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The Affect Of Clean And Healthy Living Behavior (PHBS), Economic Level And Parenting Patterns On The Risk Of Stunting Incidence In The Working Area Of UPT Puskesmas Bereng

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ABSTRACT

Stunting is a condition of growth failure in children under five due to chronic malnutrition so that children become too short for their age. The short-term impact of stunting is susceptibility to infectious diseases while the long-term impact is the inhibition of physical and cognitive development. This study aims to determine the effect of Clean and Healthy Living Behavior (PHBS), economic level and parenting patterns on the risk of stunting in the work area of UPT Puskesmas Bereng. This is an observational study, quantitative design with a cross sectional approach. The study population was all 216 toddlers aged 6-23 months. Sampling was done by cluster random sampling with a total of 140 toddlers 6-23 months. Univariate analysis was conducted to describe each variable studied. The chi-square test was used for bivariate analysis and multivariate analysis was performed by binomial logistic regression model test. The results showed that clean water sources (p = 0.001 OR 7.812), exclusive breastfeeding (p = 0.006 OR 5.898), healthy latrines (p = 0.016 OR 4.991), family economic level (p = 0.029 OR 0.224) and parenting (p = 0.001 OR 3.518) significantly influenced the risk of stunting in toddlers 6-23 months. Whereas delivery in health facilities (p = 0.285 OR 0.463), weighing infants and toddlers regularly (p = 0.053 OR 5.131), washing hands with soap and clean water (p = 0.992 OR 1.014), consumption of nutritious healthy food (p = 0.230 OR 2, 139), regular physical activity (p = 0.892 OR 0.894), family members who smoke (p = 0.552 OR 0.690) and eradicate mosquito nests (p = 0.264 OR 1.955) do not significantly affect the risk of stunting in toddlers under 6-23 months. In the interpretation of the odds ratio, clean water sources (OR 7.812) have a greater effect than other variables on the risk of stunting in toddlers under 6-23 months.

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INTRODUCTION

Stunting is a condition where children under the age of 5 grow slowly due to chronic malnutrition, making them too small for their age [1]. Malnourished children are at risk of

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contracting diseases, so children with low birth weight are susceptible to diseases such as diarrhea, measles and lower respiratory tract infections. Malnutrition in children under five has long-term negative effects on physical and cognitive development[2]. According to the World Health Organization (WHO) in 2021, two-thirds of deaths ofchildren under the age of 5 are due to malnutrition and two-thirds are due to inappropriate feeding practices in infants and toddlers [3].

In this case, children are the next generation who deserve attention and are entitled to achieve cognitive and social development. According to data collected globally, approximately 149.2 million children under the age of 5 experienced delays in physical development and cognition in 2020 [4]. According to the Indonesian Nutrition Status Survey (SSGI) in 2022, the incidence of stunting in Indonesia in 2022 was 21.6%, in this case decreasing from the previous year of 24.4%. Nationally, the stunting rate in Central Kalimantan Province in 2022 was 26.9%, down from 27.4% in the previous year. Meanwhile, in Pulang Pisau Regency, the stunting rate increased from 24.6% in 2021 to 31.6% in 2022 [5]. Specifically in the work area of UPT Puskesmas Bereng, in 2022 the stunting rate increased to 22.3%, while in 2021 it was 17.9% [6].

Identification of malnourished and stunted children uses the TB/U index with a standard deviation z-score < -2 [7]. According to the United Nations International Children's Emergency Fund (UNICEF), stunting can be caused by infectious diseases and an unbalanced diet, while the factors that influence it are indirectly related to sanitation, safe drinking water, inadequate health services, inadequate food supplies and parenting habits. The high rate of stunting caused by many factors requires an approach based on various aspects of the discipline, because preventing and overcoming stunting does not only improve nutrition interventions but also other factors, including lifestyle and environmental hygiene. The poor quality of environmental hygiene is a form of clean and healthy living behavior (PHBS). PHBS is essentially a preventive behavior of individuals or families against various diseases. In this case, the implementation of PHBS is still needed because behavioral factors contribute 30 to 35 percent to health status [3].

About 31.6% of toddlers living in poor neighborhoods are malnourished. This illustrates that there is a significant relationship between environmental sanitation and the prevalence of stunting in children under five [8]. The Ministry of Health set a target of 70% of households practicing PHBS by 2014 [9]. Based on the minimum service standards (SPM) for health in Pulang Pisau Regency for 2019-2023, the number of villages with clean and healthy living behaviors (PHBS) is 45% by 2023 [10].

