International Journal of Population Issues
https://journal-center.litpam.com/index.php/e-Saintika/index

February 2024 Vol. 1, No. 1
e-ISSN: 2615-6881
pp. 16-32

Maternal Employment and Stunting in Indonesia

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Received: August 2023; Revised: September 2023; Published: February 2024

Abstract

The global occurrence of high stunting rates and the rising participation of women in the labour force has prompted researchers to investigate whether stunting is related to mothers' participation in the labour force. Similarly, in Indonesia, women's employment opportunities have improved, and the stunting rate has remained relatively high. The question is whether stunting is related to maternal employment. More specifically, is maternal employment related to a higher stunting rate? This paper answers this question by employing a 2021 nationwide survey, encompassing low- and high-income households, enriched with an anthropometric study to measure stunting. It uses an ordinal logistic regression analysis to examine the relationship between maternal employment and stunting. The results show that maternal employment is not related to higher stunting. Even maternal employment is related to reduced stunting for maternal employment in formal sectors. The results may imply the need to expand formal sectors while anticipating a rising female labour force participation rate. The growth of formal sectors needs to be accompanied by the implementation of nutrition scaling-up initiatives for children under the age of two, as child growth undergoes rapid development in the initial two years of life.

Keywords: Maternal employment, Stunting, Ordinal logistic regression

How to Cite: Pratiwi, A., I. (2024). Maternal Employment and Stunting in Indonesia. *International Journal of Population Issues*, *1*(1), 16-32. https://doi.org/10.36312/ijpi.v1i1.1330

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INTRODUCTION

Stunting is a critical public health issue in Asia and lower-middle-income countries (LMICs). It indicates chronic and acute nutritional problems that can cause death. It constitutes a key objective within the 2030 Sustainable Development Goals framework, as stunting has the potential to hinder children from realizing their full capabilities even before they enter the school years. It affects their future physical development, health status, and cognitive abilities (De & Chattopadhyay, 2019; Woldehanna et al., 2017). It is estimated that around 52 percent of stunted children live in Asia, and 64 percent live in LMICs (UNICEF et al., 2023)

On the other hand, women's participation in the labour market has also increased globally. The World Bank (2022) reported that female labour force participation rates are generally high in LMICs, and they mostly work in the agricultural sector. This global phenomenon may be related to stunting as a mother's employment can reduce the time available to care for her child, especially during the first two years of the child's life.

In Indonesia, stunting remains a significant challenge (UN, 2022), at 24.4 percent in 2021 (Kemenkes, 2021), although it has been declining in the last two decades. This figure has not reached the Indonesia Medium-Term National Development Plan

(*Rencana Pembangunan Jangka Menengah Nasional*/RPJMN) target, namely 14 percent in 2024 (Regulation of the President of the Republic of Indonesia Number 18, 2020) and the WHO standard of 20 percent (WHO & UNICEF, 2009). Indonesia is one of the top three countries in Southeast Asia with the highest percentage of stunting under five (UNICEF et al., 2023).

Furthermore, the geographical representation of stunting prevalence at the district level reveals that certain regions continue to suffer from stunting rates exceeding 30 percent (See **Figure 1**). Each island has regencies/cities with indicators of stunting that are still high. The map shows that geographical factors can influence stunting, such as food availability, poverty, knowledge and awareness of nutrition, sanitation, and cultural and traditional factors. (Bianchi, 2000; Brauner-Otto et al., 2019; Leslie, 1988; Pangaribowo et al., 2019).

