APPLICATION THE MULTINOMIAL LOGISTIC REGRESSION METHOD IN ANALYZING THE RELATIONSHIP BETWEEN LOCAL WISDOM TO OVERCOME STUNTING

Amelia[1], Fitra Muliani[2*] dan Rahmawati[3]

[1,2] Department of Mathematics, Faculty of Engineering, Samudra University

[3] Department of Physics, Faculty of Engineering, Samudra University

[1]ameliamath@unsam.ac.id, [2*]fitramuliani@unsam.ac.id, [3]rahmawati@unsam.ac.id

*(*corresponden author)*

ABSTRACT

Aceh is the region with the highest stunting prevalence rate in 2021. This is in line with (2) that Aceh occupies the third highest position after East Nusa Tenggara (NTT) and West Sulawesi, namely at 24.4%. Meanwhile, Langsa City is one of the districts or cities with a stunting problem above the average tolerance set by WHO. The prevalence of stunting in Langsa City in 2021 was 25.5% and followed in 2022 at 22.1%. For this reason, stunting cases require more intensive handling efforts. The incidence of stunting can be overcome by providing assistance to families regarding nutritional knowledge. This can be done on an ongoing basis starting from pregnant women, breastfeeding mothers, and assistance for mothers or families who have babies aged 2 to 5 years. This assistance is provided with the aim of being able to anticipate as early as possible the factors that cause stunting, one of which is social and cultural. The model's research findings indicate that nutritional status and maternal education positively impact stunting. Additionally, local traditions like Meugang and Mee Bu Tujoh are related to the occurrence of stunting.

Keywords   : Stunting, Multinomial logistic regression, Langsa City.

I.   INTRODUCTION

Based on the Asian Development Bank, Indonesia ranks second in Southeast Asia regarding children under the age of five suffering from stunting, with a prevalence reaching 31.8% in 2020 (Apriasih, 2020).

In 2021, the prevalence of stunting in Indonesia was 24.4%. This figure experienced a decrease of 7.4% from the previous year. The prevalence of stunting is better compared to Myanmar (35%), but still higher than Vietnam (23%), Malaysia (17%), Thailand (16%), and Singapore (4%). Despite the decrease, the prevalence of stunting cases is still considered high for Indonesia, so according to the WHO, it is still classified as a country with poor nutritional status. This is in line with the World Health Organization's statement that sets the highest tolerance limit for stunting at 20 percent, or one-fifth of the total number of toddlers. In Indonesia, there are 7.8 million out of 23 million toddlers who suffer from stunting, or about 35.6 percent. The breakdown is 18.5 percent in the severely short category and 17.1 percent in the short category (Munira, 2023).

Aceh is the region with the highest prevalence rate of stunting in 2021. This is consistent with the fact that Aceh ranks third highest, following East Nusa Tenggara (NTT) and West Sulawesi, with a rate of 24.4%. This highlights the continued need for more intensive efforts to address stunting cases, as they have significant impacts on human resources and their quality. Meanwhile, Langsa City continues to face a stunting issue above the average tolerance set by the WHO. The prevalence of stunting in Langsa City was 25.5% in 2021, which increased to 22.1% in 2022. The incidence of stunting can be overcome by providing assistance to families regarding nutritional knowledge. This can be done on an ongoing basis starting from pregnant women, breastfeeding mothers, and assistance for mothers or families who have babies aged 2 to 5 years. This assistance is provided with the aim of being able to anticipate as early as possible the factors that cause stunting.

According to (Verawati 2019) There are five main factors that cause stunting, namely poverty, social and cultural, increased exposure to infectious diseases, food insecurity and community access to health services. Specifically, the factors that influence the incidence of stunting are low birth weight, inadequate breast milk, inappropriate supplementary food, recurrent diarrhea and infection. This factor is greatly influenced by the mother's role in the family's nutritional intake, starting from food preparation, selecting food ingredients, to the food menu. Pregnant mothers are strongly encouraged to consume foods that contain nutritional value so that they can avoid babies in the womb experiencing LBW. Apart from that, consuming nutritious food since pregnancy will affect the quality and production of breast milk (Larasati 2018).

