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Maternal Characteristics and Child Malnutrition in Indonesia, 2014/2015

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Abstract

Child malnutrition is a condition of disproportionate nutrition in children. It manifests in three forms—stunting, being underweight, and wasting. It is one of the biggest burdens in Indonesia, as the incidence shows an improvement, but it continues to be categorized as highly severe for stunting and being underweight and moderately severe for wasting. Using the Indonesian Family Life Survey (IFLS) Wave 5 data year 2014/2015, this study analyzes the association between maternal characteristics and the incidence of malnutrition among children aged 5–59 months in Indonesia. The probit regression result implies that maternal characteristics (mother's BMI, height, and education) significantly influence the child's malnutrition. Furthermore, there are other compounding factors to consider, such as the child's age, the number of members in a household, the household's per capita expenditure, and the household's area and region.

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INTRODUCTION

Malnutrition is one of the most common public health and nutrition problems in the world. Malnourishment in children is associated with a deteriorating health condition that is caused by increased vulnerability against chronic diseases, which can lead to a decreased quality of life (McGovern, Krishna, Aguayo, & Subramanian, 2017; Uauy et al., 2013). Therefore, the importance of eliminating malnutrition is part of the Sustainable Development Goals (SDGs). Goal 2 seeks 'sustainable solutions to end hunger and all forms of malnutrition by 2030 and to achieve food security' (Hawkes & Fanzo, 2017), which implies a decrease in child stunting by 40% and child wasting by 5% by 2024.

In 2016, about 248 million children worldwide under the age of five were estimated to be suffering from malnutrition. About 155 million of these children experienced stunting, while the number of children suffering from wasting and being underweight were far less—52 million and 99 million, respectively (UNICEF, WHO, & Bank, 2017). On the other hand, as compared to other countries in Southeast Asia, Indonesia carries the highest burden of children stunting, wasting, and being underweight (ASEAN/UNICEF/WHO, 2016).

However, the malnutrition status in Indonesia is on the decrease. Based on Riset Kesehatan Dasar's (Basic Health Survey/Riskesdas) data in 2007 and 2018, there was a decrease in the incidence of stunting and wasting from 36.8% to 30.8% and 13.6% to 10.2%, respectively (Badan Penelitian dan Pengembangan Kesehatan, 2008, 2019). At the same time, there was a slight increase in the incidence of being underweight from 13% in 2007 to 13.8% in 2018. Based on the World Health Organization (WHO) malnutrition severity standard, the prevalence of malnutrition in Indonesia is categorized as high for stunting (30–39%), high in being underweight (10–19%), and medium for wasting (10–14%) (WHO, 1995). The malnutrition elimination achievements in Indonesia at the global level have not been significant enough to achieve the SDG target in 2030 (Hawkes & Fanzo, 2017).

Several determinants of stunting, wasting, and being underweight have been identified from previous studies. Maternal body mass index (BMI) and maternal height represent the probability of intergenerational effect of malnutrition, while the mother's education is predicted to be correlated with the lack of knowledge in health and nutrition (de Silva & Sumarto, 2018). Malnutrition incidence is also specifically related to the children's gender and age. Household access to resources such as water and sanitation were found to have a relationship with malnutrition due to the dissemination of infectious diseases (Torlesse, Cronin, Sebayang, & Nandy, 2016). The number of members in a household can affect the food share within the family, thus affecting the amount of food eaten by the children (Akram, Sultana, Ali, Sheikh, & Sarker, 2018). Meanwhile, the per-capita total expenditure indicates the financial ability of a household in providing adequate food and nutrition (Sarma et al., 2017). Lastly, residential areas and regions play an essential role in addressing spatial and environmental differences such as access to economic activities, adequate health care facilities, and sufficient food (van de Poel, O'Donnell, & van Doorslaer, 2007).

Research on the relationship between the mother's characteristics and malnutrition has been widely conducted worldwide, particularly in developing countries. Previous studies on child malnutrition in Indonesia are fragmented, as they focus on certain types of malnutrition, and the findings on maternal characteristics are varied. Chowdhury et al. (2016) suggested that parental characteristics are aligned with child malnutrition. De Silva & Sumarto (2018) noted that the consequences of adult health and child malnutrition require special attention, particularly due to the high probability of the intergenerational impact from parents to their offspring.

