Determinants of Comprehensive Understanding of Stunting among Indonesian Pregnant Women and Mothers of Toddlers Aged 0–23 Months in 2023

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Abstract. Stunting is a chronic nutritional disorder that remains a priority in Indonesia. As with the second goal of the SDGs (zero hunger), the Ministry of Health (MoH) has implemented a communication strategy for behavioural change and community empowerment through a class program for pregnant women and mothers of toddlers class using the Maternal and Child Health (MCH) book. However, it is still not optimal to increase the understanding of stunting. The 2023 Indonesian Health Survey (IHS) shows that women in Indonesia still have a poor comprehensive understanding of stunting. It has includes pregnant women and breastfeeding mothers as key target groups for stunting reduction. This study aims to describe and analyse the characteristics of Indonesian pregnant women and mothers of toddlers aged 0–23 months that significantly influence their comprehensive understanding levels of stunting. Data from 2023 IHS were analysed using descriptive statistics with graph and table, together with inferential analysis through ordinal logistic regression using the Proportional Odds Model (POM). The result shows that the majority of these mothers have a poor level of comprehensive understanding of stunting, with five variables having a significant influence, namely: access to information, education level, employment status, socioeconomic status, and residence area.

Keywords–Mothers of toddlers aged 0–23 months, ordinal logistic regression, pregnant women, Proportional Odds Model (POM), understanding of stunting

1. Introduction

One of the key factors determining the success of national development today is the quality of human resources. To prepare for Indonesia's golden era in 2045, a superior and healthy generation can be created through quality physical health. This achievement can begin from toddlerhood, which is generally known as the golden age of child growth and development. However, there are chronic nutritional disorders, such as stunting, that are prone to occur in toddlers. Children with this disorder show short or very short stature compared to peers of the same age [1, 2].

Stunting is still prone to occur in toddlers in Indonesia. As shown in Figure 1, the Health Development Policy Agency (HDPA) in the 2023 Indonesian Health Survey (IHS) reported that the prevalence of stunting in Indonesia has decreased over the past decade. However, prevalence in the last three years (2021–2023) still has not yet met the National Medium-Term Development Plan (NMTDP) target of 14 percent by 2024. Furthermore, the reduction in stunting prevalence in 2023 was only 0.1

percent compared to the previous year [3]. It has strengthened the government's commitment to addressing stunting more seriously, so that the second goal of the Sustainable Development Goals (SDGs), namely zero hunger, can be achieved by 2030.

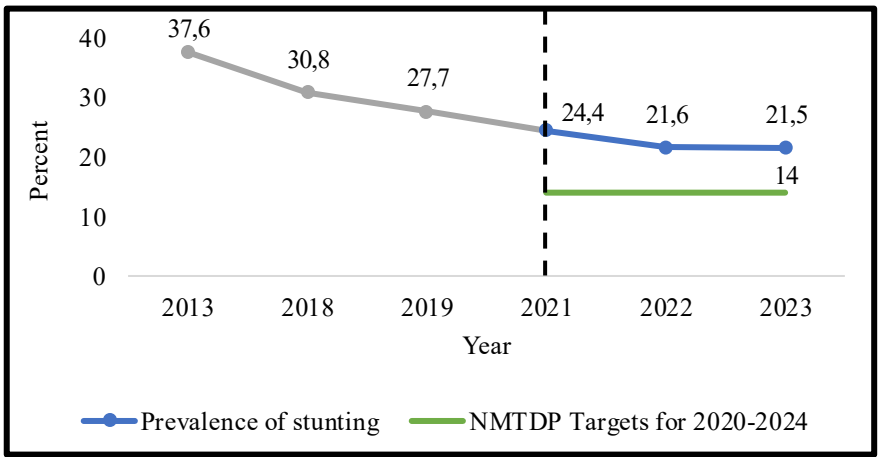

Figure 1. Trends in stunting prevalence in Indonesia 2013–2023.

The findings from the 2023 IHS indicated that the most critical period for stunting prevalence is early childhood, with the highest proportion of stunted toddlers (30.27 percent) observed in the 0–23 months age group [4]. This pronounced vulnerability arises because stunting typically originates and advances during the first 1,000 Days of Life (DoL), a defining window that spans 270 days of gestation and 730 days post-birth. Recognising this critical biological timeframe, and in an effort to ensure effective and precise policy implementation, the Team for the Acceleration of Stunting Prevention (TASP) has strategically prioritised interventions focusing on three specific target groups for stunting reduction: pregnant women, breastfeeding mothers, and toddlers aged 0–23 months [5].

The government has also established five pillars of a national strategy to accelerate stunting reduction, where the second pillar focuses on improving communication of behaviour change and community empowerment [6]. In line with this, the Ministry of Health (MoH) implements this strategy in the program for pregnant women and mothers of toddlers class through the use of Maternal and Child Health (MCH) books, which aim to improve knowledge, attitudes, and behaviour change in stunting prevention in pregnant women and mothers of toddlers [7]. However, the HDPA reported that 70.8 percent of mothers during pregnancy never attended prenatal classes; 28.3 percent of mothers of toddlers did not use the MCH book; and 67.2 percent of toddlers did not use the MCH book for information on their growth and development [4]. This percentage indicates that the implementation of this program remains not optimal.