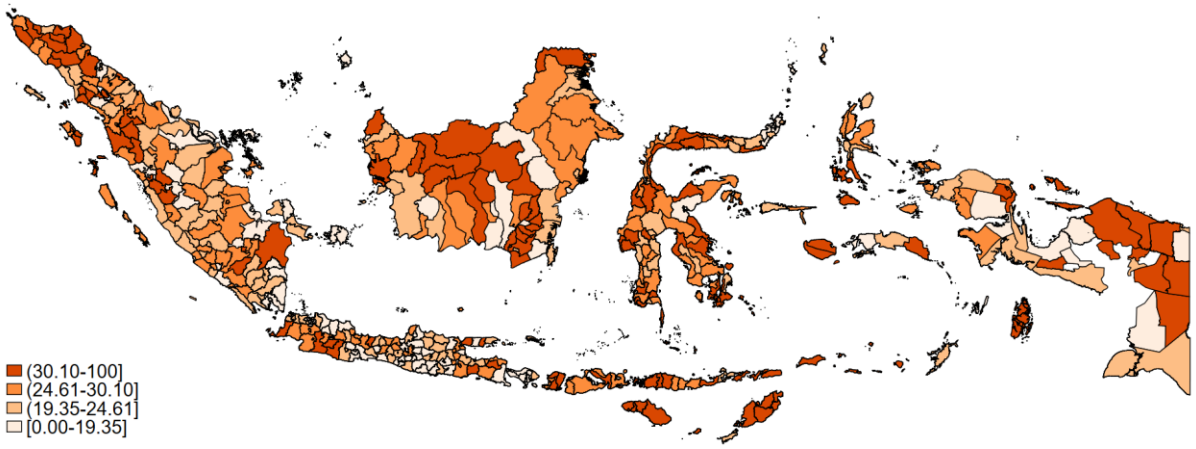

Figure 1. Prevalence of stunting by district/city (percent)

In Indonesia, the female labour force participation rate tends to be stable, above 50 percent since 1997. However, the female labour force participation rate is still far below the male participation rate (BPS, 2021). On the labour supply side, there are currently increasing job opportunities, types of work, and education for women. But, from the labour demand side, Iranian women still face challenges in society's gender norms and non-economic attitudes towards education, women's employment, and gender division in household work (Taheri et al., 2021). This phenomenon might lead to the literature exploring whether maternal employment is associated with stunting.

This paper provides empirical analysis with a national data survey enriched with an anthropometric measurement of stunting. It tests whether there exists any significant relationship between maternal employment and stunting, and what are the signs of the relationship. Therefore, to examine the relationship between maternal employment and under-five child stunting in Indonesia, this paper uses survey data from the Indonesian Nutritional Status Study *(Studi Status Gizi Balita Indonesia/SSGI)* in 2021. The strengths of this paper include the use of nutrition status data from a representative national population survey that fills in on the limitations of data sources in the previous study. The SSGI sample represents the district/city level and anthropometric data measured directly by trained enumerators with a nutrition education background during the survey period (Kemenkes, 2021). The analysis results should contribute to a better understanding of the relationship between maternal employment and stunting in Indonesia. This paper also contributes an empirical study in Indonesia using a national survey data set with better measurement of stunting. It is crucial because Indonesia has implemented the SDGs through the

legal basis of regulation of the president of the Republic of Indonesia number 111-year 2022, national action plan, and regional action plan, to encourage women's empowerment (SDGs Goal 5) and improve toddler nutrition (SDGs Goal 2).

LITERATURE REVIEW

Studies often link stunting to individual child and household characteristics, such as dietary habits, neonatal weight, history of infection, sex, exclusive breastfeeding, birth order, household wealth status, parental height, and parental education (Beal et al., 2018; Deaton, 2007; Khan et al., 2019). Moreover, socioeconomic characteristics, including community, clean drinking water, proper sanitation, cooking areas, parental employment, and economic crisis, may also determine the risk of stunting (Brinkman et al., 2010; Katoch, 2022; Mulyaningsih et al., 2021; Woldemariam et al., 2002).

Most studies show that mother education and household welfare substantially influence stunting, especially in developing countries (Katoch, 2022). Moreover, mothers' decision to work can also be influenced by career desires and high levels of mothers' education (Brauner-Otto et al., 2019). The female labour force participation rate is in the form of a U pattern toward education. It tends to be high at low levels of education. It could be due to several factors, such as an urgent economic need or a culture that values women's contributions to domestic work and the informal sector. However, as the education level of women increases, the labour force participation rate of women tends to decrease. The decrease could be due to factors such as women's preference to focus on education and careers, structural barriers or gender pressures in the workplace, greater household and childcare responsibilities, and a mismatch between women's educational qualifications and available job opportunities (Goldin, 1994).

However, at higher levels of education, the female labour force participation rate tends to increase again. The increase can happen because women with higher education have better opportunities to get more promising jobs, have greater influence in influencing policy and society, and can integrate career roles and family responsibilities (Goldin, 1994; Schaner & Das, 2016). It indicates that the mother's preference for work can affect child nutrition differently (Brauner-Otto et al., 2019). Therefore, women's work in the context of mothers (mother's work) is one of the critical factors that can affect children's nutrition.

Previous studies found causes of stunting are also multifactorial and intergenerational (Brinkman et al., 2010). Stunting often occurs in poor households and mothers with low education, which limits the resources to meet family nutrition needs which in turn force mothers to work (Ukwuani & Suchindran, 2003). Therefore, working mother is a factor related to household welfare. Working mothers can positively affect increasing household income (Andrade & Gil, 2022; Hosen et al., 2023). Higher household income will expand access and increase opportunities for nutritious food, good childcare, and healthcare services. However, working mothers can also harm the nutritional status of the under-five child because the declining duration of breastfeeding and quality time for children's cognitive development (Morrill, 2011; Ukwuani & Suchindran, 2003; Woldemariam et al., 2002).