A study using the Indonesia Family Life Survey (IFLS) data years 1993, 1997, 2000, and 2007 found that maternal BMI and height correlated with stunting and being underweight in children of ages 2–4.9 years (Rachmi, Agho, Li, & Baur, 2016). Meanwhile, there was a positive relationship between parental height, stunting, being underweight, and wasting in children under

the age of 5 using IFLS data year 2000 and 2007 (De Silva & Sumarto, 2018).

Given this background, I will attempt to utilize the newest data from IFLS Wave 5, year 2014/2015. This study includes three forms of malnutrition—stunting, being underweight, and wasting—for a complete understanding and filling in the gaps of previous studies in relation to maternal characteristics and child malnutrition. Moreover, this paper will analyze the data of children under the age of five as they are considered as the most vulnerable members in society (Manjunath, Jagadish, Kulkarni, Begum, & Gangadhar, 2014).

RESEARCH METHODS

This is a quantitative study that examines the probability of three types of malnutrition—stunting, being underweight, and wasting—in children aged 5–59 months against a set of variables. This study used the Indonesian Family Life Survey (IFLS) data, specifically IFLS Wave 5 in the year 2014/2015. This is a collaborative work of RAND and Survey Meter. It is the latest data from the ongoing longitudinal IFLS survey in 13 provinces in Indonesia, which began in 1993, and it contains a wide range of socio-economic variables, including anthropometric measurements (Strauss, Witoelar, & Sikoki, 2016). However, due to split-off households, one household in the IFLS Wave 5 needs to be tracked out of the original IFLS Wave 1's province. Hence, in this paper, malnourished children were spread across 20 provinces in Sumatra, Java, Bali, Nusa Tenggara, Kalimantan, and Sulawesi.

The study sample was created by combining IFLS Wave 5 questionnaire books. The sample included children who were still living in the household, had complete data of anthropometric measurements, and matched with their mother's data. After applying these selection criteria, the sample included 2,266 children for stunting, 2,264 for being underweight, and 2,247 for child wasting. The sampling stages are depicted in Appendix B.

To analyze the results of regression, this study applied descriptive statistics and probit estimation. Probit regression is used to analyze the binary outcome variables that require non-linear statistical techniques (Angdembe, Dulal, Bhattarai, & Karn, 2019). Previous research has used probit regression to analyze malnutrition issues, particularly stunting (Angdembe et al., 2019; De Silva & Sumarto, 2018). The probit model for stunted, underweight, and wasted children that was used in this study was adapted from de Silva & Sumarto (2018):

$$Malnutrition = \begin{cases} 1, if\ child\ haz, waz, whz\ zscore\ is\ below - 2\ SD \\ 0, if\ otherwise \end{cases}$$

and,

$$Pr\langle Malnourished = 1 \mid X\rangle = f\ (X, \beta)\ Pr\langle Malnourished = 0 \mid X\rangle = 1 - f(X, \beta)$$

Outcome Variable

The outcome variables of this paper are malnutrition conditions, which are stunting, underweight, and wasting. The sample was limited to children aged 5–59 months (under the age of five), as this is the most vulnerable age for a child's growth where any impairment will impact their quality of life as adults (Manjunath et al., 2014). The outcome variables are binary, defined as stunting if a child's height-for-age Z-score is below -2 SD, underweight if the child's weight-for-age Z-score is below -2 SD, and wasting if the child's weight-for-height Z-score is below -2 SD. The anthropometric Z-score is calculated using STATA command 'zscore06' based on the 2006 child growth standards for children aged 0–5 years by the WHO (Leroy, 2011). This paper utilizes the WHO cut-off data for stunting, underweight, and wasting databases to maintain data coherence and changes in data definitions (Grummer-Strawn, 2007). Based on the cut-off, data was excluded if a child's height-per-age Z-score was below -6 or above +6, weight-per-age Z-score was below –6 or above +5, and weight-per-height was below –5 or above +5.

Independent Variable

The independent variables used in this policy paper are selected variables that were adopted from a reduced form of conditional child health demand function by de Silva & Sumarto

(2018). This initial model addresses the anthropometric measurements of children by explaining child characteristics (Xi), parental characteristics (Xp), household composition and characteristics (Xh), access to and utilization of healthcare (Xu), household consumption/asset status (E), and spatial characteristics (Xr) in the function below.

$$H_i = \alpha + X_i\beta + X_h\delta + X_u\theta + E_\varphi + X_r\varphi + \varepsilon_i$$

Based on the above function, this paper addressed malnutrition considering maternal, child, household, and spatial characteristics. This study specifically focused on maternal characteristics, while the other variables were considered as control variables. The variables used, along with definitions and descriptive statistics, are presented in Appendix C.

