Health maternal educational and occupational factors associated with stunting among under-five children: evidence from Minggir Health Center

Andri Nur Sholihah[1*], *Erna* Setiawati[2], and *Siti* Arifah[1]

[1] Midwifery Study Program, Faculty of Health Sciences, Universitas Aisyiyah Yogyakarta, Yogyakarta, Indonesia
[2] Nursing Study Program, Faculty of Health Sciences, Universitas Aisyiyah Yogyakarta, Yogyakarta, Indonesia

Abstract. Stunting remains a major public health concern in Indonesia, where maternal socioeconomic factors are frequently linked to child nutritional outcomes. A cross-sectional study was conducted among 94 mother–child pairs at the Minggir Health Centre. Maternal education and employment status were obtained through structured questionnaires, while children's nutritional status was determined using anthropometric measurements following WHO standards. Statistical analyses were carried out with Chi-square and logistic regression tests to assess associations. The prevalence of stunting reached 50%. Most mothers had low educational attainment (83%) and were not formally employed (67%). No significant association was found between maternal education and stunting ($p = 0.583$) or between maternal employment and stunting ($p = 0.327$). Logistic regression confirmed that neither factor served as a predictor of stunting incidence. Maternal education and employment were not significantly associated with stunting in this population. These results suggest that other determinants, such as family income, feeding practices, diet quality, sanitation, and access to health services, may play a more influential role. Strengthening multisectoral and community-based interventions is essential to reduce stunting.

1 Introduction

Stunting is a chronic nutritional problem characterized by a child's height lower than the standard age. This problem in children is still one of the main indicators of global nutritional status because it is closely related to the quality of human resources in the future, and it is also related to impaired brain development, low productivity in adulthood, and increased risk of degenerative diseases [1-2]

* Corresponding author: andrisholihah@unisayogya.ac.id

Indonesia is one of the countries with a fairly high stunting burden. Based on the 2024 Indonesian Nutrition Status Survey (SSGI), the prevalence of stunting reached 19.8%, although there was a decrease from previous years. This figure is still above the threshold set by WHO (<20%), so that stunting control remains a priority for national health development [1-2]

Various factors are known to affect the incidence of stunting, including nutrition, sanitation, infection, economic conditions, and maternal factors. Of the many maternal factors, maternal education and work are often cited as important determinants in a child's nutritional status. Mothers with low education are thought to have limited nutritional and health knowledge, while mothers' work can affect the availability of time and resources for childcare. However, previous studies have shown mixed findings, including those that say there is no relationship between the three things [3-4]. This difference indicates the presence of complexity and the possibility of involvement of other factors that are more dominant.

Research related to maternal factors and stunting has been carried out extensively, there are still several research gaps that need to be studied further: Heterogeneity of research results. Some studies have found a significant relationship, while others have not; Variable limitations. Many studies have only examined maternal education and employment without considering other interacting factors, such as nutritional knowledge, feeding patterns, sanitation, and access to health; Local context. The determinants of stunting can differ between regions. Therefore, region-based research remains important to produce more targeted intervention recommendations.

Based on the description above, this study aims to analyze the relationship between education and maternal work and the incidence of stunting in children in the working area of the Minggir Sleman Health Center, Yogyakarta. The results of the research are expected to enrich the scientific literature related to the determinants of stunting, as well as become the basis for community nutrition intervention policies at the local and national levels.

2 Method

This observational, cross-sectional study measured independent and dependent variables simultaneously. The population comprised mother-child pairs residing in Minggir Health Center's area. Purposive sampling selected 94 pairs fitting inclusion criteria (children aged 0–59 months, living with biological mother, willing to participate). Exclusion criteria included congenital disorders or chronic diseases. Stunting status was calculated using WHO height-for-age Z-score: less than -2 SD classified as stunted. Maternal education was categorized as "low" (≤SMA) and "high" (>SMA), employment as "housewife" vs "working mother." Data collected from medical records and validated with nutritional records and anthropometric measurements by trained officers. Statistical analysis used Chi-square, Fisher's Exact Test, and logistic regression (OR, 95% CI, significance at $p<0.05$), via SPSS. Ethical approval obtained from Universitas Aisyiyah Yogyakarta (No. 3715/KEP-UNISA/VII/2025). Respondent consent and confidentiality safeguarded throughout.