In the culture of the Acehnese people, kenduri events are commonly held on Islamic holidays such as before Eid which is called meugang and the Prophet's birthday. At this kenduri event or activity, all Acehnese community can taste and get food with good nutritional intake. Meanwhile, in Acehnese culture, there is a kenduri event that is usually held during a mother's pregnancy, namely the mee bu tujoh buleun culture. This culture is carried out with the aim of increasing the appetite of pregnant

women and maintaining health. According to (5) local wisdom is the result of certain communities through their experiences. This can also be expressed as a form of habit, custom, value and perception, so that it can be used as an effort to overcome the incidence of stunting.

The previous research on stunting was conducted by (Fuadi 2018). The research results indicate that medically, the Mee Bu culture strongly supports the fulfillment of nutrition for pregnant women, enhances maternal immunity, and specifically ensures that infants receive adequate nutrition. Then research by Tonga, et al onga TDU, and Guest Jg, (Tonga & Tamu 2022) related to local wisdom in preventing stunting in Indonesia. The use of local food culture as MPASI provides positive results in preventing stunting in children. "Meanwhile (Natalia & Ping 2020) and (Rahayu et al. 2018) stated that the research findings indicate that Stunting is influenced by maternal knowledge, meaning that incorrect knowledge and perceptions of mothers about nutrition are closely related to the occurrence of stunting in preschool-aged children.

The research aims to explore and examine the influence of indigenous knowledge from Aceh Province on the prevalence of stunting. The Multinomial Logistic Regression method is employed to analyze the relationship between response variables and predictors. In this study, the response variable focuses on toddlers affected by stunting, while predictor variables encompass maternal age, education, nutritional status, exclusive breastfeeding, family income, maternal knowledge, maulid, meugang and meu bu tujoh. This research endeavors to contribute to governmental efforts in stunting eradication by examining the influence of local wisdom and community practices on providing adequate nutrition, using the Multinomial Logistic Regression method.

II. METHODS

2.1. Types and Sources of Research Data

The type of research applied in solving problems uses quantitative research. The data used is secondary and primary data. Secondary data was obtained from the Health Service and Langsa City Regional Health Center, while primary data was obtained by distributing questionnaires and interviews with the community. The number of samples used in this research was 72 samples.

2.2. Research variables

The response variable in this study is the stunting indicator which consists of Y=0 (weight according to height); Y=1 (weight for age); and Y=2 (weight for height). According to (Rahayu et al. 2018) factors that influence the occurrence of stunting include diet, maternal knowledge, age, maternal education, exclusive breastfeeding, family income, history of infectious diseases, genetic factors, and gestational age. In this study, the predictor variables used are based on factors that influence the occurrence of stunting.

Table 1 : Research Variable

Variable		Description
X_1	Mother's Age	Less than 20 years =0
		20 - 29 years = 1
		30 - 39 years = 2
		40 - 49 years = 3
X_2	Mother's Education	No education = 0
		Elementary school = 1
		Junior high school/Senior high school = 2
		College = 3
X_3	Nutritional status	Malnutrition = 0
		Normal nutrition = 1
		Overweight = 2
		Obesity = 3
X_4	Exclusive breastfeeding	Yes = 0
		No = 1
X_5	Family Income	Less than UMK = 0
		Greater or equal to UMK = 1
X_6	Mother's Knowledge	Low = 0
		Moderate = 1
		High = 2

variable Y is stated as stunting status, and the other variables involved are Maulid, Meugang and Mee Bu Tujoh. The steps taken in this study are as follow (Tristanti, Muliani & Amelia 2020):

1. To arrange data based on the factors causing stunting. The collected data will be organized according to the factors causing stunting. This aims to obtain categorical data from each predictor variable

2. Conducting data analysis using descriptive statistics. The obtained data will be analyzed first using descriptive statistics to understand the characteristics of the data

3. Data analysis using Multinomial Logistic Regression method

III. RESULTS AND DISSCUSSION

3.1. Descriptive Statistic

The stunting status examined in this study is categorized into three categories: 1) very short, 2) short, and 3) normal.
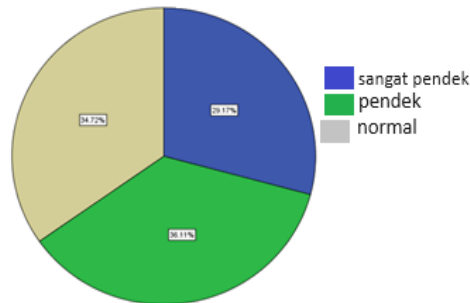

Figure 1 : Stunting status

Figure 1 shows that for stunting cases in Langsa City in 2023, the very short category was 29.17%, the short category was 36.11%, and the normal category was 34.72%.