The socioeconomic conditions of the household, including working mothers, can influence household choices and opportunities in terms of access, acceptability, technology, and quality of health care. Limited household choices and opportunities

for healthcare can result in various behaviours in producing health. Berman et al.(1994) explained that inputs for producing healthy children include internal and external household health behaviours. Internal behaviour includes infant and child feeding practices, childcare including quality and time with children, health-seeking behaviour, home hygienic and sanitation behaviour, and antenatal and postpartum care of women.

At the same time, external behaviour includes the use of preventive health services, the use of curative services, spending on all forms of treatment, and financial investment in health. Households are assumed to have utility in producing children's nutritional status using production inputs. Children's nutritional status is the nutritional accumulation status from birth that combines various production inputs. Ahmad et al. (2020) stated that the child's nutritional production function is an input function from birth order, health, nutrient intake, and community factors directed by parental preferences.

Research in developing countries shows no definite relationship between maternal employment and stunting. Some found that maternal employment is associated with lower or higher stunting due to the trade-off between income and time (Leslie, 1988). Several studies in Indonesia have shown that maternal employment is related to stunting. For example, Lestari et al. (2018) found in North Sumatera, Indonesia, that the mother's occupation had a significant relationship with the incidence of stunting in school-age children. School children who experience stunting are in families with working mothers because mothers have limited time to care for children and do not provide proper nutrition. So, their nutritional needs are not fulfilled properly.

Soekirman (1983) examined the trade-off between income and time in Semarang, Central Java using a cross-sectional survey. He found that the negative influence of a mother's employment on a child's nutritional status is only significant if the mother works more than 40 hours and earns less than the minimum wage. If the mother works more than 40 hours but receives better pay, it does not have a significant effect.

Toyama et al. (2001) also researched the impact of maternal employment on stunting in Surabaya, East Java, Indonesia, using cross-sectional survey data, focusing on the differences between the formal and informal sectors. The results indicated that the risk of stunting in children is higher when their mothers work in the informal sector. Both Soekirman and Toyame et al. studies solely focused on low-income households in one Indonesian city.

However, Soekirman (1983) and Toyama et al. (2001) used data from the 1980s to the early 2000s. This period marked the beginning of the shift of female labour force in Indonesia from the agricultural sector to the non-agricultural sector, and by the early 2000s, there was a significant increase in the number of female workers in the service sector (Vibriyanti, 2013). Additionally, the economic crisis in the late 1990s had a severe impact on urban poor populations and posed a risk of stunting due to reduced purchasing power for food (Brinkman et al., 2010). This phenomenon might have influenced the findings of previous research since the samples were taken only from urban areas and focused on low-income households.

Therefore, results of those studies may differ from the current conditions due to the phenomenon of higher female educational attainment and the strong economic growth in Indonesia (Schaner & Das, 2016). In past studies, the female labour force

tended to work longer hours, have lower incomes, and be employed in the agricultural sector. However, at present, women work an average of 40 hours per week, have higher incomes, and work as employees.

METHOD

This paper uses individual and household data for children aged 0-59 months obtained from the raw data of the Indonesian Nutrition Status Study (*Studi Status Gizi Balita Indonesia/SSGI*) in 2021. SSGI is a national survey conducted to determine the nutritional status of children under five up to the district/city level. This survey results from a collaboration between the Ministry of Health and the Statistics Indonesia in 2019. SSGI sampling design was performed using a stratified two-stage sampling with a household population of children under five in Indonesia. The sample in 2021 was obtained from as many as 153.228 households under five from 14.889 census blocks integrated with the National Socio-Economic Survey (Susenas) in March 2021. This paper uses all under-five children who have anthropometric measurements and live with their mothers in one household.

The dependent variable in this paper is stunting among children under five. It is measured using an ordinal scale from the WHO international standard deviation z-score calculation. A z-score for stunting (height for age) is calculated for each toddler, as in the research of Ukwuani & Suchidran (2003) and the World Food Program (2005). A value of 1 indicates a healthy toddler with a z-score > 0; a value of 2 indicates moderate stunting with -2 <z-score< 0; and a value of 3 indicates severe stunting with z-score <-2.

