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Policy Brief
Nutritional Inequality of Poor Children in Indonesia

This article discusses malnutrition amongst children under five years of age in Indonesia, primarily based on the welfare measure of consumption expenditure per capita. There are limited survey data of the anthropometric scale required to create child malnutrition variables and consumption and expenditure variables per capita. The latter variable is vital because social assistance policy is determined by the wealth/welfare group being targeted. The Government of Indonesia uses consumption expenditure per capita to measure the poverty rate or classify welfare groups. One source of survey data that uses both variables is the Indonesia Family Life Survey (IFLS). The analysis herein demonstrates that child malnutrition is prevalent in the lower wealth group. In addition, this study attempts to measure the impact of prenatal care (PNC) intervention on stunting. The findings suggest that PNC has no significant effect on stunting.

1. Background

Despite significant economic growth and declining poverty in Indonesia in recent years, child malnutrition is a long-term problem for the country. Among developing countries, Indonesia has a stable economic growth rate of around 5 per cent per annum, while, since 2018, the poverty rate has fallen to below 10 per cent. Nevertheless, these records are tainted by the prevalence of child malnutrition, specifically among children under five years of age. A common measure of malnutrition is the height-for-age z-score (HAZ)–that is, under -2 standard deviation (SD) and under -3 SD for severe acute malnourished children. Officially, the Government of Indonesia, through the Ministry of Health, revealed that, in 2013 and 2018, the rates of malnourished children were 27.2 per cent and 30.8 per cent respectively–exceeding the WHO standard of 20 per cent.

This publication illustrates the development of malnutrition indicator over two periods of IFLS data, followed by the analysis of stunting inequality, the evaluation of the impact of PNC as the policy implementation, and wraps up with conclusions.

2. 2000-2014 IFLS Malnutrition Indicator Development

Within the survey periods of IFLS, specifically in 2000 and 2014, the malnutrition indicators in children under five years-old signal a declining trend. The HAZ in 2014 was -1.39, a fall from -1.49 in 2000 (Table 1). Using the proportion of malnutrition with a threshold of -2 SD, the score is represented by 39.96 per cent in 2000 and 34.80 per cent in 2014.

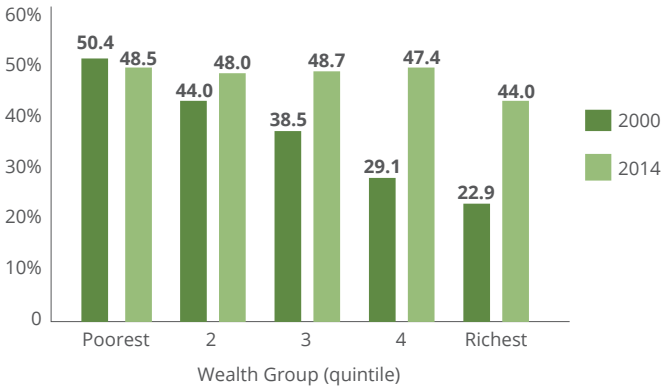
Table 1: Indicator for Stunting.

	2000	2014
Average HAZ	-1.49	-1.39
Stunting (under -2 SD)	39.96%	34.80%
Stunting, extreme (under -3 SD)	16.50%	13.10%

Source: IFLS, processed data.

From 2000 to 2014, there was a shift in the prevalence of stunting in the upper wealth group. Based on consumption expenditure per capita, the size of the welfare/wealth group is measured and classified into five groups (quintile). The prevalence of stunting in the poorest quintile was much higher compared to the richest groups in 2000, however, by 2014, stunting prevalence amongst the rich had increased significantly.

Figure 1. Distribution of BUMDes (2019)



Source: IFLS, processed.

3. Inequality of Stunted Children

The measurement of inequality describes the course of events or the prevalence of indicators that measure whether the observed variable is pro-poor or pro-rich. The general measurement for inequality in a specific indicator refers to the Gini coefficient, that describes a population group that enjoys a measure of wellbeing, for example consumption expenditure per capita and whether it is concentrated in those who are poorer or the rich. In a more specific context, such as health, the indicator concerned in the analysis needs to be examined further so it can answer whether development of the outcome variable is concentrated amongst the poor or the rich. The value or size of specific variables in the analysis on inequality is called the concentration index (CI). Other than measuring the number or coefficient, inequality can be evaluated visually through concentration curve (CC) as an analogy of the Lorenz Curve. The absence of inequality is illustrated by a CI value of 0 and 45-degree line of CC (on the equality line).

Further analysis needs to be conducted to comprehend whether the variable measured for inequality denotes positive or negative events. For child malnutrition, a higher prevalence of stunting indicates worse condition. Within the context of inequality of stunting, a positive CI value suggests that inequality tends to be pro-rich, thus disadvantaging rich groups, and vice versa. When illustrated visually, the CC with negative CI is indicated by a curve above the equality line, and positive CI below equality line.

