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The 14th IRSA International Conference. Surakarta, July 23-24th 2018

CONFERENCE PROCEEDINGS

The 14th IRSA International Conference

"Strenghtening Regional and Local Economies"

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PROCEEDING

THE 14th IRSA INTERNATIONAL CONFERENCE 2018

Strengthening Regional and Local Economies

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The Role of Nutrition Assistance and Care in the Primary Health Center and Children Double Burden of Malnutrition in Indonesia

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The World Bank report emphasized the increase of double burden from malnutrition in Indonesia (Shrimpton & Rokx, 2013). Double burden of malnutrition leads to numerous health issues particularly stunting (undernutrition) and obesity (over nutrition). The World Bank report shows that the proportion of stunting children under the age of five in Indonesia is 37.2 percent. Stunting lowers the individual's productivity at the young age and escalates the risk of developing non-communicable diseases such as diabetes when older. Meanwhile, obesity increased the risk for chronic disease, reduce productivity, and often lead to mortality. Some studies for example Thomas, Strauss & Henriques (1992); Skoufias (1999), Satriawan & Giles (2010), Sumarto & Silva (2015) underlined the importance of social economy background and mothers' education on lowering malnutrition. However, Thomas, Strauss & Henriques (1991) argued that the role of mother's education on nutrition status of children will be biased if the study neglects the role of community factors such as sanitation and access on health services. Studies by Andriani, Liao, & Kuo (2016) *and Penny et al (2005) found that the access to health facility and the quality of nutrition counselling and services in the health facilities has significant impact in lowering malnutrition. Therefore, recognizing the importance of community services delivered by the Primary Health Center (Puskemas), this study aims to investigate the role of Puskesmas in the presence of double burden of malnutrition in Indonesia. The Indonesian Family Life Survey data of wave 5 and ordinary least square technique are employed to assess the determinants of children height in Indonesia. This study reveals that socio economic status, demography, consumption habit and services offered by Puskesmas have substantial role in lowering stunting in Indonesia.*

Keywords: Double burden of malnutrition, stunting, socio economic, demography, dietary habits, health center

INTRODUCTION

This study is keen to directly observe the important role of dietary habit and community factors of health facilities in delivering nutrition services. It contributes to the literature by further investigating the role of balance diet habit at home and health facilities to prevent and lower double burden of malnutrition in Indonesia. Its contribution is essential particularly in the periods of increasing prevalence of double malnutrition in Indonesia.

The findings of this study is relevant for central, regional and local government particularly in understanding the role of public policy in improving nutritional status of young children. Moreover, this study highlights the policy intervention on health services that suitable to improve health development outcomes.

There are two objectives of the study. First is examining the influence of socio economic, demography, consumption behavior on young child nutritional status across regions in Indonesia. Second objective is examining the role of services and facilities on malnourished prevention in the Primary Health Center on young child nutritional status across regions in Indonesia.

Literature Review

The World Bank report emphasized the increase of double burden from malnutrition in Indonesia (Shrimpton & Rokx, 2013). The report also revealed that general perception on malnourished is inaccurate since it refers merely to undernutrition. Moreover, the report found that the undernutrition figure in Indonesia is decreasing while the over nutrition as a result of imbalance nutrient intakes is increasing (Rachmi, Agho, Li, & Baur, 2016). Double burden of malnutrition leads to numerous health issues particularly stunting (undernutrition) and obesity (over nutrition). The World Bank report shows that the proportion of stunting children under the age of five in Indonesia is 37.2 percent. Stunting lowers the individual's productivity at the young age and escalates the risk of developing non-communicable diseases such as diabetes when older. Meanwhile, obesity increased the risk for chronic disease, reduce productivity, and often lead to mortality.