The variable of interest in this paper is maternal employment. This variable has three categories: formal employment, informal employment, and unemployed. Formal employment includes paid employees working in the public or private sector. Informal employment includes self-employed, farmer, fisherman, domestic worker (maid/driver/gardener), and others. This refers to the woman's employment status during the last 12 months during the survey period. As it has three categories, this paper uses two dummy variables, FormalME and InformalME. FormalME is equal to 1 if the woman is employed in formal sector and 0 otherwise. InformalME is equal to 1 if the woman is employed in informal sector and 0 otherwise.

Several control variables are included in this paper in the form of individual characteristics of children under five, family characteristics, and region characteristics as in previous studies (Hosen et al., 2023; Kedir Seid, 2013; Rashad & Sharaf, 2019), and function of household production (Berman et al., 1994). Control variables for individual aspects of children under five are gender, birth weight, food intake, age, breastfeeding duration, and disease history. The characteristics of the family consists of mother's last education, mother's marital status (married or divorced), number of children in the household, wealth index, sanitation, and clean drinking water. The region's characteristics include urban-rural and island.

The equation for stunting follows an ordinal logistic regression considering that stunting is an ordered categorical variable. Besides that, the equation follows the household production function, which describes the relationship between household inputs and health outcomes at the micro level (Berman et al., 1994; Grossman, 1972). The model is represented in Equation 1.

$$Pr\ (Stun_{ij}) = \alpha + \beta_1 FormalME_i + \beta_2 InformalME_i + \sum \beta_{3i} Child_{ij} + \sum \beta_{4i} Fami + \sum \beta_{5i} Region_{ij} + \varepsilon_{ij} \quad \textit{(eq. 1)}$$

where $Stun_{ij}$ is a variable that indicates stunting of the i-th child born to the j-th mother. The binary variable $FormalME_i$ and $InformalME_i$ indicate the status of the maternal employment from the i-th child. Vector $Child_{ij.}$ $Fami_{ij.}$ and $Region_{ij}$ represent control variables for the characteristics of children, families, and the region. ε_{ij} the error term. β_1 and β_2 stand as the logistic regression coefficients, which do not have a direct interpretable meaning. cannot be interpreted directly. Therefore, it is necessary to transform each estimated coefficient into their odds ratios.

RESULT AND DISCUSSION

Descriptive statistics

The analysis of 87,308 samples of under-five children from SSGI data in 2021 reveals that Indonesia continues to face significant levels of stunting. Among children aged 0-5 years who are living with their mothers, a substantial 23.50 percent are severely stunted (HAZ>-2). Moreover, the data shows that 60.84 percent of toddlers are experiencing moderate stunting (see **Table 1**).

Table 1. Maternal Employment by Socioeconomic Conditions: Indonesia, 2021

Variables	Total sample	Formal Employed	Informal Employed	Unemployed
Stunting				
1: no stunting	15.66	23.85	14.46	14.50
2: moderate stunting	60.84	61.75	61.16	60.56
3: severe stunting	23.50	14.40	24.38	24.95
Maternal Employment	34.61	12.52	22.09	65.39
Male	51.20	50.97	50.95	51.33
Age (mean) in months	29.72	29.93	31.26	29.16
Birth weight (mean) in gram	3104.60	3108.98	3116.95	3099.59
Breastfeeding duration (mean) in months	4.92	4.27	4.79	5.09
Food intake	94.72	96.11	95.46	94.20
Disease	34.34	28.11	34.93	
Mother education				
1: no schooling	4.92	0.45	5.70	5.50
2: Primary	20.58	2.30	22.32	23.50
3: Secondary	23.12	6.22	23.61	26.19
4: >= tertiary	51.38	91.03	48.36	44.80
Marital status	97.99	97.56	96.33	98.64
Number of children (mean)	1.23	1.27	1.21	1.24
Wealth index				
1: Quantile 1	18.07	3.41	20.33	20.11
2: Quantile 2	20.66	8.51	21.89	22.57
3: Quantile 3	19.56	13.01	18.67	21.11

Variables	Total sample	Formal Employed	Informal Employed	Unemployed
4: Quantile 4	20.66	22.43	19.81	20.60
5: Quantile 5	21.05	52.62	19.29	15.61
Sanitation	85.60	93.40	82.67	85.10
Island				
1: Sumatera	32.74	23.91	32.81	34.41
2: Jawa	25.30	31.25	23.49	24.76
3: Bali-Nusa Tenggara	9.57	16.67	14.54	6.54
4: Kalimantan	12.11	11.45	10.82	12.67
5: Sulawesi	14.53	10.90	12.10	16.04
6: Maluku	3.30	3.22	3.87	3.13
7: Papua	2.45	2.59	2.36	2.45
Urban	47.76	67.28	42.30	45.88
Sample size (N)	**87 308**	**10 932**	**19 288**	**57 088**