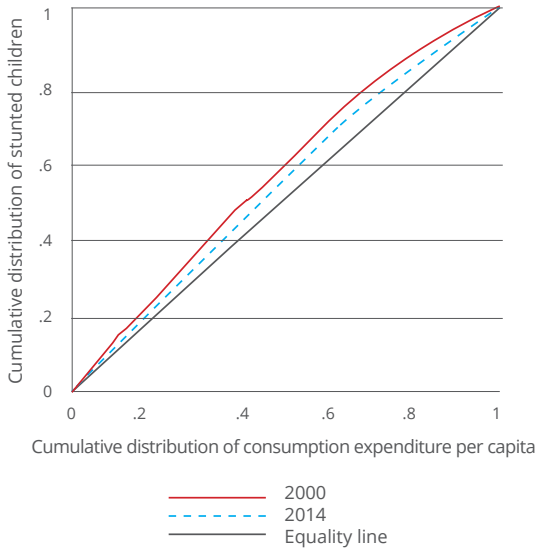
Table 2. Concentration Index of Stunting Below 2 SD

	2000	2014
Concentration index (CI) coefficient	-0.13	-0.07
Standard error (SE)	0.01	0.02
t-stat.	-11.47	-4.27
Observations (N)	3,815	2224

Source: IFLS, processed data

The inequality of stunting decreases along with the declining prevalence of stunting and the shift of stunting prevalence distribution in several groups of expenditure. Table 2 summarises the CI coefficients between 2000 and 2014. In both periods, the CI coefficients are negative, showing that malnutrition inequality tends to be pro-poor or concentrated more in poor communities. The standard error (and t-statistics) display a statistically significant CI coefficient. From 2000 to 2014, the coefficient approached zero, signifying a more equally distributed prevalence of stunting over the period.

Figure 2. Concentration Curve of Stunting Below 2 SD



Source: IFLS, processed data.

Figure 2 presents the CC of CI coefficients between 2000 and 2014. Being closer to the equality line, the 2014 curve indicates a coefficient shift that represents a more equal distribution compared to the 2000 curve. This suggests that the stunting prevalence is not merely concentrated in poor groups, but also more evenly circulated in other wealth groups.

The measured inequality from the CI and CC poses a more serious challenge for the government in addressing malnutrition. Studies in other countries, such as Vietnam (Wagstaff et al. 2003), China (Chen et al. 2007), and three Latin America countries (Forero-Ramirez et al. 2014), present a similar trend where the stunting prevalence is pro-poor. In Indonesia, specifically from the 2000 IFLS data, such an inequality will enable the government to express growing concern for the lower class, however, the shift as pointed out in the 2014 data implies that the middle class is also a wealth group of concern.

4. The Impact of PNC on *Stunting*

Some of the literature refers to efforts to improve nutrition during pregnancy, for example, PNC. One common indicator of PNC is the four-visit model during pregnancy, with the first visit during the first trimester. The advantage of the structure of the panel data in IFLS are the traceable observations in the previous period–making it possible to establish a causal relationship. The past research on malnutrition and PNC (Forero-Ramirez et al. 2014) reveals that cross-sectional data limited the ability of the study in three Latin America countries to establish causal relationship.

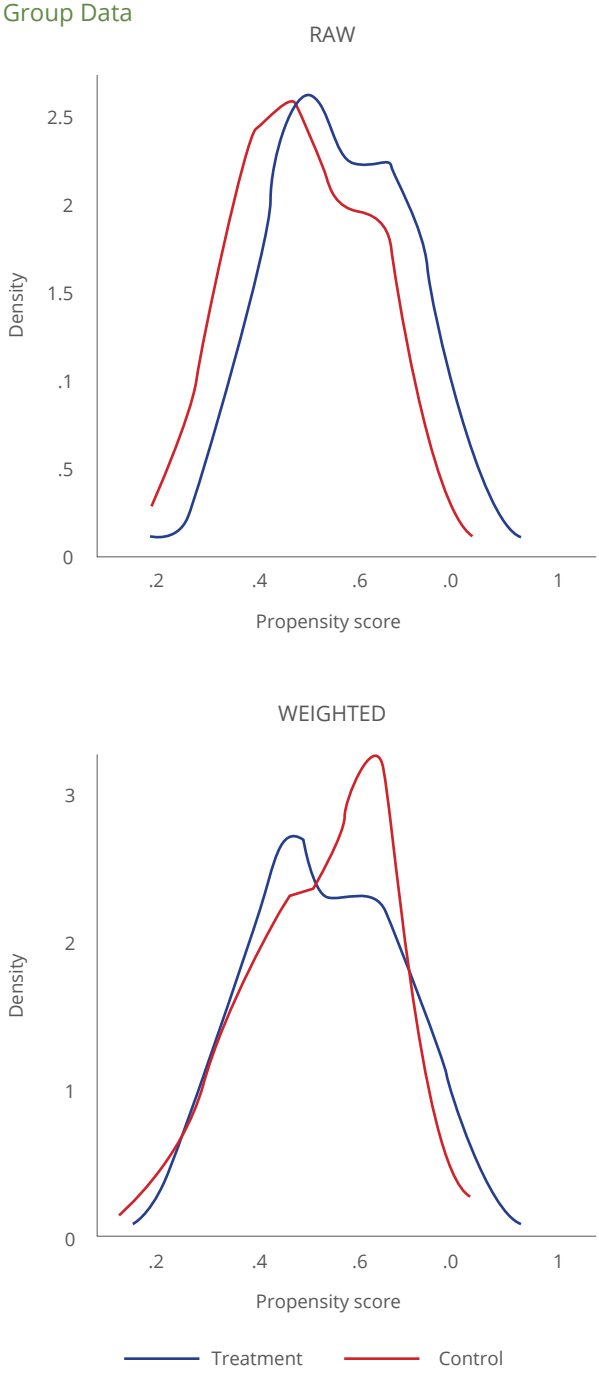
From the 2000 IFLS data, some 21 per cent of mothers with children under five years of age are making PNC visits. Based on the wealth distribution, there is no significant difference in the proportion of PNC visits between wealth groups.