3 Results and Discussion

Table 1. Respondent characteristics (n = 94)

Variabel	Category	n	%
Child Stunting Status	Stunting	47	50,0
	Not Stunting	47	50,0

Variabel	Category	n	%
Mother's Age	Age at risk	27	28,7
	Age is not at risk	67	71,3
Mother's Work	Housewives	63	67,0
	Work	31	33,0
Mother's Education	Low (≤ high school)	78	83,0
	High (> high school)	16	17,0

A total of 94 mother-child pairs were analyzed in this study. The prevalence of stunting was recorded at 50%, the same as the group of children who were not stunted. Based on age, most children were in the non-risk age category (71.3%), while 28.7% were in the risk age category. From the maternal side, the majority of mothers are housewives (67.0%), and most have low education (83.0%).

Table 2. The relationship of maternal education with stunting incidence

Mother's Education	Stunting n (%)	No Stunting n (%)	Total	p-value
Low	40 (51,3)	38 (48,7)	78	0,583
Tall	7 (43,8)	9 (56,2)	16	
Total	47 (50,0)	47 (50,0)	94	

Bivariate analysis showed that maternal education was not significantly related to the incidence of stunting (p=0.583). In the low-educated mothers group, 51.3% of children were stunted, while in the higher educated group, the stunting rate was lower (43.8%). This difference is not statistically significant, so maternal education has not been proven to be a factor influencing stunting.

Table 3. The relationship between mother's work and stunting incidence

Mother's Work	Stunting n (%)	No Stunting n (%)	Total	p-value
Housewives	29 (46,0)	34 (54,0)	63	0,327
Work	18 (58,1)	13 (41,9)	31	
Total	47 (50,0)	47 (50,0)	94	

The results of the bivariate analysis also showed that the mother's employment status was not significantly related to the incidence of stunting (p=0.327). Although the proportion of stunted children is higher in the working mother group (58.1%) than in housewives (46.0%), this difference is not statistically significant. This shows that the mother's employment status is not a factor that determines the occurrence of stunting.

Table 4. Simple logistic regression analysis

Variabel	B	HERSELF	Forest	p-value	OR	95% CI for OR
Mother's Work	0,452	0,461	0,960	0,327	1,572	0,636–3,883
Mother's Education	-0,144	0,578	0,062	0,803	0,866	0,279–2,690
Konstanta	-0,587	1,177	0,249	0,618	0,556	

A simple logistic regression analysis confirmed that the mother's education and employment were not significant as predictors of stunting incidence. Maternal employment had an odds ratio (OR) of 1.572 (95% CI: 0.636–3.883; p=0.327), indicating a tendency for children of working mothers to be more at risk of stunting, although not significant. Maternal

education had an OR of 0.866 (95% CI: 0.279–2.690; p=0.803), suggesting that children of highly educated mothers tended to be less likely to be stunted, but this difference was also not statistically significant.

3.1. Maternal education and stunting

The results of this study did not show a significant relationship between the mother's education level and the incidence of stunting in children. These findings are in line with several recent studies that have found that although maternal education is often identified as an important risk factor, its influence is not the only determinant and can be overridden by other factors such as knowledge, family economics, and the environment. A study by Yunitawati [5] concluded that in poor communities in Indonesia, the correlation between maternal education and stunting incidence is weak if not supported by environmental interventions and practical nutritional understanding. Research by Laksono et al [6] using Indonesian national data shows that a child's chances of experiencing stunting increase as the mother's education level decreases, the risk in mothers with basic education is 1,587 times higher than in universities. However, another analysis in the last 5 years highlights that mothers' knowledge of nutrition and healthy behaviors can be more influential than formal education alone. The study of Andarusukma et al. [7-8] also confirms that birth and maternal history factors dominate over education alone.