The social consequences of stunting or malnutrition include reduced educational attainment (cognition) and economic decline. Stunting is a red flag for a country because it can slow economic growth and increase poverty. Each year malnutrition causes a loss of 5% of global gross domestic product [11]. Therefore, the President of the Republic of Indonesia emphasized that things that need to be considered to prevent stunting include improving diet, parenting habits, improving living conditions and access to drinking water. [12].

Socio-economic factors are indirect factors such as the level of education of parents,

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the economic situation of each family and the ability of daily food consumption. Lack of food in a family will lead to diseases due to poor family nutrition. The economic situation of a family is influenced by several factors, including parents' livelihood, education level and the number of family members. The economic situation of a family will affect its ability to fulfill nutritional needs and benefit from good health services. [13]. The family economy is also associated with stunting rates, this is in accordance with UNICEF's statement that one of the fundamental problems for infant growth and development is the economic crisis [7][14]. In addition, one of the indirect factorsassociated with stunting is parental habits which are closely related to eating habits [15]. Some of the factors that hinder optimal child feeding practices include lack of knowledge, local customs and maternal awareness about child nutrition [16].

Pulang Pisau Regency's stunting reduction target based on the SPM of Pulang Pisau Regency in the 2019-2023 Strategic Plan is below 34.4% by 2023 [10]. Based on data from the Ministry of Health's Nutritional Status Assessment, the stunting rate in Pulang Pisau Regency has fallen below the SPM target. This when compared to the WHO threshold is still categorized as high because it exceeds 20%. [15]. Previous studies rarelyspecify PHBS as a research variable. Improving sanitation and improving the quality of life of the community can prevent the risk of stunting in an area. Therefore, this study aims to determine the effect of PHBS, economic level and parenting patterns on the risk of stunting in toddlers 6-23 months in the working area of UPT Puskesmas Bereng. This research analysis is also useful for local governments as a reference to examine the factors that cause stunting risk so that they can provide policies to anticipate stunting in the stunting locus area of Pulang Pisau Regency.

METHODS

Research design

In essence, this research is an observational study, which is designed quantitatively with a cross-sectional approach. The variables of this study include independent variables and dependent variables. The dependent variable is the risk of stunting and the independent variables are PHBS, family economic level and parenting patterns. The study was conducted in the work area of UPT Puskesmas Bereng, namely Buntoi Village, Hanjak Maju Village, Gohong Village, Kalawa Village and Bereng Village.

Population and sample

The study population was only toddlers in the work area of UPT Puskesmas Bereng which amounted to 216 toddlers aged 6 to 23 months. While parents or familieswho take care of these toddlers are informants. Research sampling was conducted using cluster random sampling. The sampling technique is grouped based on the village or sub-district working area of the UPT Puskesmas Bereng. Being in the work area of UPT Puskesmas Bereng and willing to be interviewed by researchers as inclusion criteria. While the exclusion criteria are refusing or unable to be interviewed and in a sick condition. After knowing the number of children under 5 years old in the UPT Puskesmas Bereng work area, the number

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of samples that can be used for this study can be determined. In this case, the calculation of the sample size uses the Slovin equation as follows :

$$n = \frac{N}{1 + (N.e^2)}$$

$$n = \frac{216}{1 + (216 \times 0.05^2)}$$

$$= 140.26$$

From the above calculations, the result is 140.26. So that the sample set is at least 140 toddlers. The sampling technique used in this study is probability sampling, meaning that all population elements have the possibility to be sampled, using cluster random sampling. The equation in cluster random sampling is:

$$fi = \frac{Ni}{N}$$

$$fi = \frac{140}{216}$$

$$= 0.65$$

An equal distribution of the number of samples was obtained by using the *cluster randomsampling* method for each UPT Puskesmas Bereng area, as follows:

Table 1. Results of the research sample distribution

Village	Population	$fi \times n$	Sample
Buntoi	64	0.65 x 64	42
Gohong	45	0.65 x 45	30
Kalawa	28	0.65 x 28	16
Hanjak Maju	52	0.65 x 52	34
Bereng	27	0.65 x 27	18
Total	216		140

Data collection instrument

The data to be collected in this study include:

1. Primary Data
   Primary data is data obtained directly by researchers using data collection instruments in the form of questionnaires and TB/U measurements on toddlers.
2. Secondary Data
   Secondary data is data obtained from the Electronic Community-Based Nutrition Recording and Reporting (e-PPGBM) UPT Puskesmas Bereng. In this case, the data is in the form of the distribution of infants aged 6-23 months in the operational areaof UPT Puskesmas Bereng.