Low participation among mothers in the program reflects a lack of awareness about how to improve their understanding of stunting. The Indonesian government has set a target of 70 percent of individuals having a good understanding of stunting by 2024 [6]. When the target focuses on Indonesian women, HDPA reports that only 70 percent of women in Indonesia understand the correct definition of stunting. In addition, most women in Indonesia have a limited understanding of stunting, including its causes and impacts. Specifically, 86.3 percent of women only know the cause of stunting from low nutritional food intake in children, and 75.2 percent of women only know that stunting will impact physical growth inhibition. Even fewer than half of women answered the questions on stunting prevention correctly [4]. In fact, the Directorate General of Public Health (Ditgen of PH) has determined that a good understanding of stunting includes the definition, causes, impacts, and ways to prevent stunting [8]. This condition indicates that the understanding of stunting in women, especially pregnant women and mothers of toddlers aged 0–23 months in Indonesia, still have poor and not comprehensive.

Limited and partial understanding of stunting also directs the low awareness of mothers to take preventive measures for stunting. This condition is reinforced by the results of previous research conducted in Lebih Village, Gianyar Regency, related to the knowledge of stunting among mothers of

toddlers. Although 83.3 percent of mothers of toddlers stated that they were aware of stunting, only 23.1 percent of them understood the correct definition of stunting. Furthermore, knowledge regarding additional indicators of stunting remains inadequate, such as: signs or symptoms of stunting (47.4 percent), causes of stunting (30.8 percent), ways to prevent stunting (17.9 percent), and ways to treat stunting (14.1 percent) [9]. Thus, the limited comprehensive understanding of stunting among pregnant women and mothers of toddlers aged 0–23 months indirectly contributes to the incidence of stunting in children.

According to the theory of knowledge, six factors influence a person's knowledge: age, information or mass media, education, experience, socioeconomic and cultural, and environment [10]. In line with that, the previous research at the Cijagra Lama Community Health Centre, West Java, found characteristics of pregnant and breastfeeding mothers that were related to the level of knowledge of stunting, namely: maternal age, education, occupation, family income, and information about stunting. Specific characteristics of pregnant women can be seen through the spacing of pregnancies, gestational age, and number of children. Meanwhile, breastfeeding mothers' characteristics generally lead to breastfeeding duration [11].

Previous studies about stunting knowledge among pregnant women and mothers of toddlers aged 0–23 months have been conducted. However, these studies have not yet used socioeconomic status variables based on the ownership index approach. The advantage of this approach is that respondents can provide honest and reliable answers, resulting in accurate data on household welfare [4]. Furthermore, this research focuses on pregnant women and mothers of toddlers aged 0–23 months in Indonesia. Based on these issues, this research aims to gain a level of comprehensive understanding of stunting among Indonesian pregnant women and mothers of toddlers aged 0–23 months in 2023, and to identify variables that significantly influence their understanding of stunting. Because this level of understanding uses an ordinal data scale, data analysis will be led using ordinal logistic regression.

2. Research Method

2.1 Theoretical Basis

Knowledge is a person's curiosity processed through the five senses, such as the eyes for observing and the ears for hearing. Understanding is a component of knowledge that can be characterised by the ability to interpret or explain something previously known [12]. Thus, knowledge must be continuously honed to gain new understanding [10]. There are three levels of knowledge based on the percentage of correct answers, as follows [13]:

- Poor knowledge, with a percentage of correct answers of less than 56 percent of the total scores.
- Fair knowledge, with a percentage of correct answers of 56–75 percent of the total scores.
- Good knowledge, with a percentage of answers of more than 75 percent of the total scores.

In accordance with that, someone who has an understanding of stunting reflects that he has known and can re-explain the problem of stunting, identify the characteristics and risk factors for stunted children, and understand how to prevent and treat stunting [8]. Additionally, they can recognize that stunting will be dangerous to health and clarify that it is not a myth or a consequence of karma [14]. Thus, knowledge of stunting from the 2023 IHS explains a comprehensive understanding of stunting through four key indicators: definition, causes, impacts, and ways to prevent stunting [4].

According to the theory of knowledge, six factors influence a person's knowledge: age, information/mass media, education, experience, socioeconomic and cultural factors, and environment. Age refers to the absorption process and the mindset in receiving knowledge. Furthermore, information plays a crucial role as a medium encountered in everyday life. Next, education can be viewed as a conscious effort to develop one's abilities and identity through the learning process, both inside and outside school. Then, employment status is an integral part of the experience described through the learning process and the development of professional skills in the work environment. Meanwhile, socioeconomic status interprets the ability to utilise various facilities to increase knowledge. The final

factor is the residence area, where reciprocal interaction occurs regarding access to knowledge that enters an environment [10].