Based on my calculations from IFLS Wave 5 data in 20 provinces, the prevalence of stunting is 84%, being underweight is 60%, and wasting is 9.5%. Most of the data falls below the -2 WHO cut-off for stunting, while for being underweight and wasting, the mean of the data was slightly above the cut-off. The data differs based on child nutritional status indicators while studying the same children aged between 5–59 months. Appendix B shows that, on average, the mothers in this study weighed about 55.6 kg, with height about 151.7 cm with BMI about 24.1 kg/m^2, which is categorized as low BMI. Meanwhile, on average, mother's education was mainly dispersed at the first category which is no education or incomplete primary.

Mother's Characteristics

Parental characteristics predominantly constituted the mother's characteristics, which included BMI, height, and education level. 'Body mass index is used to assess mother's nutritional status, defined as a ratio of weight (kg)/[height (m)]^2' (Akram et al., 2018). There are three categories of BMI—thin (below 18.5 kg/m^2), normal (18.5–24.9 kg/m^2), and overweight (over 25 kg/m^2). The mother's height is considered normal if it is over or equal to 150.1 cm (Addo et al., 2013). Education level for mothers is categorized into four groups: (1) no or incomplete primary school (0–5 years), (2) completed primary school (6 years), (3) completed junior high school (9 years), and (4) completed senior high school and higher education (12 years and above).

Child Characteristics

Child characteristics are represented by the child's gender and age. A child's age is categorized into six groups: (1) 0–12 months, (2) 13–24 months, (3) 25–36 months, (4) 37–48 months, and (5) 49–59 months (Geberselassie et al., 2018). The age of the child (in months) is obtained by reducing the birth year of the child with the year of IFLS wave 5 data recording (2015), multiplying it by 12 months, and adding the difference in the month of birth in 2015. I used 2015 instead of 2014 in age calculations due to the IFLS Wave 5 fieldwork conducted between September 2014 and March 2015 (Strauss, Witoelar, & Sikoki, 2016) with the assumption of including the children surveyed in 2015.

Household Characteristics

The variables that represent household characteristics are toilet facilities in the household, the number of members, and household total per-capita expenditure. The toilet facility is a binary variable, where a household with a toilet and a septic tank is categorized under improved toilet facility. The members of a household include a count of the people in the household, and this variable is classified into two categories—less and equal to five people and over six people in a household. Lastly, household consumption is defined as the per capita total expenditure of a household. It is generated as a monthly total of food, non-food, and schooling expenditure divided by the total number of household members. This measure is shown in the regression in the form of quintile groups.

Spatial Characteristics

The spatial characteristics of a household are determined by the area and region where the household resides. The areas of a household are categorized as rural and urban, while the regions of the household are divided into four groups—

Sumatra, Java, Bali and Nusa Tenggara, and Kalimantan and Sulawesi (Rachmi et al., 2016).

RESULTS AND DISCUSSION

In this study, I estimated three types of malnutrition separately (i.e., stunting, underweight, and wasting). This section presents descriptive statistics results and regression analysis, which is divided into three parts, based on malnutrition forms and followed by analysis of maternal and other relevant characteristics (child, household, and spatial characteristics).

Descriptive Analysis

The descriptive statistics in this study are presented in Appendix D, E, F and G for child malnutrition by household residential area, child malnutrition by province, maternal characteristics, and other characteristics, respectively. In general, IFLS Wave 5 data analyses in Appendix D and E demonstrate that 1 out of 5 stunted children reside in Central Java. Stunted children also found in a rural area in West Java; however, their percentage is less than the stunting incidence in the concerned urban area in Central Java. More underweight children who are under five years old are found in West Nusa Tenggara; further, the population of such children is greater in the rural area than the urban area. Meanwhile, children suffer from wasting are identified in Central Java, particularly more in the rural area, and East Java. in the urban area.

It can be seen in Appendix F that in all types of malnutrition, mostly concerning under-five children, have mothers with normal BMI. Moreover, over than half of the mothers who had stunted children were short-statured, and normal height mothers were found with underweight and wasted children. Meanwhile, in general, mothers with malnourished children were found to complete senior high school and higher education, and this percentage is larger in mothers with wasted children.

Appendix G presents information about control variables of this study. Over 50 percent of stunted and wasted children in this study were male, while half of the underweight children were female. Moreover, based on the data, these children were found out to be malnourished at 25–36 months old. The household characteristics of malnourished children are as follows: a small family with less than five members, improved toilets, and living in low-income families (second quintile of per capita expenditure group for stunting and underweight children); the poorest of the families belonged to wasted children; meanwhile, over half of the children and their families were living in the urban area of the Java island.