Figure 3. Proportion of Prenatal Visits Based on 2000 IFLS

Source: IFLS, processed data.

For identification purposes, this study specifically utilised a model with stunting variables as outcomes and PNC an intervening variable. There were two outcome variables tested–the probability of stunting and HAZ. Most observations were taken in 2000. As the data on PNC only applies from the responses given by expectant women in the IFLS questionnaire in 2000, this study limited the observations to children 1-3 years of age in 2000 (born in 1997 and 1998).

Figure 4. Balancing of Treatment Group and Control Group Data



Source: IFLS, processed data.

The PNC model estimation in the first stage used a logit model to balance between a treatment group (expectant women with at least four PNC visits; the first visit in the first trimester) and control group (expectant women with no PNC visit or failing to fulfill the requirement of the four-time visit). This stage aims to satisfy the selection-on-observable assumption and overlap assumption (common support) in establishing causal relationship. With the limited target as specified above, the mothers are estimated to be pregnant in 1997. Subsequently, the characteristics of these mothers and the family heads were taken into account as a covariate for the first stage modeling of PNC.

Technically, the estimation outcome of the first stage used in the balancing process served as a weighting in the second stage estimation for the outcome variable. The estimation using this balancing approach is defined as inverse-probability weighting (IPW). The implementation of analysis method to evaluate the program impact using econometric approach was introduced by Hirano et al. (2003).

Table 3. Estimated Impact of PNC on Stunting

VARIABLE	(1) OLS	(2) OLS	(3) IPW	(4) IPW
Pre-natal care	-0.012	0.013	0.016	0.028
	(0.028)	(0.032)	(0.040)	(0.040)
Observations	1,262	961	676	672
Control Variable	No	Yes	No	Yes
Overidentification test			12.59	
p-value			0399	

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: IFLS, processed data.

The estimated impact of PNC on stunting does not display any statistically significant effect. Table 3 proves that with the estimator of either OLS or IPW, the estimated parameter coefficient with PNC treatment does not provide significant result on stunting prevalence.

Furthermore, PNC visits have not empirically produced a significant effect on stunting. From the data, fewer than 50 per cent of women undertake PNC visits, signifying that pregnant women continue to have poor access to health care. On the other hand, It is suspected that these PNC visits are likely insufficient to have an impact as there may be a problem with the quality of these visits. In this regard, it is necessary to improve the quality of monitoring and evaluation to further determine the root cause.

This study is limited as it does not include regional aspects or differences in nutrition between regions as Indonesia is a large archipelagic country with disparate data availability on cities and villages.

Conclusion

The monitoring of child malnutrition indicator development should consider the group distribution concentration, particularly in countries with limited funding allocations to alleviate nutrition problems. The policy options in addressing budget constraint and determining priority groups require supporting evidence. Through a group distribution-based analysis, the actual projection of malnutrition cases it can be determined whether it is pro-poor or pro-rich.

To examine child malnutrition inequality, further analysis in this study requires supporting data with better and more extensive and updated national observation coverage. One of the advantages of IFLS data is that it has more in-depth information over a longer time period than other sources. Nevertheless, the weakness lies in the level of coverage that cannot be applied to estimations at the provincial and district/municipal levels. The data from the National Socioeconomic Survey (Susenas) and Basic Health Research (Riskesdas) that was integrated in 2018 has considerable potential for the development of this study analysis given that it can provide micro-level information for the anthropometric variables and consumption expenditure per capita. With a large number of observations and national coverage, this data is beneficial for making estimations at provincial or district/municipal level.

The findings from this study summarise the higher prevalence of child malnutrition in poor groups as compared to that in rich groups. This reality is nearly identical with some other indicators of development (for example, education and health), where socioeconomic characteristics of low-welfare communities tend to have similar course of prevalence. After 14 years, however, it appears that stunting is not only concentrated in poor groups. This will pose a challenge for the Government of Indonesia if no immediate measure is taken regarding child malnutrition.

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