. As Tanjung Karang district is one of the 100 villages for the implementation of GEN program, our study sought to reflect the current nutritional and developmental status among the children living in the particular area and compared it with the reported profile from the provincial and national data. For developmental status, this study assessed children aged 0 to 59 months, which is different from the current developmental data reported by the Indonesian Basic Health Research, which only captured children aged 36 to 59 months. It is expected that the study results could be used to support the implementation of GEN program and promote the current nutritional and developmental screening in children through integrated health service post for children (*posyandu*).

METHODS

This was a community-based cross-sectional study conducted in January 2018 in 16 *posyandu* in Tanjung Karang district, Mataram, WNT. The study population was under five years old children living in villages which were enrolled as the implementation locations for GEN program in WNT province. By using a convenience sampling, Tanjung Karang district was selected as the study location, considering the proximity to the research center and access to the study location. This district is located on the west coast of Lombok island, with an approximate population number of 8544 or equal to 3325 people/km^2 (Pemerintah Kota Mataram, 2015).

All under five years old children coming to the *posyandu* were recruited. Inclusion criteria were children aged under five years old and in a fine condition with no apparent illness, which was examined by history taking. Exclusion criteria included parents or guardian who declined to participate and participants with incomplete demographic data. Data collection was initiated by collecting demographic data, such as parent's occupation and educational level, through interview and maternal and child handbook. Subsequently,

children underwent anthropometric measurement, including weight, length/height, and head circumference. This measurement was conducted by the health care workers from Tanjung Karang PHC. Weight was measured using *dacin* weight scale, while length and height were measured using length board and *microtoise*, respectively.

Developmental aspects were assessed using prescreening developmental questionnaire (*Kuesioner Pra-Skrining Perkembangan/*KPSP), which is used in the SDIDTK guideline. This questionnaire had a sensitivity of 60% and specificity of 92% and explored four aspects of development including gross motor, fine motor, speech and language, and personal social aspect (Dhamayanti, 2016). Scores generated from the developmental screening were interpreted according to the KPSP guideline, i.e.9-10 as normal, 7-8 as dubious, and ≤6 as suspected to have developmental delay. All data were recorded into an individual case report form and verified by the study team. Children's nutritional status was classified according to weight for age z-score (WAZ), height/length for age z-score (HAZ), and weight for height/length for age z-score (WHZ) using the World Health Organization Anthro® v3.2.2 anthropometric calculator. Data analysis was conducted using a descriptive approach in SPSS® 11.0 and presented using table and graphs.

RESULTS AND DISCUSSION

Sample Characteristics

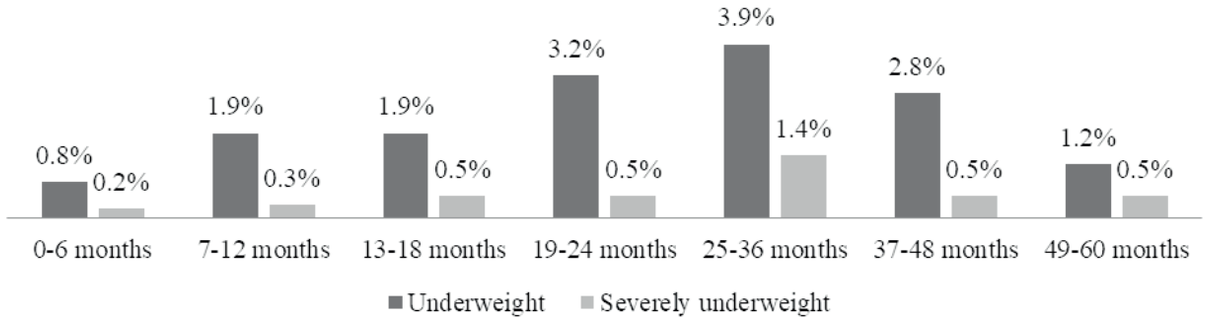
This was the first study describing the nutritional and developmental status of under five years old children in Mataram, WNT that is conducted through *posyandu* as a part of primary health care service in Indonesia. A total of 696 under five years old children came to the *posyandu*, and 91.7% (638/696) met the sampling criteria and were recruited as study participants. Although all children completed the developmental screening, not all of them underwent anthropometric measurements. There were 628 children and 570 children who had weight and height/length data, respectively, and only 561 children who had both weight and height/length data. The proportion of male and female were similar, with most of the participants were in the age group 25-36 months old (19.4%) and 7-12 months (19.1%). The mean age of the mother was 29.1 years old, with most of the mothers had educational level less than nine years (53.4%) and did not work (74.5%). The summary of the participant's characteristic is shown in Table 1.