2.2 Research Scope

This research covered 38 provinces in Indonesia. The data were sourced from the raw data as result of the 2023 IHS. The unit of analysis included Indonesian pregnant women and mothers of toddlers aged 0–23 months who answered "Yes" to questions about knowing about stunted children and were not represented. Therefore, the total number of analysis units was 14,993 mothers in Indonesia.

Table 1. Identify the components that form a comprehensive understanding of stunting.

Components	Questions	Correct Answer Criteria	References
Definiton of stunting	Does not gaining weight	No	[15]
	Failure to grow	Yes	[1, 4]
	Dwarfism	No	[16]
	Malnutrition/wasting	No	[2, 17]
	Short/stunted	Yes	[2, 4, 17]
	Prolonged Malnutrition	No	[17]
	Underweight	No	[17]
	Chronic lack of energy	No	[18]
	Anemia	No	[19]
Causes of stunting	Less nutritions children's food intake	Yes	[20]
	Insufficient maternal nutritional intake during pre- and pregrnancy periods	Yes	[20]
	Lack of sanitation	Yes	[20]
	Children often suffer from illness	Yes	[20]
	Poverty	Yes	[20]
	Hereditary Diseases	Yes	[20]
Impact of stunting	Risk of suffering from Noncummincable Diseases (NCDs) as an adult	Yes	[20]
	Decreased level of intelligence	Yes	[20]
	Stunted physical growth	Yes	[20]
	Hampered brain development	Yes	[20]
	Low productivity level	Yes	[20]
	Has no impact	No	[20]
Stunting Prevention	Babies/children are given exclusive breast milk	Yes	[21]
	Babies/children are given breast milk for 2 years	Yes	[21]
	Baibes/children are given Complementary Breast Milk (CBM) according to the nutritional needs	Yes	[21]
	Immunize babies/children	Yes	[21]
	Monitoring babies/children weight and height gain every month at the integrated health center/health facility	Yes	[21]
	Pregnant women to drink Blood Increasing Tablets (BIT)	Yes	[21]
	Pregnant women regularly pregnancy at least 6 times at health facilities	Yes	[21]
	Pregnant women to consume animal protein according to portion	Yes	[21]

The research variables were also used as a reference to answer the research objectives. These variables were divided into two types: response variables and predictor variables. The response variable was the level of comprehensive understanding of stunting, which is compiled from four indicators of stunting knowledge: definition, causes, impacts, and prevention measures of stunting [4]. As shown in Table 1, 29 questions were obtained to form a comprehensive understanding of stunting. If respondents answered each question correctly, they received a score of 1. Conversely, respondents who answered incorrectly were given a score of 0. Then, the total score obtained by respondents was grouped into three categories on an ordinal scale based on the percentage of correct answers: poor, fair, and good [13]. On the other hand, the predictor variables used consisted of age, access to information, education level, employment status, socioeconomic status, and residence area. The operational definition of each variable is explained in Table 2.

Table 2. Operational definition of variables.

Variables	Operational Definition	Categories	References
Response Variable			
The level of comprehensive understanding of stunting (Y)	Total score obtained by the mother	Code 0: poor (score 0–16) Code 1: fair (score 17–21) Code 2: good (score 22–29)*	[13]
Predictor Variables			
Age (X_1)	Physical, mental, and cognitive maturity of the mother's age	Code 0: high-risk (under 20 years old and over 35 years old) Code 1: low-risk (20–35 years old)*	[22, 23]
Access to information (X_2)	Number of accesses to information to find out about stunting	Code 0: unvaried (maximum one type of information access) Code 1: varied (minimum two types of information access)*	[24]
Education level (X_3)	The mother's highest completed level of formal education, evidenced by a certificate	Code 0: junior secondary school or lower Code 1: senior secondary school or higher*	[25, 26]
Emplyoment status (X_4)	Mothers aged at least 10 years who are engaged in occupations requiring more than 6 hours per day	Code 0: unemployed Code 1: employed*	[26, 27]
Socioeconomic status (X_5)	Maternal socioeconomic status based on ownership index	Code 0: poorest Code 1: middle Code 2: richest*	[11, 26]
Residence area (X_6)	Classification of maternal residence	Code 0: rural Code 1: urban*	[28]

*) Reference category

2.3 Analysis Method

Analysis methods utilized in this research included both descriptive and inferential analyses. The descriptive analysis was presented in a table to provide a general overview of the level of comprehensive understanding of stunting among Indonesian pregnant women and mothers of toddlers aged 0–23 months in 2023. The inferential analysis employed ordinal logistic regression with the Proportional Odds Model (POM) to analyze variables that significantly influenced the level of comprehensive understanding of stunting among these mothers. A significance level of 5 percent was used in the analysis. The formula of the POM equation focused on two models, namely: the level of comprehensive understanding of stunting that was poor and maximum fair understanding, as illustrated below:

$$logit(P(Y \leq j)|\boldsymbol{x}) = \log\left(\frac{P(Y \leq j|\boldsymbol{x})}{P(Y > j|\boldsymbol{x})}\right)$$
$$= \alpha_j + \beta_{j1}X_1 + \beta_{j2}X_2 + \beta_{j3}X_3 + \beta_{j4}X_4 + \beta_{j5.0}X_{5.0} + \beta_{j5.1}X_{5.1} + \beta_{j6}X_6 \quad (1)$$