A study by Skoufias (1999) underlined the significant issue of malnutrition in Indonesia and focused on the undernutrition measured by under weight index. The study found that parental education level particularly mother's education had significant effect in the children's nutrition status. However, Thomas, Strauss, & Henriques (1991) and Skoufias (1999) argued that the role of mother's education on nutrition status of children will be biased if the study neglects the role of community factors such as sanitation and access on health services. But, their papers were not capable to measure the community factors directly rather employing the fixed effect to capture unobservable heterogeneity across children.

The recent literature on Indonesia children nutritional status has adopted the double burden of malnutrition concept in understanding the malnourished issue. Sumarto & Silva (2015) revealed that child stunting was high both in poor and wealthy households. This implies that income growth itself is not effective in tackling double burden of malnutrition. Regarding the community factors, Sumarto & Silva (2015) found evidence that access on health services contributed to lower double burden of malnutrition. Moreover, their study suggested that nutrition-sensitive development is essential to lower double malnutrition. The role of health services delivery in reducing stunting was also acknowledged by Giles & Satriawan (2010) particularly on the capacity of health service center of Puskemas (Primary Health Center) in providing Supplementary Feeding Program (well-known as PMT).

The maternal and child health community services in Indonesia are delivered through the integrated service delivery post (Posyandu) which is facilitated by Puskesmas. One key activities of Posyandu is

providing nutritional counseling to children and mothers. Andriani, Liao, & Kuo (2016) reported that non-availability of Posyandu significantly increased the risk of obesity. This study however, did not assess the quality of services provided. With the variability in the capacity of health centers in delivering services across regions in Indonesia, it is important to assess the quality of services, particularly regarding child nutrition. National mainstream media of Kompas in the past one month has been circulated information that the prevalent of malnutrition in Indonesia is contributed by a diversity of health center capacity in providing community services. Regarding to the prevention on malnutrition, a study by Penny et al., (2005) in Peru revealed that the quality of nutrition counselling and services in the health facilities improved the nutritional status of young children. They argued that education intervention in the health services has important role on child health improvement. Particularly, their study discovered that enhancement of nutrition counselling quality by providing training for manpower in the health centers improved its capacity to deliver services to lower the rate of stunting by more than two-third. Therefore, recognizing the importance of community services delivered by the Primary Health Center (Puskemas), this study aims to investigate the role of Puskesmas in the presence of double burden of malnutrition in Indonesia.

HYPOTHESIS

1. Primary Health Center (Puskemas) better services and facilities on malnourished prevention can improve young children nutrition status across regions in Indonesia
2. Better socio economic status lowers the prevalence of malnourished on young children
3. Demography factors have influence on nutrition status of young children
4. Dietary habit has important effect on improving nutrition status of young children

DATA AND METHODOLOGY

This study will analyze data from the Indonesia Family Life Survey wave 5, a longitudinal survey representing 86 percent of Indonesia population. The dataset provides information on children health, household conditions such as parental education, income and consumption behavior and community facilities data of health facilities including midwife, delivery post, Posyandu, elderly Posyandu and Puskesmas. This study will utilize the information on services provided, manpower capacities, resources and infrastructures, source of funds related to nutritional services in the health facilities across regions in Indonesia. Regarding to the measure of nutrition status, this study refers to Satriawan & Giles (2010) that employed the mean-child standardized height-for-age to measure double burden of malnutrition for young children. Both studies relied on the Indonesia Family Life Survey dataset to collect information on children health status that captured self-reported measures of general health status and biomarker measurement

conducted by a nurse.

This study focuses on the determinants of stunting of young children under five years old in Indonesia. The anthropometry of nutritional status of young children under five years old is employed to assess the malnutrition status. The guideline was introduced by the Ministry of Health in 2010. There are four nutritional status using the height category. First is severely stunted category which refers to children with height lowers than -3 standard deviation of the median of children in their age. The second category is stunted children with height between -3 standard deviation and -2 standard deviation compared to the median height of children in the same age. The third category is normal children with height between -2 standard deviation and +2 standard deviation of the median height of children in their age. Finally, those with height more than +2 standard deviation of the median are categorized as higher than normal child.