Stunting is more likely to occur in mothers who are not working, with a rate of 24.95 percent (see **Table 1**). The socioeconomic background of maternal employment shows that mothers who do not work have a lower level of education than working mothers. It is shown from the percentage of working mothers who have completed at least tertiary education higher than non-working mothers, especially from formal work. That condition is unsurprising because highly educated mothers are more likely to be involved in labour (Andrade & Gil, 2022)

Therefore, the duration of breastfeeding for working mothers was shorter than for non-working mothers. Although working mothers in formal sectors may have breastfeeding facilities in public spaces (Rashad & Sharaf, 2019), it turns out that working mothers in formal sectors have shorter breastfeeding time than working mothers in informal sectors. It is possible that mothers who work in the informal sector have more flexible working hours and can bring their children to work (Ukwuani & Suchindran, 2003). Working mothers provide a shorter duration of breastfeeding, but they are more likely to provide complete nutritional food. **Table 1** shows that the provision of complete nutritional food to five-year-old children is higher in working mothers. This is in line with empirical evidence which finds that increased income from mothers will be spent on highly nutritious food (Pangaribowo et al., 2019)

The percentage of working mothers increases at the higher wealth index quintile. It relates to the reason that working mothers earn more money in their households than those who do not work. The reason also makes mothers who are divorced more likely to decide to work. It can be seen from the percentage of mothers with married status that is smaller in working mothers. Then, the percentage of unemployed mothers increases in the lower wealth index quintile. This may be due to the tendency for the education of non-working mothers to be lower and the household to depend only on their spouse's income.

Table 2 shows the socioeconomic conditions according to the nutritional status of children under five. Boys are more likely to suffer from stunting than girls. Toddlers born with low body weight are also more likely to have stunting than toddlers with birth weights above 2.500 grams. Toddlers who are breastfed for less than six months tend to have better nutritional outcomes than those who are breastfed for more than six months. This result contrasts with several studies showing that breast milk can

reduce stunting by increasing immunity (Ahmed et al., 2022; Ukwuani & Suchindran, 2003). It is possible that longer breastfeeding is more likely to result in stunting if the mother has poor nutrition and/ or an unhygienic way of feeding the baby (Syeda et al., 2021). Stunting is greater in mothers with low education and divorce. Divorced mothers may have more difficult time-sharing constraints than married mothers (Andrade & Gil, 2022).

Table 2. Stunting by Socioeconomic Conditions: Indonesia, 2021

Characteristic	No Stunting	Moderate Stunting	Severe stunting
Child gender			
Male	15.72	59.56	24.72
Female	15.60	62.19	22.22
Birth weight			
Low	7.60	53.08	39.32
Normal	16.64	61.78	21.58
Breastfeeding duration			
< 6 month	15.84	61.28	22.88
More than 6 month	15.24	59.79	24.98
Maternal education			
No school	11.28	57.20	31.52
Primary	11.57	58.77	29.66
Secondary	13.24	60.89	25.87
Tertiary and more	18.81	61.99	19.20
Marital status			
Married	15.71	60.88	23.41
Divorced	13.41	58.68	27.91
Wealth Index			
Quantile 1	10.64	56.75	32.61
Quantile 2	12.05	60.27	27.67
Quantile 3	14.24	62.06	23.70
Quantile 4	17.16	62.16	20.67
Quantile 5	23.35	62.48	14.17
Island			
Sumatera	16.58	60.94	22.49
Jawa	17.15	61.84	21.01
Bali Nusa Tenggara	16.07	61.89	22.05
Kalimantan	14.15	59.27	26.58
Sulawesi	12.19	59.97	27.83
Maluku	14.84	59.60	25.55
Papua	15.58	59.71	24.71
Urban-rural			
Urban	18.52	61.45	20.02
Rural	13.04	60.28	26.68

Notes: no stunting (HAZ≥0), moderate stunting (-2≤HAZ<0), severe stunting (HAZ<-2)

Furthermore, the percentage of stunting in poor households (quantile 1) is higher than in wealthy households (quantile 5). Poverty is an obstacle for households needing access to and fulfillment of child nutrition, so an increase in income or decent

work can increase access and fulfillment of these nutrients in poor households (Win et al., 2022). This condition may be different in wealthy households, spending more time to fulfill children's nutrition becomes more critical (Goldin, 1994; Soekirman, 1983). Moreover, high stunting tends to occur in children under five who live in rural areas and islands in Eastern Indonesia.