Nutritional Status

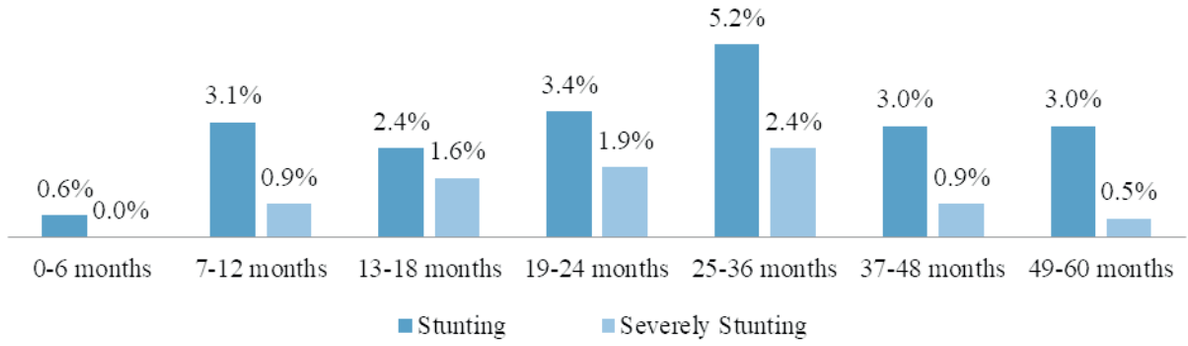
According to the results for the weight for age z-score (WAZ), approximately 15.6% of children were underweight (WAZ -3-<-2 SD) and 3.8% were severely underweight (WAZ <-3 SD). Meanwhile, according to height/length for age z-score (HAZ), there were 23.1% of children who were stunting (HAZ -3-<-2SD) and 9.1% who were severely stunting (HAZ <-3SD). Lastly, using the criteria for the weight for height/length z-score (WHZ), there were 5.5% of children who were wasting (WHZ -3-<-2 SD), 2.5% of children who were severely wasting (WHZ <-3SD), and 2.0% who were overweight. The summary of the nutritional status among the participants is shown

Table 1. Characteristics of the Participants

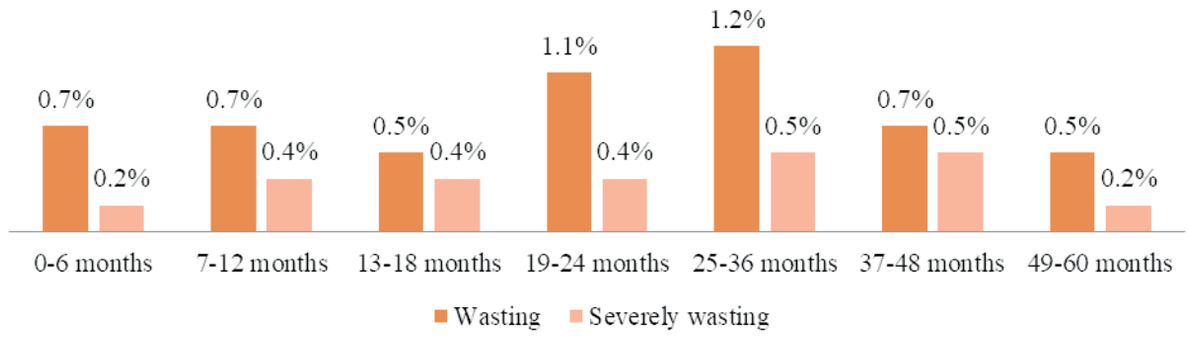
Characteristics	n	%
Under-five years old		
Male	312	48.9
Female	326	51.1
Age Group (months)		
0 - 6	77	12.1
7 -12	122	19.1
13 - 18	84	13.2
19 - 24	87	13.6
25 - 36	124	19.4
37 - 48	97	15.2
49 – 60	47	7.4
Birth Weights (gram)		
<1500	2	0.3
1500 - <2500	51	8
2500 - 4000	558	87.5
>4000	11	1.7
Mother		
Age (mean ± SD)	29,14±6,27	
Occupation		
Housewife	475	74.5
Fulltime worker	36	5.6
Entrepreneur	95	14.9
Others	23	3.6
Education status		
Low (≤9 years)	335	53,4%
Moderate (10-12 years)	213	34,0%
High (>12 years)	79	12,6%