Note:

j : categories of understanding the levels of stunting are: poor ($j = 0$) and fair ($j = 1$)
X_1 : high-risk age
X_2 : unvaried access to information
X_3 : junior secondary school or lower
X_4 : unemployed status
$X_{5.0}$: poorest socioeconomic status
$X_{5.1}$: middle socioeconomic status
X_6 : rural area

The steps in the POM analysis were taken as follows:

1. POM parameters were estimated to get the comprehensive understanding of stunting level by the predictor variables ($\widehat{\boldsymbol{\beta}}$) using the Maximum Likelihood Estimation (MLE) method. This estimation was performed using SPSS Statistics 27 software.
2. Testing of the Parallel Lines (PL) assumption was conducted to confirm that POM could be used in ordinal logistic regression analysis. The hypotheses was applied as follows:
   H_0 : $\beta_{0k} = \beta_{1k} = 0$ (all predictor variables have the same regression coefficient value in each model, with $k = 1, 2, \ldots, 6$)
   H_1 : At least one predictor variable that has a different regression coefficient (β_{jk}) value in each model, with $j = 0, 1$ and $k = 1, 2, \ldots, 6$
   The test statistic used was the Likelihood Ratio test, as follows [29]:
   $$PL = -2\log\left(\frac{l_C}{l_U}\right) \sim \chi^2_{(p(J-2))} \quad (2)$$
   Note:
   l_C : likelihood function in a constrained model
   l_U : likelihood function in an unconstrained model
   j : ordinal categories in the response variable, with $j = 0, 1, \ldots, J-1$
   k : number of predictor variables, with $k = 1, 2, \ldots, p$
   With $\alpha = 0.05$, a decision to reject H_0 was made when the PL statistic exceeds $\chi^2_{(0.05;7)} = 14.067$ or the p-value was less than 0.05. If the test results led to a decision to reject H_0, then it was concluded that at least one predictor variable had a different regression coefficient value in each model at the significance level of 5 percent. On the other hand, accepting H_0 implied all predictor variables had the same regression coefficient value in each model at this significance level, confirming that the POM could be applied.
3. Simultaneous parameter testing aimed to collectively analyze the influence of predictor variables on the level of comprehensive understanding of stunting. The hypotheses were explained as follows:
   H_0 : $\beta_{j1} = \beta_{j2} = \cdots = \beta_{j6} = 0;\ j = 0, 1$ (all predictor variables do not affect the level of comprehensive understanding of stunting in each category at j^{th})
   H_1 : at least one parameter $\beta_{jk} \neq 0; j = 0, 1$ dan $k = 1, 2, \ldots, 6$ (at least one predictor variable that influences the level of comprehensive understanding of stunting in each category at j^{th})
   The test statistic utilized the Likelihood Ratio test, which was formulated as [30]:
   $$G = -2\log\left(\frac{l_0}{l_1}\right) \sim \chi^2_{(p)} \quad (3)$$
   Note:
   l_0 : likelihood function without considering predictor variables
   l_1 : likelihood function considering predictor variables
   When using a 0.05 significance level, a decision to reject H₀ was made when the value of G was greater than $\chi^2_{(0.05;7)} = 14.067$ or the p-value was less than 0.05. The decision to reject H₀ meant

that at least one predictor variable significantly affects the level of comprehensive understanding of stunting at the significance level of 5 percent.

4. Partial parameter testing aimed to analyze the influence of each predictor variable on the level of comprehensive understanding of stunting. The hypotheses were explained as follows:
   H_0 : $\beta_{jk} = 0 \; ; j = 0,1$ and $k = 1,2,\ldots,6$ (the k^{th} predictor variable has no effect on the level of comprehensive understanding of stunting at each j^{th} level category)
   H_1 : $\beta_{jk} \neq 0 \; ; j = 0,1$ and $k = 1,2,\ldots,6$ (the k^{th} predictor variable has an effect on the level of comprehensive understanding of stunting at each j^{th} level category)
   The test statistic employed was the Wald test, outlined as follows [30]:

$$W_{jk} = \left(\frac{\hat{\beta}_{jk}}{\widehat{SE}(\hat{\beta}_{jk})} \right)^2 \sim \chi^2_{(1)} \tag{4}$$