Data collection tools or instruments must be tested for suitability to ensure that the data obtained is free from bias. In this study, the distribution of questionnaire test scores with validity and reliability tests was 30 respondents who visited the UPT Puskesmas Bereng who brought their babies or toddlers.

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1. Based on the validity test using the Pearson r test, it turns out that r table > r count (r = 0.361). Then all of these items are declared valid.
2. The results of the reliability test using the Cronbach α test, with the test results including high with a coefficient of α > 0.7. In this case it can be declared reliable for further testing.

Collection procedure

1. The research questionnaire used in this study uses a guttman scale. The size of this scale functioned in identifying the level of participation and agreement of respondents to a series of statements or items. In the PHBS question, the alternative answers in the research questionnaire are "Yes or No". While the parenting pattern will be divided into several questions representing democratic, permissive and authoritarian parenting. Alternative answers in each parenting category are "Yes or No". The determination of parenting patterns is determined based on the number of dominant values from each parenting pattern answered. Meanwhile, the question for family economic level consisted of two answer options, namely ≥ UMR (Regional Minimum Wage) and < UMR. In this case, it refers to the minimum wage of Pulang Pisau Regency in 2023 of IDR. 3,223,402.42 based on the Decree of the Governor of Central Kalimantan [17].
2. Monitoring of height/length in toddlers refers to the Card Towards Health Book (KMS) of infants/toddlers by looking at the results of the last measurement taken by posyandu cadres/health workers on duty during posyandu services. After that, the TB/U category of stunting or malnutrition that has been determined is < -2 SD.

Identification of the above sample during field observations refers to e-PPGBM data that adjusts the distribution of the number of children under five based on the name and address of residence. Each variable was analyzed univariate to multivariate using binomial logistic regression tests and seeing the magnitude of the influence of each variable based on the OR (Odds Ratio) value. Multicollinearity is diagnosed by calculating the simple correlation coefficient between independent variables, if there is a simple correlation coefficient of more than 0.8, it indicates a multicollinearity problem [18][19][20].

In this case, the type of p value for each variable included for the multivariate testis p < 0.25. Until we know that the final model of this multivariate test is to exclude variables with p > 0.05.

1. Testing the metrics simultaneously with the best model selection test and partialtesting to see the influence of each variable.
   a. Simultaneous Test
      Hypothesis
      H0 : $\beta 1 = \beta 2 = \beta 3 = \cdots = \beta p = 0$
      (No independent variable has an effect on the dependent variable)
      H1 : At least one $\beta j \neq 0$; j = 1, 2, ..., p
      (At least one independent variable has an effect on the dependent variable)

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b. Partial Test
Hypothesis
H0 : βj=0
(Independent variable has no significant effect on the dependent variable)
H1: $\beta j \neq 0$; j = 1, 2, ..., p
(The dependent variable has a significant effect on the dependent variable)

2. Perform model completeness check.
   a. Hypothesis
      H0 : Model fit (no difference between prediction and observation)
      H1 : Model does not fit (there is a difference between prediction and observation)
   b. Significant level (α) decision criteria H0 is rejected if the sig value < α
3. Forming a model.
   The interpretation used in the logistic regression model is the odds ratio model.

This study received an ethical approval letter from the Universitas Indonesia Maju with number 450/Sket/Ka-Dept/RE/UIMA/I/2024.

RESULTS

The table below presents a description of the characteristics of respondents andanalysis of each variable from univariate, bivariate to multivariate analysis.

Table 2. Characteristics of research respondents

Variables	Category	n	%
Gender of Toddlers	Male	69	49.29
	Female	71	50.71
Toddler Age	6-11 months	59	42.14
	12-17 months	35	25.00
	18-23 months	46	32.86
Age of Mother/Respondent	15-24 years old	49	35.00
	25-34 years old	58	41.43
	35-44 years old	33	23.57
Occupation of Respondent/Head of Household	Self-employed (traders and daylaborers)	70	50.00
	Farmers	56	40.00
	Others (private employees, civil servants and honoraryemployees)	14	10.00

Based on the table above, the majority of toddlers' gender is female at 50.71%.The age of toddlers is more in the age range of 6-11 months by 42.14%. In this case the mother of the toddler as the majority respondent is in the age range of 25-34 years by 41.43%. In the occupation of the respondent/head of the family, most of them are self- employed (traders and day laborers) by 50%.