(A) Distribution of under five years old with underweight and severely underweight according to the age groups



(B) Distribution of under five years old with stunting and severely stunting according to the age groups



(C) Distribution of under five years old with wasting and severely wasting according to the age groups

Figure 1. Distribution of under five years old with underweight and severely underweight (A); stunting dan severely stunting (B); and wasting and severely wasting (C) according to children's age groups

in Table 2. The distribution of children who were underweight and severely underweight, stunting, and wasting based on children's age groups showed that the peak for either underweight and severely underweight, stunting, or wasting were at age group 25-36 months old (see Figure 1).

The proportions of under five years old children which were underweight and severely underweight (19.4%), stunting (32.2%), and wasting (8.0%) in our study were lower than the findings reported by the Ministry of Health in 2017 which were 22.6%, 37.2%, and 8.6%, respectively (Kementerian Kesehatan RI, 2018). These lower proportions might be due to the fact that Tanjung Karang district is located in an urban setting of Mataram city and has both convenient access to health care facilities and access to employment

Table 2. Profile of Nutritional Status among Under Five Years Old Children in Tanjung Karang, WNT

Nutritional Profile	n	%
Weight for Age z-score (WAZ)		
Overweight (WAZ >2SD)	6	1
Normal (WAZ -2-2SD)	500	79,6
Underweight (WAZ -3-<-2 SD)	98	15,6
Severely underweight (WAZ <-3SD)	24	3,8
Height/Length for Age z-score (HAZ)		
Tall (HAZ >2SD)	8	1,4
Normal (HAZ -2-2SD	379	6,4
Stunting (HAZ -3-<-2SD)	132	23,1
Severely stunting (HAZ <-3SD)	52	9,1
Weight for Height/Length z-score (WHZ)		
Overweight (WHZ >SD)	11	2
Normal (WHZ -2-2SD)	505	90
Wasting (WHZ -3-<-2 SD)	31	5,5
Severely wasting (WHZ <-3SD)	14	2,5

opportunities in the city. This is in line with a study using data from the Demographic and Health Survey from 36 countries, stating that better nutritional status among children living in an urban area might be explained by "the cumulative effect of a series of more favourable socioeconomic conditions" which eventually lead to better care for the children (Smith et al., 2004). However, when compared to the data from the Indonesian Basic Health Survey in 2018, the proportions of children with underweight and severely underweight and stunting in this study are still higher than the national level which were 17.7% and 30.8%, respectively (Agency of Health Research and Development, 2018). According to a study from Hanandita and Tampubolon (2015), the clustering of under-nutrition is still apparent in several regions in Indonesia, including Nusa Tenggara islands, and that under-nutrition is still consistent with being found in low-income areas. This finding echoes the urgency of relevant policy that is able to close the existing socio-economic gaps between regions in Indonesia.

Furthermore, the prevalent cases of undernutrition in the study location might be explained by the high proportion of mothers who have low educational status. As reported by Stewart et al. (2013), lower educational status of children's guardian is strongly associated with poor nutritional status of the children and increases the risk of stunting. Furthermore, studies conducted in Sragen and Boyolali were consistent to show that mother's knowledge in child's nutrition is significantly associated with their children's nutritional status (Hapsari, 2018; Munthofiah, 2008). While promoting a longer formal education for parents is promising, improving parent's knowledge in child nutritional status is also important and might be more feasible to be conducted as a community intervention to reduce stunting and wasting prevalences in WNT.

The distributions of children with underweight, wasting, and stunting in this study were shown to be highest in the age group 25-36 months, even though the numbers might not be remarkably different with the other age groups. The findings for underweight and stunting in this study are similar with the data from the Indonesian Basic Health Survey (2018), of which the highest prevalences for underweight and stunting are in age groups 24-35 months and 12-35 months, respectively. Meanwhile, Garenne et al., (2019) suggest that wasting is usually occurred in younger children (6-29 months), while stunting might be more prevalent in the older age group (30-59 months).