   Note:
   $\hat{\beta}_{jk}$: parameter estimates or regression coefficients of the k^{th} predictor variable for each j^{th} level category of the response variable
   $\widehat{SE}(\hat{\beta}_{jk})$: standard error of the parameter estimate or regression coefficient of the k^{th} predictor variable in each j^{th} level category of the response variable
   At significant level of 0.05, the decision to reject H_0 was made when it had statistical value $W_{jk} > \chi^2_{(0.05;1)} = 3.841$ or p-value$_{jk} < 0.05$. It meant that the k^{th} predictor variable had a significant effect on the level of comprehensive understanding of stunting in each j^{th} level category at the significance level of 5 percent.
5. The goodness of fit test aimed to ensure that the selected POM was suitable for predicting the level of comprehensive understanding of stunting. The following hypotheses were employed:
   H_0 : POM is fit for predicting the level of comprehensive understanding of stunting
   H_1 : POM is not fit for predicting the level of comprehensive understanding of stunting
   The statistical tests employed were the Pearson test in the fifth equation and the Deviance test in the sixth equation, as detailed below [31]:

$$\chi^2 = \sum_{j=0}^{J-1} \sum_{i=1}^{n} \frac{(n_{ji} - \hat{\mu}_{ji})^2}{\hat{\mu}_{ji}} \sim \chi^2_{(v)} \tag{5}$$

$$D^2 = 2 \sum_{j=0}^{J-1} \sum_{i=1}^{n} n_{ji} \log\left(\frac{n_{ji}}{\hat{\mu}_{ji}} \right) \sim \chi^2_{(v)} \tag{6}$$

   Note:
   n_{ji} : frequency of an observation from the i^{th} analysis unit in the j^{th} level category of the response variable
   $\hat{\mu}_{ji}$: frequency estimate of the i^{th} analysis unit in the j^{th} level category of the response variable
   v : the difference between the cumulative logits model and the number of model parameters.
   By using $\alpha = 0.05$, a decision to reject H0 arose when the values of χ^2 and D^2 were beyond of $\chi^2_{(\alpha;\,181)} = 213.391$ or p-value smaller than 0.05. If the decision was to reject H_0, the conclusion was that the POM had no fit for predicting the level of comprehensive understanding of stunting at the significance level of 5 percent. In contrast, the decision to accept H_0 stated that the POM was fit for predicting this understanding at the significance level of 5 percent.
6. The interpretation of the Odds Ratio (OR) value helped analyze the tendency of the level of comprehensive understanding of stunting.

3. Result and Discussion

3.1 Characteristics of Indonesian Pregnant Women and Mothers of Toddlers Aged 0-23 Months who Have a Comprehensive Understanding of Stunting in 2023

According to the data processing results of the 2023 IHS, Figure 2 illustrates that the level of comprehensive understanding of stunting among Indonesian pregnant women and mothers of toddlers aged 0–23 months remains poor. This limited understanding leads to minimum changes in mothers' attitudes and behaviours toward preventive measures of stunting. Only 4.4 percent of these mothers have a good level of comprehensive understanding of stunting, which is still far below the government's target of 70 percent. When broken down by maternal characteristics, this percentage is presented in Table 3.

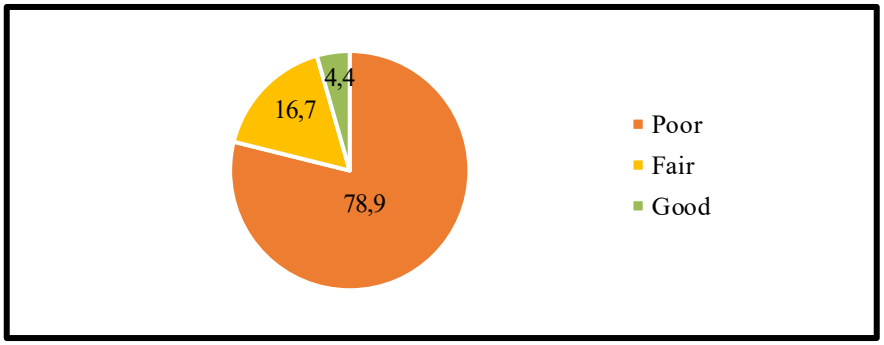

Figure 2. Percentage level of comprehensive understanding of stunting among Indonesian pregnant women and mothers of toddlers aged 0-23 months in 2023.

Visualization in Table 3 shows that most pregnant women and mothers of toddlers aged 0–23 months in Indonesia fell into the low-risk age category. This condition indicated that these mothers possessed sufficient physical, mental, and cognitive maturity to improve their knowledge of stunting [23]. However, maternal maturity is not always positively correlated with an increased understanding of stunting. The analysis reveals that mothers in the high-risk age category exhibit a higher level of understanding of stunting compared to those in the low-risk age category. Although the difference was insignificant, this could be explained by the active involvement of middle-aged mothers in social activities and their greater availability of time for reading [10]. Meanwhile, teenagers generally interacted highly with social media, friends, and family [32]. In this case, mothers at high-risk ages have a good tendency to share their knowledge for mothers at low risk ages. On the other hand, mothers at low-risk ages will be better able to share their health experiences, including good toddler health care with mothers at high-risk ages.

Based on access to information characteristics, the majority of mothers have unvaried access to information. This condition suggests their access to information is still limited, which doesn't effectively improve their understanding of stunting. Conversely, mothers with varied access to information can raise their knowledge of stunting. Therefore, they can combine different sources of information, such as health workers and mass media, which were currently the most preferred by mothers [10, 11, 24]. By utilizing a combination of conventional and digital information media, it can make easier for users to adapt the technology and obtain accurate validation of stunting understanding from health workers.