Following the WHO child growth standard chart (WHO & UNICEF, 2009), Table 2 shows that toddlers in Kalimantan, Sulawesi, Maluku, and Papua are more likely to experience severe stunting, surpassing the national average of 23.5 percent. Furthermore, the rates of moderate stunting islands of Sumatera, Java, Bali, and Nusa Tenggara remain high. They are at risk of falling into the severe stunting category.

Under-five stunting is more prevalent among mothers who work in the informal sector than in the formal sector. Under-five stunting by type of mother's work is shown in **Table 3**. Mothers who work as farmers/farm workers have the greatest probability (30.29 percent) of having severely stunted children under five. The next ones are 24.24 percent among mothers who work as fishermen and 24.09 percent among domestic workers (drivers/maids). It is possible that mothers who work in the informal sector have problems breastfeeding due to the absence of a paid maternity leave policy and the absence of breastfeeding facilities (Rashad & Sharaf, 2019).

Table 3. Prevalence Stunting by Type of Work

Variable	No stunting	Moderate stunting	Severe stunting
(1)	(2)	(3)	(4)
Unemployed			
No work	14.47	60.55	24.97
Schooling	23.43	61.14	15.43
Employed			
Civil servants	23.52	62.59	13.89
Private employees	23.96	61.48	14.57
Self-employed	16.83	62.46	20.70
Farmer	10.02	59.70	30.29
Fisherman	15.15	60.61	24.24
Domestic Worker (driver/maids)	14.20	61.70	24.09
Others	15.50	60.86	23.63

Notes: no stunting (HAZ≥0), moderate stunting (-2≤HAZ<0), severe stunting (HAZ<-2)

Descriptive statistics show that under-five malnutrition is concentrated in socioeconomically vulnerable households. Malnutrition is higher in mothers who do not work, have low education, have a low wealth index quantile, live in the countryside, and live in the islands of East Indonesia. When categorized by their type of employment, mothers employed in the informal sector tend to have children with a higher prevalence of stunting compared to mothers employed in the formal sector.

Regression Results

The Ordinal Logistics model shows the relationship between maternal employment and stunting (see **Table 4**). Model 1 is a model specification that explains the relationship between maternal employment and stunting without any control

variables. Model 2 through Model 4 represent different specifications of the model, each incorporating individual child, family, and regional controls in sequential stages.

Table 4 demonstrates a significant correlation between a mother's occupation and reduced stunting risk, particularly when the mother is engaged in formal employment across all four model specifications. The probability of mothers working in formal sectors having toddlers classified as being in the high stunting categories is 0.744 times lower than that of mothers who are not employed in formal sectors, with all other control variables held constant within the model.

On the other hand, mothers working in the informal sectors are also likely to experience lower stunting rates, but only seen in Model 2. When variations in family and regional characteristics (Model 3 and Model 4) are held constant, the association between mothers employed in informal settings and stunting disappears.

The results provide different conclusions from previous studies which argue that maternal employment is associated with an increase in stunting. Using a national nutrition data set, this paper finds that maternal employment is associated with a reduction in stunting. The difference in the results of this study with previous studies may be due to the better education level of the female workforce (dominantly educated above high school) which allows women to have more decent job opportunities and better knowledge of nutrition (BPS, 2021; Mugo, 2012; Mulyaningsih et al., 2021). In addition, women in Indonesia tend to spend their resources or assets on highly nutritious foods such as dairy, meat, or fish products (Pangaribowo et al., 2019). Hence, it is reasonable to infer that an increase in income is associated with an increase in expenditure on highly nutritious food.

Table 4 Odd ratio of Ordinal Logistic Analysis: Relationship between maternal employment and stunting in Indonesia.

Variables	Stunting			
	Model 1	**Model 2**	**Model 3**	**Model 4**
FormalME (1:formal mother employed)	0.526***	0.527***	0.728***	0.744***
	(0.011)	(0.011)	(0.017)	(0.017)
InformalME (1:informal mother employed)	0.982	0.967**	0.985	0.989
	(0.016)	(0.016)	(0.017)	(0.017)
Gender (1:male)		1.156***	1.154***	1.153***
		(0.016)	(0.016)	(0.016)
Age		1.017***	1.017***	1.017***
		(0.000)	(0.000)	(0.000)
Birth weight		0.999***	0.999***	0.999***
		(0.000)	(0.000)	(0.000)
Breastfeed duration		1.027***	1.025***	1.026***
		(0.001)	(0.001)	(0.001)
Food		1.477***	1.600***	1.618***
		(0.050)	(0.055)	(0.056)
Disease		1.242***	1.166***	1.167***
		(0.018)	(0.017)	(0.017)
Mother education (ref: no school)				