3.2. Data Analysis

3.2.1. Significance Test of Parameters

Significance Test of Parameters In the parameter significance test, it is divided into Partial Test and Simultaneous Test

a. Partial test

Table 2: Partial test results

effect	Model fitting criteria	Likelihood ratio tests		
	Likelihood of Reduces model	Chi-Square	df df	Sig sig
Intercept	80.314	0.000	0	
Mother's Age	88.122	7.809	6	0.252
Mother's Education	104.699	24.385	6	0.000
Nutritional status	88.091	7.777	6	0.255
Exclusive breastfeeding	80.691	0.377	2	0.828
Family Income	82.056	1.742	2	0.418
Mother's Knowledge	80.418	0.104	4	0.999

Table 2 shows that because the Sig value is less than 0.05, the mother's education has an effect on the dependent variable or stunting status.

b.	Simultaneous Test

The simultaneous test results show that since the Sig value is less than 0.05, there is not enough evidence to reject H_0, meaning that at least one independent variable statistically significantly affects stunting status.

3.2.2. Multinomial Logistic Regression Model

The model formed from each category of stunting status is:

$$g_1(X) = -21{,}156 - 17{,}574X_1 + 15{,}812X_2 + 19{,}019X_3 + 0{,}273X_4 + 1{,}272X_5 - 0{,}077X_6$$
$$g_1(X) = -4{,}507 + 0{,}136X_1 - 17{,}249X_2 + 19{,}644X_3 + 1{,}052X_4 + 0{,}197X_5 - 0{,}019X_6$$

The model shows that the variables of nutritional status and mother's education have a significant effect on stunting, with a Sig value less than 0.05.

3.2.3. Model Fit Test

Table 3 : Pseudo R-Square

Cox and Snell	0,542
Nagelkerke	0,610
McFadden	0,357

The Nagelkerke value indicates that the independent variables account for 61% of the influence on stunting status, while the remaining 39% is influenced by variables not included in the study.

3.2.4. The Relationship Between Local Wisdom (Meugang, Mee Bu Tujoh, and Maulid) and Stunting Status

The hypothesis test to examine the relationship between Acehnese local wisdom and stunting status is as follows:

H_0 = There is no relationship between stunting status and Meugang, Maulid, and Mee Bu Tujoh.

H_1 = There is a relationship between stunting status and Meugang, Maulid, and Mee Bu Tujoh.

3.2.5. The Relationship Between Stunting Status and Meugang Celebration

The Sig value is less than 0.05, so H0 is rejected, meaning there is a relationship between stunting status and the Meugang celebration.

Table 4: Chi Square Test

	value	df	A sig
Person chi-square	7.318	2	0.026
Likelihood ratio	8.463	2	0.015
Linear-by-linear association	1.964	1	0.161
N of valid cases	72		

3.2.6. The Relationship Between Stunting Status and Maulid Celebration

The Sig value is greater than 0.05, so there is not enough evidence to reject H0, meaning there is no relationship between stunting status and the Maulid celebration.

Table 5 : Chi square test

	Value	df	A sig
Person chi-square	0.682	2	0.711
Likelihood ratio	0.682	2	0.711
Linear-by-linear association	0.072	1	0.788
N of valid cases	72		

3.2.7. The Relationship Between Stunting Status and Mee Bu Tujoh

Table 6 : Chi square test

	value	df	A sig
Person chi-square	6.102	2	0.047
Likelihood ratio	6.330	2	0.042
Linear-by-linear association	5.898	1	0.015
N of valid cases	72		

From the results of the Chi-square test, it is shown that the Sig value is less than 0.05, so H_0 is rejected, meaning there is a relationship between stunting status and the Mee Bu Tujoh celebration.