The highest percentage occurred among mothers with senior secondary school or higher. This finding was consistent with previous research, which indicates that the most mothers held senior secondary school qualifications [11, 23, 27, 33, 34]. These mothers can continue their education to higher levels to improve their understanding. The Indonesian government can also enhance awareness of stunting, both formally and informally, so that it gives every mother an equal opportunity to learn. Additio nally, stunting material can focus on the curriculum at the higher education level to gain a scientific understanding of stunting and develop stunting prevention measures.

Data analysis indicates that most mothers are unemployed. Generally, unemployed mothers were

housewives [11, 23, 33, 34]. To increase their knowledge about stunting, they often used available time to access informational media, interact with neighbors, and attend health education sessions [33, 34]. In contrast, this study found that employed mothers have a more comprehensive understanding of stunting than unemployed mothers. This situation is possible because employed mothers had the opportunity to improve their professional skills and share knowledge within their workplace [10, 27]. Based on the understanding gained by employed mothers, they can share the theory of stunting to unemployed mothers. Meanwhile, unemployed mothers can also share experiences of toddler care to prevent stunting to employed mothers. Interaction between these two categories is crucial for improving stunting prevention efforts simultaneously.

This research indicates that more than 50 percent of mothers belong to the richest socioeconomic group. It was helpful to meet the nutritional needs of toddlers and utilise various health facilities, such as health counselling [10, 11]. Similarly, the government can develop an electronic card or a digital-based social assistance, such as e-money, to integrate with stunting literacy. The higher the level of mothers' participation in improving stunting awareness, the more incentive points that they receive. This strategy can positively impact when these points can be exchanged for social assistance funds or nutritious food products.

Regarding the characteristics of their residence area, mothers are more likely to live in urban areas than in rural areas. This situation may have encouraged mothers to increase their knowledge of stunting by utilising the knowledge access centralised in urban areas [35]. However, no differences are found in the comprehensive understanding of stunting between the two regions. In fact, this situation indicated that utilizing knowledge facilities in both regions has not yet led to optimal reciprocal interactions [10]. Actually, the government has attempted to set a target of at least 380 districts/cities to be able to formulate a campaign policy for changing behaviour to prevent stunting in Indonesia in 2023. Moreover, the determination of nutritional intervention targets is also aimed at convergence, with at least 80 percent targeting pregnant women and mothers of toddlers aged 0-23 months who live in rural areas [5]. Thus, the government needs to increase maternal awareness by utilizing various facilities to support understanding of stunting throughout Indonesia.

Table 3. Percentage level of comprehensive understanding of stunting based on Indonesian maternal characteristics in 2023.

Predictor Variables	Categories	Percentage	The Level of Comprehensive Understanding of Stunting (%)		
			Poor	Fair	Good
Age	Code 0: high-risk	24.2	77.9	17.6	4.5
	Code 1: low-risk	75.8	79.2	16.4	4.4
Access to information	Code 0: unvaried	88.5	80.1	15.7	4,1
	Code 1: varied	11.5	69.2	24.1	6.7
Education level	Code 0: junior secondary school or lower	31.3	82.1	14.4	3.5
	Code 1: senior secondary school or higher	68.7	77.4	17.7	4.8
Emplyoment status	Code 0: unemployed	56	81.8	14.6	3.6
	Code 1: employed	44	75.2	19.3	5.5
Socioeconomic status	Code 0: poorest	28.5	83.1	13.8	3.1
	Code 1: middle	20.2	81.3	14.5	4.2
	Code 2: richest	51.3	75.6	19.1	5.2
Residence area	Code 0: rural	44	78.7	17.0	4.3
	Code 1: urban	56	79.1	16.4	4.5

Source: The 2023 IHS, processed

3.2 *Variables that Influence a Level of Comprehensive Understanding of Stunting among Indonesian Pregnant Women and Mothers of Toddlers Aged 0-23 Months in 2023*

In ordinal logistic regression analysis, specifically in the Proportional Odds Model (POM), the Parallel Lines (PL) assumption must be fulfilled to obtain accurate estimates. The results of the PL assumption test show that the statistical value is equal to 4.776, which is below $\chi^2_{(0,05;7)}$ of the 14.067. In other words, these results give a p-value more than 0.05, leading to the decision to fail to reject H_0. Hence, assumption PL can be fulfilled, so that POM gets ready to use at a 5 percent significance level.

After accepting this assumption, a simultaneous parameter test will be conducted to examine the joint influence of the predictor variables on the level of comprehensive understanding of stunting among pregnant women and mothers of toddlers aged 0-23 months in Indonesia. This analysis reveals that the value of $G = 285.475$, which exceeds $\chi^2_{(0,05;7)} = 14.067$. In other words, this result is consistent with the p-value < 0.05, so that gives a decision to reject H_0. It can be concluded that at least one predictor variable significantly affects the level of comprehensive understanding of stunting among these mothers at the 5 percent significance level.