According to the IFLS dataset surveyed in 2014-2015, there are about 10 percent of young Indonesian children have severe malnourished problem. There are 536 from 5,118 young children are severely stunted. The prevalence is slightly higher in the rural area compared to urban ones. The second category of nutritional status is stunted and the proportion in Indonesia is quite high. There are 938 from 5,118 young children are categorized as stunted because their height is lower than the normal norm. The proportion of stunted children under 5 y.o is 18.46 per cent from the total sample. Thus, the proportion of stunted children both severely stunted and stunted is close to 30 per cent from the total young children. This number is comparable with previous study by the World Bank that shows the prevalence of stunting in Indonesia is 37.2 per cent. Regarding to the distribution of malnourished problem across urban and rural, the IFLS dataset shows that rural areas have higher proportion of stunted children compared to urban areas.

Table 1. The Prevalence of Stunting of Young Children under 5 y.o in Indonesia 2015

The category of height	Frequency		Sub total	Proportion (%) from total sample	Cumulative percentage (%)
	Urban	Rural			
Severely stunted*	252 (8.52%)	284 (11.68%)	536	9.84	9.84
Stunted**	481 (16.26%)	457 (21.53%)	938	18.46	28.30
Normal***	1,925 (65.06%)	1,267 (59.68%)	3,192	62.81	91.11
Higher than normal child****	301 (10.17%)	151 (7.11%)	452	8.89	100.00
Total	2,959 (100%)	2,123 (100%)	5,118	100.00	

Source: Indonesia Family Life Survey Wave 5 (2015)
Note:
The height category is based on the anthropometry standard guideline published by the Ministry of Health No. 1995/MENKES/SK/XII/2010.

**Children under the severely stunted category is those with height lowers than -3 standard deviation of the median of children in their age.*
***Children under the stunted category is those with height between -3 standard deviation and -2 standard deviation of the median of children in their age.*
***Children under the normal category is those with height between -2 standard deviation and +2 standard deviation *of the median of children in their age.*
****Children under the higher than normal category is those with height more than +2 standard deviation *of the median of children in their age.*

Table 2. The Prevalence of Stunting of Young Children under 5 y.o
in Indonesia 2015, Sub Group Analysis of Male and Female

The category of height	Frequency		Sub total	Proportion (%) from total sample
	Male	Female		
Severely stunted	286 (10.85%)	214 (8.75%)	536	9.84
Stunted	512 (19.42%)	426 (17.42%)	938	28.30
Normal	1,613 (61.19%)	1,579 (64.55%)	3,192	91.11
Higher than normal child	225 (8.54%)	227 (9.28%)	452	100.00
Total	2,636 (100%)	2,446 (100%)	5,118	

Source: Indonesia Family Life Survey Wave 5 (2015)

The prevalence of stunting is more critical especially for male children. Table 2 shows that the proportion of severely stunted male young children is 10.85 percent to total male children compared to 8.75 per cent for the female children. Similarly, the proportion of stunted male young children is 19.42 per cent compared to 17.42 per cent for female children.

The econometric modelling of ordinary least square is utilized to examine the role of socio economic status, demography factors, dietary habit and nutritional services and facilities activities in the health facilities to lower malnourished problem of stunting in Indonesia. The malnourished of stunting is measured by using the Z score of young children under 5 years old representing the distance of height with the median. The Z score formula is presented in below equation.

$$Z\ score = \frac{height - median\ height}{median\ height - standard\ deviation\ minimum} \quad \text{if height<=median height}$$

$$Z\ score = \frac{height - median\ height}{standard\ deviation\ plus - median\ height} \quad \text{if height>=median height}$$

The socio-economic status is measured by the monthly total consumption of the households comprised both food and non-food spending (in logarithm). The dietary habit is observed by using the food consumption dataset comprised the type of food consumed by the children in the past one week. This study is further construct the information to generate the type of foods and the frequency of

consumption. The focus is to create a categorical variable representing the combination of food consumption both basic and unhealthy snack. Basic food is comprised of four components of carbohydrate, vegetables, fruits and protein. Children are supposed to consume all the basic components every day. If children consume all the necessary components in daily basis, they are entitled to be in the category four. Meanwhile, if the children do not consume full set of all four basic components, they will be coded 0, 1, 2 or 3 according to their dietary habit. In addition, this study codes babies under 6 months in the category 5 because they are recommended to fully breastfeeding so they do not consume the solid food yet. Below table of operationalization of the variable provides detail information about the category.