Variables	Stunting			
	Model 1	Model 2	Model 3	Model 4
Primary			0.950	0.958
			(0.033)	(0.033)
Secondary			0.875***	0.903***
			(0.030)	(0.031)
Tertiary and more			0.739***	0.770***
			(0.025)	(0.026)
Marital status (1:married)			0.964	0.960
			(0.048)	(0.048)
Number of children			1.149***	1.145***
			(0.017)	(0.017)
Wealth index (ref: Quantile 1)				
Quantile 2			0.865***	0.871***
			(0.019)	(0.019)
Quantile 3			0.751***	0.764***
			(0.017)	(0.018)
Quantile 4			0.660***	0.681***
			(0.015)	(0.016)
Quantile 5			0.487***	0.509***
			(0.012)	(0.013)
Sanitation			0.848***	0.845***
			(0.017)	(0.017)
Island (ref: Jawa)				
Sumatera				1.070***
				(0.020)
Bali Nusa Tenggara				1.048*
				(0.027)
Kalimantan				1.263***
				(0.031)
Sulawesi				1.358***
				(0.031)
Maluku				1.245***
				(0.051)
Papua				1.205***
				(0.057)
Urban				0.871***
				(0.013)
cut1	0.168***	0.036***	0.024***	0.027***
	(0.002)	(0.002)	(0.002)	(0.002)
cut2	3.026***	0.768***	0.533***	0.606***
	(0.028)	(0.042)	(0.045)	(0.052)
r2_p	0.006	0.041	0.054	0.056
ll	-80971.697	-78079.228	-77078.822	-76879.635
chi2	989.997	6384.473	8285.611	8670.280
p	0.000	0.000	0.000	0.000

Variables	Stunting			
	Model 1	Model 2	Model 3	Model 4
aic	161951.394	156178.455	154197.645	153813.270
bic	161988.902	156272.227	154385.189	154066.454
N	87308	87308	87308	87308

Note: Robust standard errors in parentheses: * p <0.1; ** p < 0.05; *** p <0.01

However, the finding that maternal employment is related to lower prevalence of stunted children is only found among women working in formal sectors. Maternal employment in formal sectors does not conflict with childcare, perhaps because the mother's income is able to cover the costs of caring for children. Mothers who work in formal sectors have higher incomes, normal working hours (an average of 40 hours/week), and labour policies such as paid maternity leave and more adequate public breastfeeding facilities. Table 1 indicates that mothers engaged in formal sectors tend to possess a higher wealth index.

However, the relationship disappears among women working in informal sectors. As shown Toyama et al. (2001), income from formal sectors has made women more than compensate for the loss of their time with their children. In contrast, income from informal sectors primarily serves to alleviate poverty without the same compensatory effect on family time. Additionally, mothers might experience work-related fatigue, leading to decreased attention to child nutrition, or their income might not be adequately allocated to support their children's nutritional needs. (Hosen et al. 2023).

This argument is supported by research in Indonesia (Soekirman, 1983) and Egypt (Rashad & Sharaf, 2019) which found that working mothers can increase stunting if mothers work in the informal sector, work longer hours, and have lower incomes. Moreover, mothers in formal jobs tend to have higher education, and they may therefore have good nutrition knowledge. Thus, the mother's income can provide alternative care, nutritious food, and better health facilities.

As Model 4 has a significant chi-square test at five percent, the largest pseudo-R squared value, and the smallest AIC and BIC values, it is selected to conduct the covariate analysis. Most of the covariates show expected empirical results. For example, there is an increased likelihood of stunting in toddlers as they grow older. Additionally, boys are at a higher risk of experiencing stunting compared to girls.

However, some individual covariates show unexpected results. For example, among toddlers who have complete nutritional food, longer breastfeeding is associated with increasing stunting. Breastfeeding may be beneficial when the child is less than six months old, and the mother's nutrition is good. Nevertheless, long breastfeeding and complete nutritional feeding can be associated with higher malnutrition. This may be because of the mother’s inadequate knowledge of nutrition or a lack of resources in the household. Delayed introduction of complementary foods can result in a child never developing a healthy appetite for complementary foods. This can result in excessive reliance on breast milk, potentially leading to challenges in developing proper chewing abilities. These issues may ultimately contribute to a weakened immune system and hinder the child's overall growth and developmental progress (Syeda et al., 2021).