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Table 3. Univariate analysis of each variable

Variables	Category	n	%
Nutrition Status	Stunting Risk	56	40.00
	Normal	84	60.00
PHBS			
Delivery at a Health Facility	Yes	97	69.29
	No	43	30.71
Weighing Infants and Toddlers	Yes	119	85.00
Periodically	No	21	15.00
Exclusive breastfeeding	Yes	87	62.14
	No	53	37.86
Wash Hands with Soap	Yes	135	96.43
andClean Water	No	5	3.57
Healthy Latrine	Yes	90	64.29
	No	50	35.71
Consume Nutritious Healthy	Yes	94	67.14
Food	No	46	32.86
Routine Physical Activity	Yes	24	17.14
	No	116	82.86
Family Member Smokes	Yes	95	67.86
	No	45	32.14
Clean Water Source	Yes	81	57.86
	No	59	42.14
Eradicating Mosquito Nests	Yes	86	61.43
	No	54	38.57
Economic level	≥ UMR (IDR. 3,223,402.42)	38	27.14
	< UMR (IDR. 3,223,402.42)	102	72.86
Parenting	Authoritarian	37	26.43
	Permissive	20	14.29
	Democratic	83	59.29

In this case, the percentage of stunting risk in children under 6-23 months is 40%, while children under five with normal nutritional status is 60%. Across ten PHBS variables, among others, childbirth in health facilities by 69.29%, weighing babies and toddlers regularly by 85%, exclusive breastfeeding by 62.14%, washing hands with soap andclean water by 96.43%, using healthy latrines by 64.29%, consuming nutritious healthy food by 67.14%, routine physical activity by 17.14%, family members who smoke by 67.86%, using clean water sources by 57.86% and eradicating mosquito nests by 61.43%.While the majority of household economic levels are < UMR by 72.85% and the parenting patterns applied by each parent are mostly democratic by 59.29% followed by authoritarian and permissive.

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Table 4. Bivariate analysis of each variable

Variables	Category	Nutrition Status				p value	OR
		Stunting Risk		Normal			
		n	%	n	%		
PHBS							
Delivery at a Health Facility	Yes	32	32.99	65	67.01	0.285	0.463
	No	24	55.81	19	44.19		
Weighing Infants and Toddlers Periodically	Yes	42	35.29	77	64.71	0.053	5.131
	No	14	66.67	7	33.33		
Exclusive breastfeeding	Yes	22	25.29	65	74.71	0.006	5.898
	No	34	64.15	19	35.85		
Wash Hands with Soap and Clean Water	Yes	52	38.52	83	61.48	0.992	1.014
	No	4	80.00	1	20.00		
Healthy Latrine	Yes	19	21.11	71	78.89	0.016	4.991
	No	37	74.00	13	26.00		
Consume Nutritious Healthy Food	Yes	28	29.79	66	70.21	0.230	2.139
	No	28	60.87	18	39.13		
Routine Physical Activity	Yes	12	50.00	12	50.00	0.892	0.894
	No	44	37.93	72	62,07		
Family Member Smokes	Yes	37	38.95	58	61.05	0.552	0.690
	No	19	42.22	26	57.78		
Clean Water Source	Yes	11	13.58	70	86.42	0.001	7.821
	No	45	76.27	14	23.73		
Eradicating Mosquito Nests	Yes	33	38.37	53	61.63	0.264	1.955
	No	23	42.59	31	57.41		
Economic Level	≥ UMR	7	18.42	31	81.58	0.029	0.224
	< UMR	49	48.04	53	51.96		
Parenting	Authoritarian	23	62.16	14	37.84	0.001	3.518
	Permissive	12	60.00	8	40.00		
	Democratic	21	25.30	62	74.70		

In this context, bivariate analysis with chi-square test was conducted to understand the relationship between variables. In the variables of delivery in health facilities (p = 0.285 OR 0.463), weighing infants and toddlers regularly (p = 0.053 OR 5.131), exclusive breastfeeding (p = 0.006 OR 5.898), hand washing with soap and clean water (p = 0.992 OR 1.014), healthy latrines (p = 0,016 OR 4.991), consumption of nutritious healthy food (p = 0.230 OR 2.139), regular physical activity (p = 0.892 OR 0.894), family members who smoke (p = 0.552 OR 0.690), clean water sources (p = 0.001 OR 7.821), eradicating mosquito nests (p = 0.264 OR 1.955). While at the family economic level (p = 0.026 OR 0.224) and parenting (p = 0.001 OR 3.518). A significant relationship to the risk of stunting was found in exclusive

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breastfeeding (p = 0.006), healthy latrines (p = 0.016), clean water sources (p = 0.001), economic level (p = 0.029), and parenting (p = 0.001).