The observation of the dietary habit is also conducted by examining the consumption of unhealthy snack such as instant noodle, fast food, carbonated beverages, fried snack and sweet snack. This study creates three categories of unhealthy snack consumption. The first category is coded as 0 for children consume unhealthy snack less than 7 times a week. The second category is coded 1 for children having the unhealthy snack between 7 to 14 times a week implying consumption patter of unhealthy snack twice of more in daily basis. Finally, the third category is the heaviest consumers of unhealthy snack of more than 14 times a week.

This study controls the demography factors of young children by using the areas of living, gender and mothers' education. Mothers' education is measured by the years of schooling. Finally, in order to assess the role of Primary Health Center in improving nutritional status of young children, this study covers three types of services offered by the center. First service, coded as A, is growth and development monitoring for children under 5 years old. The second service, coded as B, is additional nutrition aside from breast milk distribution for babies between 6 – 24 months. Lastly, the service C refers to treatment for malnutrition for children under 5 years old.

Table 3. Operational Definition of Variables

Variable	Operational definition
DEPENDENT VARIABLE	
Z score of height	The z score is calculated by using the information of children height and their correspondence median and standard deviation of the children under the same age based on anthropometry standard guideline published by the Ministry of Health No. 1995/MENKES/SK/XII/2010. Z score=((height-med)/(med - sd min)) if height<=med Z score=((height-med)/(sd plus - med)) if height>=med *sd stands for standard deviation*
INDEPENDENT VARIABLES	
Households consumption	Log of monthly total consumption
Basic food consumption habit	The value is 0: not having all the necessary 4 components of carbohydrate, vegetables, fruits and protein everyday 1: having at least 1 necessary component of carbohydrate, vegetables, fruits and protein everyday

	2: having at least 2 necessary components of carbohydrate, vegetables, fruits and protein everyday 3: having at least 3 necessary components of carbohydrate, vegetables, fruits and protein everyday 4: having all necessary component of carbohydrate, vegetables, fruits and protein everyday 5: Babies under 6 months that the recommendation is fully breastfeeding
Unhealthy snack consumption habit	The value is 0: having the unhealthy snack less than 7 times a week 1: having the unhealthy snack between 7-14 times a week 2: having the unhealthy snack more than 14 times a week
Urban/ rural	The value is 1 if the child lives in urban area 2 if the child lives in rural area
Sex	The value is 1 if the child is male 2 if the child is female
Mothers' education	The number of years of schooling of mother
Primary Health Center (Puskesmas) services A*	The value is 0: if none of the public health center offers the service in the enumeration area 1: if there is one public health center offers the service in the enumeration area 2: if there are two public health center offers the service in the enumeration area 3: if there are three public health center offers the service in the enumeration area
Primary Health Center (Puskesmas) services B*	
Primary Health Center (Puskesmas) services C*	

Note:
Services A on growth and development monitoring for children under 5 y.o
Services B on additional nutrition aside from breast milk distribution for babies 6 – 24 months
Services C on treatment for malnutrition for children under 5 y.o

EMPIRICAL FINDINGS

The estimation result is available in table 4. In general, most of explanatory variables are proven statistically in influencing the children nutritional status. A better socio-economic status reflecting by the coefficient of log of total consumption is positive and statistically significant in improving the young children height. This implies that wealthier households have better ability in fulfilling the nutrition needs of the children. The dietary habits measuring by the consumption pattern of basic and unhealthy snack are effective in improving children nutritional status. A higher Z score is contributed by better consumption of basic food and lower frequency of unhealthy snack consumption.