Developmental Status

The results from the developmental screening showed that approximately 12.3% and 3.1% of under five years old children had a dubious result and suspect for developmental delay, respectively (Table 3). Among those children, gross and fine motor aspect (58.1% and 58.1%) were the most prevalent aspects that were impaired, followed by

Table 3. Profile of Developmental Status among Participants

Characteristics	n (%)
KPSP Results	
Normal (9-10)	540 (84,7)
Dubious (7-8)	78 (12,2)
Suspect to have a delay (≤6)	20 (3,1)
Delayed Aspect	
Gross motor	57 (58,1)
Fine motor	57 (58,1)
Speech and language	46 (46,9)
Personal social	35 (35,8)
Number of Impaired Aspects	
1	29 (4,5)
≥2	69 (10,9)

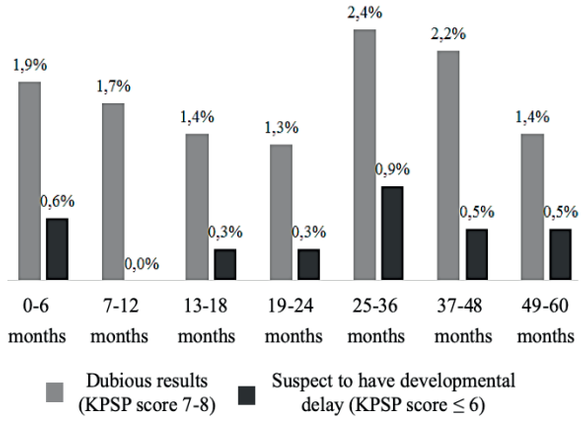


Figure 2. Distribution of Children Who Were at Risk of Developmental Delay According to the Age Group

speech and language aspect (46.9%) and personal social aspect (35.8%). A number of 69 participants (10.9%) had a developmental delay in two or more aspects and were at risk of GDD. The distribution of children who were at risk of developmental delay according to the age group was shown in Figure 2.

Our results on developmental screening showed that there is a considerable proportion of children (15.4%) who need further examination and stimulation for their developmental aspects. Similar to the determinant for nutritional status, low educational status among parents is also associated with a higher risk for developmental delay in children, mediated by the lack of stimulation for children's development (Fadlyana et al., 2003; Sitaresmi et al., 2008).However, the number of children who were suspected of having developmental delay (3.1%) in our study was lower than the national estimate from the Indonesian Pediatric Society (5-10%) (Medise, 2013). A previous research conducted in Bandung showed that the prevalence of developmental delay is higher in a rural area compared to an urban area (29.3% vs 18.7%, p=0.012), which might be due to lower socioeconomic status and more moderate knowledge in child development among those who live in the rural area (Fadlyana et al., 2003). This is also in accordance with study from Sitaresmi et al. (2008) which reported that the proportion of children with dubious KPSP result and suspect to developmental delay in a rural area of Bantul, Yogyakarta was high, i.e. 28% and 8%, respectively. It was also reported that low socioeconomic status increased the odds of developmental delay among under five years old children by 180% (OR 2.8, 95% CI 1.4, 5.7) (Sitaresmi et al., 2008).

According to the trend of distribution of KPSP results and children age groups, the proportion of children who had dubious and suspect to have developmental delay results are higher in the age group 24 months old and over, compared to its counterparts. This is in line with a study from Sitaresmi et al. (2008) which showed that the prevalence of developmental delay in their study was higher for children aged 18 months old and over. Although conducted in the same setting, i.e. urban area, our results on aspects that the children had developmental delay on are different from study by Fadlyana et al., (2003). Their study reported that speech aspect was the most prevalent (66%), followed by perception (38%), fine motor (35%), gross motor (35%), and social (1%). However, this particular study used different developmental screening tool, of which the modified Munchener method was used (Fadlyana et al., 2003).

Research Limitations

There are some limitations to this study. Firstly, although the response rate of this study was excellent, our study population was only taken from an urban area. This might impact the generalisability of this study to a broader WNT area, which consists predominantly of rural regions. Secondly, our study is subject to information bias arisen from error in the measurement of both nutritional status and developmental status. Although training had been conducted for all of the research staffs prior to the study, we did not measure the inter-rater reliability, which is more objective to assess the difference of measurements between observers. This leads to a non-differential measurement error, reducing the true prevalence of the outcomes.

CONCLUSION

The profile of nutritional and developmental status of under five years old children in

Tanjung Karang district, Mataram, WNT could be examined using tools provided in SDIDTK kit through *posyandu* in the community. In this study, the prevalences of underweight and severely underweight, stunting, and wasting among under five years old children in Tanjung Karang district, Mataram, WNT are lower than the average provincial prevalences for the respective parameters in 2017. Furthermore, there is a considerable proportion of children in the region who are at risk of developmental delay and need to be assessed further.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest in this study.

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