Regression Analysis

The IFLS Wave 5 is analyzed by applying probit regression using STATA 15. In general, the results for predictor factors are varied, as seen in Appendix H.

Maternal Characteristics

The regression result reveals that maternal BMI is correlated with underweight and wasting but not stunting. These findings support the first hypothesis on the effect of the mother's BMI on child malnutrition. Mother's with BMI below 18.5 are positively correlated with the probability of being underweight and wasting in children. Black et al. (2008) emphasized that low BMI in mothers might affect the composition of breast milk due to the low level of micronutrient that is predicted to increase the risk of worsening a child's growth. On the other hand, the regression result showed that children whose mothers have BMI over 25 were predicted to have less chance of being underweight and wasted. According to Black et al. (2008), based on cohort studies in 24 low and middle-income countries, most women with BMI greater than 25 kg/m^2 were categorized as mildly overweight, which is one of the protective factors against short gestational age. On the other hand, stunting is not correlated with maternal BMI, which is most likely due to the nature of BMI as a representation of current nutritional status (Perkins, Subramanian, Smith, & Özaltin, 2016), whereas stunting is the consequences from long-term malnutrition (UNICEF et al., 2017).

Short height of mothers (short than 150.1 cm) is significantly and negatively related to the probability of stunting and underweight incidence.

This result justifies the second hypothesis on the role of mother's height in malnutrition incidents in children. This observation is consistent with previous studies from 5 birth cohorts in Brazil, Guatemala, India, the Philippines, and South Africa (Addo et al., 2013). Mother's height portrays an intergenerational effect that a mother's condition after having children is not only related to her condition at a younger age but also linked to her mother's nutritional status. However, Uauy et al. (2013) also suggested that a mother's height represents not only the genetic state but also environmental effects. Environmental factor such as low nutritional intake before and during pregnancy is linked to premature birth and low birth weight, which leads lead to degradation of adult health (Perkins et al., 2016). Meanwhile, IFLS Wave 5 data suggest no association between wasting and mother's height. Perkins et al. (2016) suggested that adult height is the outcome of nutrition accumulation during the growth period and genetic influences, and it tends to be fixed compared with younger people. According to that, since wasting is a condition that shows existing malnutrition of a child, it can be assumed that maternal height has an insignificant effect on wasting.

Based on the regression result, mother's education at primary and junior high school is identified to have a positive and significant association with child's stunting. Meanwhile, lower than primary to junior high level of mother's education tends to have a positive and significant correlation with being underweight compared to secondary and higher education. Furthermore, no education or incomplete primary school of a mother was found to be positively associated with child stunting. This IFLS Wave 5 data shows similar results with study in Ghana (Amugsi DA, Mittelmark MB, & Lartey A., 2013) and Pakistan (S. Khan et al., 2019) that maternal education higher than primary school is one of the factors related to the increase of malnutrition in children. In contrast with that, Fadare, Amare, Mavrotas, Akerele, & Ogunniyi (2019) suggested that mothers with an educational level higher than primary school are associated with stunting and wasting reduction. However, this result does not necessarily reject the third hypothesis about mother's education being associated with child's malnutrition. In this study, the categorization from no education or incomplete primary school to junior high school level represents the lower end of educational attainment compared to the reference, the senior high school and higher education. It must also be noted that previous study by J. Khan & Mohanty (2018) found out that higher levels of education (secondary and higher education) is negatively associated with child malnutrition.

The result might cover the importance of higher education as a protective factor of child malnutrition. Nevertheless, based on the study in Ghana, Amugsi DA et al. (2013) imply that such result is expected as a consequence of structural factors such as nutrition and antipoverty intervention that focus on disadvantaged population. Nutritional program in Indonesia in the 1990s focused on wasting prevention, while stunting and maternal malnutrition were not included as a priority. Later, the policy changed as Basic Health Survey in 2007 found out that 36.8% of children under five years were stunted. In 2011, Indonesia joined the SUN Movement, a global movement tackling the inevitable impact of undernutrition, particularly stunting, which involves proposals for the betterment of maternal, infant's, and children's nutritional status. Moreover, as the incidence of stunting increased in 2013, the Indonesian government launched the 1,000 days of life program to improve the nutritional status of children under five. The program is specifically targeted the disadvantaged woman, such as women with low education and those from a low-income family. Some of the programs consist of improvement in education for parents, essentially regarding nutrition and childcare, a feeding program for mothers and child, and social security for poor families.