The inconsistency of the results of this study can be explained from several aspects. First, in this study there is homogeneity of the sample, where the majority of respondents have low education (83%). The small variation in the group of highly educated mothers (17%) makes it difficult to see the differences between groups significantly. Second, formal education is not always synonymous with parenting skills. Nutritional knowledge and childcare patterns can be obtained through Posyandu counseling, media, and life experiences. Thus, mothers with low education also have the potential to have adequate parenting skills when exposed to relevant health information. Conversely, mothers with higher education do not necessarily practice healthy nutritional behaviors, especially when they are less directly involved in the daily care of mother's education and stunting are contextual, depending on local social, cultural, and structural factors. Third, cultural factors also influence. In some societies, including in Indonesia, childcare patterns are not entirely determined by the mother, but also by grandmothers, in-laws, or close relatives. Studies have found that the influence of grandparents and extended families on children's diets is so strong, that the formal education of the individual mother is often less dominant in determining children's eating behavior. Parenting patterns, family beliefs in food, and cultural value systems play a major role in feeding practices. Therefore, child nutrition campaign strategies need to target all family units and pay attention to local cultural factors to be effective [9-10].

Similar studies have informed that although maternal education correlates with children's nutritional status, the effect is highly dependent on the availability of health education interventions, access to information, and the active role of the community. Study by Rezaeizadeh et al. [11], suggests that formal education is only one of many factors that affect child growth, while informal education such as counseling has been shown to have a significant impact on improving maternal nutritional behavior.

3.2. Maternal work and stunting

This study aims to examine the relationship between maternal employment status and the incidence of stunting in children, using representative samples and in-depth statistical analysis. The results showed that there was no significant relationship between the

employment status of mothers, both working and as housewives, and the incidence of stunting in children. This finding was reinforced by the results of the chi-square test which showed a significance value (p=0.327), indicating that in the population studied, the working status of the mother had no direct effect on the linear growth of the child.

These results are in line with several studies that have been published, including a systematic review by Saleh et al. [12], It emphasizes that maternal employment status is not the main determinant of stunting incidence when other variables such as education level, nutritional knowledge, and family socioeconomic conditions are taken into account. Maternal employment is often mentioned in research as one of the factors, but the effect is statistically weak when compared to the role of maternal health education and literacy, quality of nutritional intake, and access to health services [13].

Theoretically, maternal work can have a dualistic influence: increased household income plays a mostly positive role in improving the quality of food consumption and health services, while reduced parenting time can be a challenge, especially in terms of feeding and monitoring child growth and development. However, the real impact of maternal work depends on the type of work (formal/informal), working hours, family support, maternal autonomy in making household decisions, and inherent socioeconomic factors [6-7].

In Indonesia, the almost balanced proportion of working and non-working mothers in the study sample, as well as the similar distribution of stunting incidence in both groups, further emphasizes that the main determinant of stunting is not maternal employment status, but rather influenced by education level, family economic conditions, and access to basic health and nutrition services. Study by [7] in Southeast Asia also concluded similarly, that maternal education and family wealth index are factors that are consistently associated with stunting in children [12]. The implications of this study confirm that stunting prevention interventions should be directed at improving maternal nutrition literacy, parenting education, monitoring child growth and development, family economic empowerment, and strengthening primary health services. The policy focus does not need to focus too much on the employment status of mothers, but rather on building family and community ecosystems that support optimal child growth and development [15].

4 Conclusion

No significant associations were found between maternal education or work status and stunting incidence in this population. Greater attention should be given to family income, parenting practices, nutritional intake, and health services for successful stunting reduction policies and interventions.

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