To determine the predictor variables that influence the level of comprehensive understanding of stunting among mothers, a partial parameter test will be conducted. As shown in Table 4, the Wald test results show that the value of W_{jk} over $\chi^2_{(0.05;1)} = 3.841$ or p-value$_{jk}$ less than 0.05 with $j = 0$ and 1 as well as $k = 2,3,4,5,$ and 6. In other words, the results provide a decision to reject H_0. Accordingly, it can be stated that the variables of access to information, education level, employment status, socioeconomic status, and residence area have a significant effect on their level of comprehensive understanding of stunting at a significance level of 5 percent.

Table 4. Partial parameter significance test results.

Predictor Variables	Code	$\widehat{\beta}_{jk}$	$\widehat{SE}(\widehat{\beta}_{jk})$	W_{jk}	Df	$p-value_{jk}$	$exp(\widehat{\beta}_{jk})$
Constant 1		0.588	0.059	97.903	1	0.000*	1.800
Constant 2		2.361	0.068	1220.063	1	0.000*	10.602
Age (X_1)	0	-0.059	0.047	1.589	1	0.208	0.943
Access to information (X_2)	0	0.052	0.057	84.611	1	0.000*	1.682
Education level (X_3)	0	0.106	0.048	4.744	1	0.029*	1.112
Emplyoment status (X_4)	0	0.320	0.041	60.353	1	0.000*	1.377
Socioeconomic status ($X_{5.0}$)	0	0.435	0.054	65.783	1	0.000*	1.545
Socioeconomic status ($X_{5.1}$)	1	0.271	0.055	23.973	1	0.000*	1.311
Residence area (X_6)	0	-0.172	0.043	15.772	1	0.000*	0.842

*) significant at $\alpha = 5$ percent
Source: The 2023 IHS, processed

The goodness of fit test aims to verify whether POM can be used to predict the level of comprehensive understanding of stunting among these mothers. The results of this test provide a value of $\chi^2 = 173.360$ and $D^2 = 182.164$, where this value is less than $\chi^2_{(0,05;181)}$ of 213.391. In addition, the p-value is greater than 0.05, so the decision is to accept H_0. With a significance level of 5 percent, it can be concluded that the POM model is suitable for predicting the level of comprehensive understanding of stunting in them. The POM equation is formulated as follows:

Model 1

$$logit\big(P(Y \leq 0|\boldsymbol{x})\big) = 0.588 - 0.059X_1 + 0.52X_2^* + 0.106X_3^* + 0.320X_4^* + 0.435X_{5.0}^* + 0.271X_{5.1}^* - 0.172X_6^* \quad (7)$$

Model 2

$$logit\big(P(Y \leq 1|\boldsymbol{x})\big) = 2.361 - 0.059X_1 + 0.52X_2^* + 0.106X_3^* + 0.320X_4^* + 0.435X_{5.0}^* + 0.271X_{5.1}^* - 0.172X_6^* \quad (8)$$

*) significant at $\alpha = 5$ percent

Based on age characteristics, high-risk aged mothers are 0.943 times more likely to have a poor comprehensive understanding of stunting than low-risk aged mothers, assuming other predictor variables are held constant. This interpretation suggests that high-risk aged mothers actually have a better understanding of stunting compared to low-risk aged mothers. With a better understanding of stunting, high-risk aged mothers were also expected to be able to understand the impact of potentially life-threatening obstetric complications during pregnancy and childbirth [36]. This action will benefit mothers in understanding the condition of their toddlers and themselves. In addition, the age variable does not significantly affect the level of comprehensive understanding of stunting at the 5 percent significance level. Align with this, previous research conducted at the South Wara Community Health Centre, Palopo City, South Sulawesi Province, it may have been due to maternal maturity playing a greater role in decision-making and effective parenting patterns [37]. Therefore, low-risk aged mothers still can make good changes in stunting prevention behaviour even though their understanding of stunting is not yet fully adequate.

Access to information has a significant effect on the level of comprehensive understanding of stunting. The odds ratio (OR) for the information access variable was 1.682. This finding indicates that mothers with unvaried access to information are 1.682 times more likely to have a poor understanding of stunting compared to mothers with varied access to information, assuming that other predictor variables remain constant. It suggests that limited information access is associated with a poor understanding of stunting. Previous studies conducted in Karangdadap Community Health Centre, Pekalongan Regency, Central Java Province, supported the idea that information access is significantly related to knowledge about stunting [24]. Accessing information was often limited due to mothers' time being focused on household chores or childcare, which restricted opportunities to process received information effectively [11]. Therefore, providing varied sources of information is expected to help mothers reinforce and improve their understanding of stunting. Variations in information access will encourage mothers to use their five senses to confirm every piece of information about stunting that they receive repeatedly.

When considering education level, mothers with a junior secondary school education or lower are 1.112 times more likely to have a poor understanding of stunting than mothers with a senior secondary school education or higher, assuming other predictor variables remain constant. It indicates that mothers with a basic education level tend to lack a solid understanding of stunting. This condition aligned with previous research, at the Melati integrated service post, Sewon II Community Health Centre area, Special Region of Yogyakarta Province, which revealed that mothers who had completed secondary or higher education levels were better able to think openly and absorb a wide range of information from their studies [33]. Even education had a positive impact on the development of good behavioural changes and enriched new experiences [34]. Therefore, good education is essential for mothers' cognitive and moral development, empowering them to implement effective measures to prevent stunting scientifically.