By looking at the previous conditions of nutrition and health policies in Indonesia, it can be inferred that the policy dynamics may influence the result of this study. It can be also inferred that the program is targeted properly for stunting, as there was a significant reduction in stunting prevalence in 2018 and the result in this study show that stunting is not correlated with higher education. As

for being underweight, this study uncovers that mother's education is positively significant with all levels of education lower than senior high school. Like stunting, there is a possibility that the well-targeted program has less impact on the effect of education on underweight incidence. Meanwhile, no education of a mother increases the probability of having wasted children, which can be inferred from the change in policy that previously focused on wasting, then shifted to stunting, as the intervention program may emphasize more on stunting eradication.

Based on the discussion above, maternal nutritional status such as mother's BMI and height are predictors of malnutrition in children under five years. Rachmi et al. (2016) highlighted that the health and nutrition program need to focus on appropriate linear growth and weight in order to resolve the malnutrition problems. Childcare knowledge and behavior such as sanitation, immunization, proper intake of vitamin A and iodized salt consumption, and health care utilization were found to be protective against child malnutrition (Semba et al., 2008). Thus, access to education facilities is needed to increase mother's exposure to this information. Amugsi DA et al. (2013) suggested that mother's formal education is related with women empowerment while allowing these mothers become able to make a rational decision over unhealthy traditional culture in child nutrition such as improper feeding practices. From Table 6, it can be inferred only less than 60% of mothers that have access to formal education. As not all the population have access to formal education, there are also demand for informal education. In Nigeria, education for disadvantaged women who have limited access to formal school can be carried out through informal education to boost their skills in literacy and numeracy, which may lead them to receive knowledge and practice in child health and nutrition (Fadare et al., 2019). The health and nutrition intervention should start early by involving women at every stage, such as adolescent girls, young-aged women, and pregnant women (Rachmi et al., 2016). Furthermore, the nutrition and health knowledge shall be expanded to cover all the information that is needed to improve women's knowledge as a part of malnutrition eradication.

Child, Household, and Spatial Characteristics

Children's age is negatively and significantly correlated with stunting, being underweight, and wasting. As children begin to grow older, particularly starting at age 39–48 months, their chance of stunting and being underweight was found to decrease. Meanwhile, children aged 39–49 months are negatively related to wasting than children 0–12 months, and the chance increases as the child grow older. G. N. Khan et al. (2016) stated that the first 1,000 days of children's life is the critical period for their growth. After they are two years old, the growth impairment is irreversible. Thus, the intervention will be harder (Prendergast & Humphrey, 2014). As for wasting children, the positive association related with the effect of breastfeeding is not rewarding due to mother's low intake of nutritious food and the child's illness (Aheto, Keegan, Taylor, & Diggle, 2015).

The per-capita household expenditure shown as quintile groups are found to affect stunting and being underweight but not wasting. The richest quintile was expected to demonstrate reduction in the chance of child stunting and being underweight. Similar findings also found in Africa that children in the lower quintile group have a higher probability of being malnourished. Children in higher quintile have more advantage in regard to wider access to food and health services, which lower the probability of growth deprivation (G. N. Khan et al., 2016; J. Khan & Mohanty, 2018).

The IFLS Wave 5 data found out that the number of household members is correlated with stunting and underweight but not wasting. Malnutrition is influenced by the inadequacy of food and fewer eating portions for children. Thus, it will increase the probability of suffering from infectious disease due to the weak immune system (Dukhi et al., 2017). In South Africa, stunting was positively associated with one of the household food insecurity, which represents inadequate food in the household as there are more members and higher competition for food due to limited food supply required for larger household (Akram et al.,

2018; Dukhi et al., 2017). Wasting children are more related to the cessation of breastfeeding (Aheto et al., 2015).

The area of residence is only significantly associated with stunting. Although the findings among several studies differ, the result is in line with the previous review of child stunting in Indonesia by Beal, Tumilowicz, Sutrisna, Izwardy, & Neufeld (2018), which mentioned that the incidence of stunting occurs more in rural areas (particularly in poor locations) compared to urban areas. Other studies, such as those in Nepal, Bangladesh, Malawi, and Nigeria, identified that household residing in rural areas tend to have a higher risk of children malnutrition (S. Khan et al., 2019). Meanwhile, studies in Indonesia revealed that regions outside Java-Bali most likely reflect a lower socio-economic condition and limited resources and facilities (healthcare facilities and improved personal toilets) (Titaley, Ariawan, Hapsari, Muasyaroh, & Dibley, 2019). Moreover, Barati et al. (2018) implied that in Central Java, mothers perceived ready-to-eat food such as instant milk porridge as healthier than home-made food. Moreover, they preferred ready-to-use food because it is cheap and easy to use as it is sold in a sachet.