3.3. Discussion

3.3.1. Maternal Education's Relationship to Stunting

According to the results of the study, it can be described that the most dominant level of knowledge is at the level of education at the junior and senior high school levels as many as 37 respondents (51.4%). Furthermore, the results of the analysis of the study show that the mother's education level has a significant role in the incidence of stunting. Mothers with a high level of education tend to have higher knowledge. Low education levels in mothers can have an impact on the absorption of information received, and the higher the level of education, the easier it is to receive information to be more effective. Education is influenced by knowledge. Good knowledge from a mother can influence better feeding practices, thus potentially preventing the incidence of stunting in toddlers (Aini Rahmah et al. 2023).

The knowledge of a person is inseparable from the information obtained in his life. Information can be obtained from various sources, including mass media. With the development of technology, various kinds of mass media are available, influencing a person's knowledge of new innovations. Mass media such as television, radio, newspapers, magazines, and others act as a means of communication, influencing the formation of people's opinions and beliefs.

Knowledge is a factor that facilitates a person in making decisions and behaving. This factor can be a trigger for behavior that becomes the basis or motivation for its action, influenced by traditions, habits, beliefs, education levels, and socio-economic levels. Mothers who have the ability in themselves will increase knowledge to overcome stunting prevention efforts.(Herlina, Rahayu & Lintang Suryani 2021)

3.3.2. Nutritional Status Relationship to Stunting

The results of data analysis using the multinominal logistic regression method show that nutritional status in toddlers affects the occurrence of stunting. The nutritional status of toddlers who are fulfilled means that the amount of intake is balanced with the nutritional needs of children. Thus, these toddlers can be categorized as toddlers with good nutritional status. Physical and brain growth, as well as the ability to work and general health can be achieved if the body gets enough nutrients to be used efficiently. In this condition, the body will be in good nutritional status, allowing toddlers to grow and develop in a balanced manner. (Madiko, Ilham & Mojdo 2023). When a toddler is malnourished, which occurs due to nutritional intake below their needs, they are more susceptible to disease and growth failure or stunting. (Yuningsih 2022) in her research also revealed that there is a close relationship between malnutrition in toddlers and the incidence of stunting.

According to the results of this study, researchers assume that nutrient intake in toddlers is very important to support the growth of nutritional status so that toddlers grow according to the growth chart so that there is no failure to grow which can cause stunting. Nutritional status of toddlers is the main thing to know a person's health condition. In toddlers, nutritional status is important to prevent stunting. Normal nutrition will make toddlers have a healthy body and good growth and development so that they can prevent stunting.

3.3.3. Meugang and Meu Bu Tujoh's Relationship to Stunting

Meugang is a tradition in Aceh that is celebrated by cooking meat dishes and eating meat together ahead of the month of Ramadan, Eid al-Fitr and Eid al-Adha. Based on the results of data analysis in this study, meugang has a significant relationship with the incidence of stunting, namely the meugang variable getting a p-value of less than 0,05. Researchers assume that mothers who during pregnancy and breastfeeding celebrate meugang and taste meugang dishes can affect the growth of the fetus and toddlers. This is consistent with Damayanti's research (Damayani 2020) which shows that animal protein intake is significantly associated with the incidence of stunting. Animal protein intake can increase body length or height and decrease stunting in toddlers (p<0.05).

The tradition of Me Bu Tujoh is a tradition from the people of Aceh in appreciating pregnant women by delivering a number of foods and fruits for pregnant women at the 7th month of pregnancy. The ingredients of Ba bu or rice delivery consist of packaged rice and side dishes such as fish, meat, and chicken. The rice is delivered by the in-laws of the pregnant

mother and will be enjoyed together in a pleasant atmosphere. This event is held specifically for pregnant women who must get delicious, useful and nutritious food so that the nutritional intake of the fetus can be fulfilled (Warzukni, Raudhati & Agustina 2023). According to the results of this study, the me bu tujoh tradition has a significant relationship with stunting with the me bu tujoh variable having a p value of less than 0,05.

IV. CONCLUSION

The conclusions of this research is:

1. The analysis of the data shows that the variables of nutritional status and maternal education have a significant effect on stunting with a sig value <0.05.

2. Local wisdom, namely Meugang and Mee Bu Tujoh, are associated with the occurrence of stunting, with a Sig value < 0.05.