The OR value for the employment status variable is 1.337. This value reflects the tendency of unemployed mothers to have a poor comprehensive understanding of stunting, which is 1.337 times greater than that of employed mothers, assuming that other predictor variables are constant. It means that unemployed mothers have a greater chance of having a limited understanding of stunting. In line with previous research, employment status was associated with stunting knowledge. This condition could be seen from mothers' learning process when exchanging ideas, information, and opinions with

colleagues to improve their knowledge [27, 33]. Therefore, the higher a woman's professional skills, the more she can improve her understanding of stunting. An organization in the workplace is expected to provide health education to improve mothers' skills and the learning process. This education can be implemented through training, socialization, or stunting prevention classes to improve mothers' skills and learning processes in their work environment. These efforts will encourage mothers to apply the stunting knowledge they have acquired in effective stunting prevention practices for toddlers.

The socioeconomic status variable has an OR value of 1.545 in the poor group and 1.311 in the fair group. The tendency of mothers with the poorest socioeconomic status to have the poor comprehensive understanding of stunting is 1.545 times higher than that of mothers with middle and richest socioeconomic status, assuming that other predictor variables are held constant. In fact, mothers with middle socioeconomic status tend to have a poor comprehensive understanding of stunting by 1.311 times compared to mothers with the poorest and richest economic status, assuming that other predictor variables are constant. These results indicate that the higher the mother's socioeconomic status, the greater the opportunity to improve understanding of stunting. This condition occurred because mothers with good socioeconomic status were able to meet family nutritional needs and utilize various health facilities to improve stunting literacy [11, 38]. Therefore, the government can improve community welfare through the Indonesian Nutrition Card program to encourage the use of health access and fulfillment of free nutritious food needs for underprivileged households. The companies, merchants, or even individuals who are capable with financial can participate as members to provide nutritious food products at affordable prices. Similarly, households with poor socioeconomic status can benefit from the assistance they receive by purchasing these products. This utilization is also expected to encourage economic circulation for the Indonesian people based on electronic cards.

The residence area significantly influences the level of comprehensive understanding of stunting. Mothers living in rural areas have a 0.842 times lower level of comprehensive understanding of stunting than mothers living in urban areas, assuming other predictor variables are constant. This insight was different from previous research that has been conducted in Pati Regency, Central Java Province, especially in Gabus II Health Center as a rural area and Pati II Health Center as an urban area, which access to information, employment, economic growth, and education was concentrated in urban areas, contributing to increased knowledge [35]. However, other research which was carried out in Bogor City and Sukabumi Regency, also revealed that mothers' experience providing exclusive breastfeeding was better in rural areas than in urban areas [39]. It can be said that internal experience can encourage increased understanding of stunting in mothers living in rural areas. Thus, mothers' experiences can be enhanced in urban areas. Meanwhile, mothers' knowledge can be enhanced by focusing on rural areas. Furthermore, mothers living in both rural and urban areas can even interact to share experiences and knowledge in a meeting.

4. Conclusion

The conclusion states that the majority of Indonesian pregnant women and mothers of toddlers aged 0–23 months in Indonesia have a poor level of comprehensive understanding of stunting in 2023. This lack of understanding is particularly evident among mothers with unvaried access to information, junior secondary school or lower education level, unemployed status, and have the poorest socioeconomic status. The factors that significantly influence mothers' understanding of stunting include access to information, education level, employment status, socioeconomic status, and residence area. Mothers with unvaried access to information, junior secondary school or lower education level, unemployed status, the poorest socioeconomic status, and living in urban area are significantly more likely to have a poor comprehensive of stunting in Indonesia.

Several suggestions are addressed to the government, the MoH, and HDPA in Indonesia, as well as future researchers. The government needs to evaluate the second pillar of the national strategy to accelerate stunting reduction, specifically improving communication for behaviour change and community empowerment. The authors also adds that the government needs to establish specific targets, based on the target groups for stunting reduction. Then, MoH can implement two new programs

proposed by the author, namely: private classes for pregnant women and mothers of toddlers in offline and online, and Dapur Gesit (Dapur Gizi Edukasi dan Usaha Ibu Tangguh) to increase the active role in gaining understanding of stunting among pregnant women and mothers of toddlers in Indonesia. Furthermore, HDPA can strengthen quality assurance through three stages: before, during, and after data collection, to maintain comprehensive data accuracy. The final suggestion is directed at further research by considering the age limits for mothers entering the reproductive period based on the provisions of the National Population and Family Planning Abroad (NPFPA) which is a maximum of 50 years, HDPA which is 10–54 years, and WHO which is a maximum of 60 years [26, 36, 40]. The next researcher can also consider the criteria for biological mothers based on the variable of marital or previously married status.

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