Moreover, the demography factors determine the children nutritional status. Children in the rural area is more prone to malnutrition compared to those in urban area. In addition, the mothers' education is a strong predictor of children nutritional status which more educated mothers have better knowledge so they provide more balance dietary habits and other positive influence to their children.

Finally, the services offered by the Primary Health Center is effective in improving nutritional status of young children. The estimation result shows that the higher number of health center that provides

services related to growth and development monitoring for children under the age 5 years old, a better nutrition status of the children lives nearby and this lowers the prevalence of stunting.

CONCLUSION AND RECOMMENDATION

This study reveals that socio-economic status, demography factors, dietary habits and nutrition-related services offered at the primary health centers contribute to improve young children nutritional status across regions in Indonesia. The findings enhance the previous studies that better socio economic status enable families to fulfill the children nutrition needs. Moreover, lowering the prevalence of stunting should be started from home by providing balance nutrition from basic foods and reducing the consumption of unhealthy foods.

There are some policy implications to combating malnourished prevalence in Indonesia. Government across level from local to national are suggested to enhance the socialization program introducing good dietary habits for children and all family members. In addition to the socialization program, government should provide incentives and support for family to feed their children properly. Considering that children in rural areas are exposed to the stunting risk higher than children in urban areas, government may also put intensify the implementation of the programs in rural areas. Finally, the Primary Health Centers have substantial role in lowering stunting by providing effective services such as growth and development monitoring for children under the age 5 years old.

Table 4. Empirical Results

Z score	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Household consumption	0.2214876	0.0423187	5.23	0	0.138519	0.3044561
Basic food consumption habit						
1	0.5569511	0.3171907	1.76	0.079	-0.064921	1.178823
2	0.5351764	0.3071065	1.74	0.081	-0.0669251	1.137278
3	0.5239443	0.3087945	1.7	0.09	-0.0814665	1.129355
4	0.6512845	0.3309866	1.97	0.049	0.0023647	1.300204
5	4.030175	0.3238919	12.44	0	3.395164	4.665185
Unhealthy snack consumption habit						
1	-0.1259962	0.0614435	-2.05	0.04	-0.2464601	-0.0055324
2	-0.1747338	0.1819382	-0.96	0.337	-0.531435	0.1819674
Urban/rural	-0.3121229	0.0616655	-5.06	0	-0.4330219	-0.1912239
Sex	0.0333991	0.0292447	1.14	0.253	-0.0239369	0.0907352
Mothers' education	0.06466	0.0073042	8.85	0	0.0503396	0.0789804
Public health center (Puskesmas) services A						
1 health center	1.096428	0.4620314	2.37	0.018	0.1905865	2.002269
2 health center	1.168087	0.4638657	2.52	0.012	0.2586493	2.077524
3 health center	1.237996	0.4639276	2.67	0.008	0.328437	2.147555
Public health center (Puskesmas) services B						
1 health center	-0.0132854	0.1850009	-0.07	0.943	-0.3759911	0.3494203
2 health center	-0.0307413	0.1757446	-0.17	0.861	-0.3752995	0.3138169
3 health center	-0.0954011	0.1784127	-0.53	0.593	-0.4451904	0.2543882
Public health center (Puskesmas) services C						
1 health center	-0.1843973	0.259354	-0.71	0.477	-0.692877	0.3240823
2 health center	-0.187169	0.2588589	-0.72	0.47	-0.6946779	0.32034
3 health center	-0.0240172	0.2638406	-0.09	0.927	-0.5412931	0.4932587
_cons	-6.114272	0.7708866	-7.93	0	-7.625643	-4.6029
Observation	3,987					
F (20, 3966)	59.57					
Prob. > F	0.000					
R-Square	0.2310					

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