Furthermore, the family characteristic covariate reveals that as a mother's educational level increases, the likelihood of stunting in children decreases. Mothers

with higher levels of education tend to possess greater knowledge about nutrition and childcare practices, create a healthier environment for their children, and demonstrate increased awareness of utilizing essential child healthcare services like immunization (Mulyaningsih et al., 2021). Divorced mothers are at higher risk of having stunted children than mothers with partners due to constraints on time-sharing and the lack of a childcare support system (Andrade & Gil, 2022; Win et al., 2022). The greater number of toddlers is associated with higher stunting. Many siblings in a household often increase the likelihood of child malnutrition (Hosen et al., 2023; Katoch, 2022).

Furthermore, low wealth index quintile (quantile 1) is associated with stunting, which may reveal the effect of household's income. Rising income levels can enhance family food security by enabling them to purchase the necessary nutritional requirements for toddlers, consequently lowering the prevalence of stunting Low-income/poor households (quantile 1) have lower access to adequate food intake in terms of types and quantities due to lower purchasing power (Ahmed et al., 2022).

The results according to regional characteristics show that toddlers living in urban areas are associated with reducing stunting. As shown by Mulyaningsih et al. (2021), individuals residing in urban areas of Indonesia enjoy greater access to healthcare services and essential infrastructure, including improved road networks that reduce travel time to healthcare facilities. In contrast, access to healthcare services remains constrained in rural areas. On the other hand, families in rural areas are more sensitive to rising food prices because they allocate two-fifths of their budget for basic needs. As food prices increase, the purchasing power of rural families decreases, making it increasingly difficult to meet their children's essential nutritional needs. Compared to Java Island, toddlers living on other islands are more associated with higher stunting. These results strengthen the descriptive analysis in **Table 2**, namely, stunting is higher on the islands of Kalimantan, Sulawesi, Maluku, and Papua.

CONCLUSION

This paper aims to examine the relationship between maternal employment and toddler stunting using Indonesia's national nutritional status data. Several previous studies in Indonesia found that maternal employment is associated with an increase in stunting among five-year-old children due to reduced breastfeeding and parenting time. At the same time, mothers' income is too low to compensate the time costs. Nevertheless, previous studies are limited to samples originating from low incomes who tend to work to avoid poverty. It is possible that the results could be different if the samples were more varied and nationally representative, especially with the current conditions where the phenomenon of education and employment opportunities for women has been improving. Inputs to produce child nutrition outcomes consist of many factors. Providing childcare time is not sufficient to reduce stunting if it is not supported by knowledge, income, and access to nutritious food sources.

This paper contributes to the use of a national data set, rather than limited to low-income respondents, as well as a better statistical analysis (using an ordinal logistic regression analysis). With better coverage of the data set and inferential statistical analysis, this paper obtains a different result. With both the descriptive and ordinal logistic regression analysis, it finds that maternal employment may be associated with a reduction in stunting.

Mothers employed in formal occupations tend to have higher income levels, follow standard working hours (averaging around 40 hours per week), and benefit from labour policies such as paid maternity leave and improved access to suitable public facilities for breastfeeding. This combination of factors ensures that maternal employment aligns harmoniously with childcare responsibilities.

However, the result is only found among mothers working in formal sectors. On the other hand, there is no significant relationship between maternal employment and stunting among women working in informal sectors. Therefore, this paper concludes that maternal employment is not related to high stunting. Even, it is associated with lower stunting in formal sectors.

This paper also reveals that the duration of breastfeeding for working mothers is lower than for non-working mothers; and better education is more likely to be associated with better provision of nutritious food. Therefore, as working mothers are more likely to be educated, working mothers may be more likely to provide better nutritional food. Working mothers can also better combine career roles and household chores by forming a family support system. Mothers who are more educated may know about nutrition and child-rearing practices, provide a healthy environment for their children, and have a greater awareness about using child health care services such as immunization.

RECOMMENDATION

This research produces significant implications for advancing the objectives of Goal 2 (eradicating hunger and addressing malnutrition) and Goal 5 (promoting gender equality and empowering women and girls) within the Sustainable Development Goals (SDGs). Policymakers can direct their efforts towards several key areas: elevating the educational attainment of women, enhancing healthcare development initiatives in Eastern Indonesian islands, expanding opportunities for women in formal employment, and strengthening nutrition programs catering to children under the age of 2. This comprehensive approach aims to address malnutrition and improve anthropometric indicators in toddlers, as this period marks their most rapid growth during the initial two years of life.

However, it's important to acknowledge that this paper's scope is confined to investigating the connection between maternal employment and stunting, utilizing a cross-sectional dataset. Future research should delve deeper into the endogeneity issue to facilitate a more nuanced examination of the impact of maternal employment on stunting. Incorporating longitudinal data sets would further enhance the quality of analysis in this regard.

Funding
This research received no external funding.

Conflict of interests
The author declare no conflict of interest

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