Although many previous studies showed evidence on associations between child gender and malnutrition, IFLS Wave 5 data found out that the child's gender is not significantly associated with stunting, being underweight, and wasting. Likewise, research on children below five years of age in Pakistan also addressed that gender is not associated with all types of malnutrition (G. N. Khan et al., 2016). This indicates that parents do not necessarily discriminate against girls on nutritional inputs.

In Indonesia, household toilet facility is not significantly associated with malnutrition. This is because many of the household (more than 70%) have improved toilet facility. However, the negative association corresponds with previous research on wasting in Ethiopia by van Cooten, Bilal, Gebremedhin, and Spigt (2019) and stunting in Indonesia by Torlesse et al. (2016). Improved toilet helps to prevent feces contamination and disease transmission, reducing the probability of diarrhea and nutrition-related problems.

It should be noted that this study might have had some limitations. It uses cross-sectional data so that it cannot be inferred as causality between the dependent and independent variables. Another limitation for this study is that it is not able to cover all child malnutrition predictors such as child feeding practice, more specific information on mother's nutritional knowledge, and healthcare utilization due to time constraint.

CONCLUSION

This study explores the relationship between maternal characteristics and malnutrition incidence in terms of stunting, being underweight, and wasting in Indonesia. IFLS Wave 5 data showed that maternal characteristics such as BMI, height, and education are negatively correlated with child malnutrition incidence. These findings imply that there is a need to improve the woman welfare in all life stages to avoid intergenerational transmission of malnutrition. The first 1000 days of life program, which consists of the nutrition-specific and nutrition-sensitive framework of intervention, thus, needs to be enhanced.

As maternal nutritional status may be inherited through generations, adequate nutrition and health-related information need to be introduced as early as possible. This policy implication is to pay attention to informal education as several parts of the society may not have access to formal education. Moreover, in this advanced technology and information era, the government encourages carried out health promotion through the various channels, such as health promotion in poor areas, office, and housing areas as well as and social media.

The government launched a nutrition-specific program that incorporates health-related institution in wide-range of programs in reducing malnutrition. Some of the programs are nutrition education in community health center (Puskesmas) and integrated maternal and child health service post (Posyandu) managed by Ministry of Health and local government as well as reproductive health and adolescent nutrition handled by National Population and Family Planning Board.

In Parigi Kecil village, South Kalimantan, a community partnership program, particularly in food diversification using local fish, is found to increase mothers' nutritional knowledge. This village is found to have a high number of stunted children in the region. Mothers who are joining community partnership program named IBUSAZI (Kelompok Ibu Sadar Gizi or Mother's Nutrition Awareness Group) are empowered to implement the knowledge to utilize and process local fish commodities along with managing businesses to improve the health and provide income for the family (Ariyani, Nurhanifah, & Anshari, 2018). This successful community program can be an example for the government for intervention program diversification.

Besides the nutrition-specific program, the Ministry of Health is also currently working on the nutrition-sensitive program. This program includes some specialized program such as supplementary feeding, immunization, and infectious disease prevention for pregnant and breastfeeding mothers and children 0 to 23 months of age. Moreover, this type of program is regularly included a priority in the Ministry of Health's performance. The government might want to develop inclusive education through informal education in a way that people who have limited knowledge can receive and understand the health and nutrition information. The community health center in Mauk, Banten region, held nutrition posts as an initiative to combat malnutrition. Kasimazi (Kelas modifikasi makanan bergizi or nutritious food modification sessions) were found to influence changes in mother's behavior to choose, prepare, and process appropriate diet for their toddler and family (Jatmika, Y. W., Fitriyana, P., Komari, J., Nisak, C., Puspitasari, N., Nurkamilah, N., ... & Rasni, 2018). Thus, it is suggested to initiate programs such as nutrition posts at the community level as a complementary plug-in to the Ministry of Health's program.

Other than that, the government should also notice other factors that are associated with child malnutrition. As from the discussion section, IFLS Wave 5 data indicates other factors that correlate with malnutrition incidence, such as children's age, several household members, the location of their residence, and their expenditure as a proxy of income.

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