REFERENCES

[1]. Aini Rahmah, A., Indra Yani, D., Eriyani, T. & Rahayuwati Fakultas Keperawatan, L., 2023, 'The Relationship Between Maternal Education and Exposure to Stunting Information Mother's Knowledge About Stunting', *JNC*, 6(01), 1–10.

[2]. Apriasih, H., 2020, '"The Influence of Family Parity on the Nutritional Status of Toddlers in the Prevention of Stunting"', *'Proceedings of the National Health Seminar'*, 84–89.

[3]. Damayani, E., 2020, *The Relationship Of Processed Food Consumption And Animal Protein Intake With Incidents Of Stunting In Toddler*, NUTRITIONAL STUDY PROGRAM FACULTY OF HEALTH SCIENCES NGUDI WALUYO UNIVERSITY, Semarang.

[4]. Fuadi, T.M., 2018, 'The Culture of Mee Bu for Declining Stunting: Aceh Local Wisdom in the Process of Reproduction', *Journal of Biology Education*, 10(02), 1–7.

[5]. Herlina, T., Rahayu, S. & Lintang Suryani, R., 2021, 'Description Of The Level Of Mother's Knowledge About Stunting In Toddler In Kedawung Village, Susukan District, Banjarnegara District', *BORNEO NURSING JOURNAL (BNJ)* , 4(1), 10–17.

[6]. Madiko, S., Ilham, R. & Mojdo, D., 2023, 'The Relationship Of Nutritional Status Of Toddlers And Incidents Of Stunting In The Working Area Of The Eastern City Puskesmas', *Indonesian Journal of Medical and Health Sciences*, 03(01).

[7]. Larasati, N.N., 2018, *Factors Associated with the Incidence of Stunting in Toddlers Aged 25-59 Months at the Posyandu in the Wonosari II Public Health Center Area in 2017*, Health Polytechnic of the Ministry of Health Yogyakarta, Yogyakarta.

[8]. Munira, S.L., 2023, *'Results of the 2022 Indonesia Nutritional Status Survey (SSGI)'*, Kementerian Kesehatan RI, Jakarta.

[9]. Natalia, E. & Ping, M.F., 2020, 'Local Wisdom and Maternal Knowledge on Nutritional Status and Eating Patterns in the Incidence of Stunting in Preschool-Aged Children', *Nursing World: Journal of Nursing and Health*, 8(3), 435–441.

[10]. Rahayu, A., Yulidasari, F., Putri, A.O. & Anggraini, L., 2018, *STUDY GUIDE-Stunting and Its Prevention Efforts*, 01 edn., CV Mine, Yogyakarta.

[11]. Rohmi, A.L., 2017, *Multinomial Logistic Regression Analysis on Types of Traffic Violations in Surabaya City* – PhD thesis, ITS, Surabaya .

[12]. Tonga, T.D.U. & Tamu, J.G.U., 2022, *Strengthening Local Wisdom in Stunting Prevention in Indonesia by Utilizing Katuk Leaves (Sauropus Androgynus)*, Faculty of Health Sciences Tribhuvana Tunggadewi University, Malang.

[13]. Tristanti, Muliani, F. & Amelia, 2020, 'Application of Multinomial Logistic Regression Method on Chemotherapy Usage in Breast Cancer Cases at H. Adam Malik Hospital Medan', *Jurnal Gamma-Pi*, 2(1), 18–23.

[14]. Verawati, M., 2019, 'ANALYSIS OF THE PROBLEM OF STUNTING IN TODDLERS IN INDONESIA', *Proceedings of the National Seminar of the Faculty of Health Sciences, University of Muhammadiyah Ponorogo*, 62–65.

[15]. Warzukni, S., Raudhati, S. & Agustina, A., 2023, 'The relationship between knowledge and attitudes and pregnancy care in Acehnese Mee Bu Gateng Culture in the Peusangan Siblah Krueng Public Health Center Work Area, Bireuen Regency', *Journal of Public Health Innovation (JPHI)*, 3(02), 101–106.

[16]. Yuningsih, 2022, 'The Relationship of Nutritional Status and Stunting in Toddlers', *Oktisotin:Midwifery Scientific Journal*, 9(2), 102–109.