Table 5. Multivariate analysis of each variable

Model	Variables	OR	95% CI	p value
1	Clean Water Source	7.821	2.30-26.22	0.001
	Exclusive breastfeeding	5.898	1.56-22.24	0.006
	Weighing Infants and ToddlersPeriodically	5.131	0.91-28.85	0.053
	Healthy Latrine	4.991	1.33-18.74	0.016
	Parenting	3.518	1.73-7.16	0.001
	Consume Nutritious Healthy Food	2.139	0.62-7.42	0.230
	Economic Level	0.224	0.05-0.92	0.029
2	Clean Water Source	7.821	2.30-26.22	0.001
	Exclusive breastfeeding	5.898	1.56-22.24	0.006
	Healthy Latrine	4.991	1.33-18.74	0.016
	Parenting	3.518	1.73-7.16	0.001
	Economic Level	0.224	0.05-0.92	0.029
3	Clean Water Source	7.821	2.30-26.22	0.001
	Exclusive breastfeeding	5.898	1.56-22.24	0.006
	Healthy Latrine	4.991	1.33-18.74	0.016
	Parenting	3.518	1.73-7.16	0.001

In the table above is logistic regression modeling, there are three logistic regression models. Determining the final model of the multivariate test is by removing variables that have a p value > 0.05 and comparing OR values. The following is the mathematical equation in the final logistic regression model based on the coefficient :

$$logit\ (p) = -8.598 + 1.036\ exlusive\ breastfeeding + 1.398\ healthy\ latrine + 2.112\ clean\ water\ source + 0.967\ parenting$$

The proportion or probability in the final model is $p = \frac{1}{1+e^{8.598}} = 1.99\ x\ 10^{-4}$

In this case, the interpretation of the odds ratio (OR) of each significant variable can be explained by the size of the OR value. In the clean water source, the OR is 7.821. This shows the risk of stunting in children who do not have access to clean water is 7.821times higher than children who have access to clean water. The OR value for exclusive breastfeeding was 5.898. This shows the risk of stunting in children who are not exclusively breastfed is 5.898 times higher than children who are exclusively breastfed. The OR value for healthy latrines was 4.991. This states the risk of stunting in toddlers who do not use healthy latrines is 4.991 times greater than using healthy latrines. The ORvalue on parenting is 3.518. This indicates that the risk of stunting in toddlers raised by authoritarian and permissive parents is 3.518 times higher than in children raised by democratic parents. While the OR value at the economic level is 0.224. This shows that the risk of stunting in children with family income < UMR is 0.224 times higher than children with family income ≥ UMR.

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Table 6. Accuracy results on the final model of binomial logistic regression

Model	Observation	Prediction		PercentageCorrect (%)	Total Percentage (%)
		Normal	StuntingRisk		
3	Normal	73	11	86.9	83.7
	Stunting Risk	11	45	80.4	

In this context, the final model of binomial logistic regression is able to predict accurately. This is evidenced by the total percentage in the model of 83.7%. So that the model is well able to distinguish between nutritional status at risk of stunting and normal.

Discussion

Based on SSGI data in 2022, Indonesia's stunting prevalence in 2022 was 21.6%, in this case down from the previous year which amounted to 24.4%. At the national level, the stunting prevalence in Central Kalimantan Province in 2022 was 26.9%. Meanwhile, the stunting prevalence in Pulang Pisau Regency was 31.6%. Thus, the incidence of stunting in Pulang Pisau Regency is high. Many factors influence the high incidence of stunting, such as environmental, socioeconomic and parenting factors [1][21].

PHBS is one of the factors studied, of the 10 indicators analyzed, only 3 indicators have a significant influence. In previous research by A. Aprizah, there was a significant relationship between PHBS and the incidence of stunting (p = 0.004) because behavior is the result of awareness, willingness and ability to take actions that a person or individual believes in either through the learning process or just knowing [3].

Delivery in health facilities shows no influence on the risk of stunting. Childbirth assisted by health workers, whether doctors, midwives or paramedics, has standards for the use of sterile and safe equipment. In addition, health workers are people who are competent in handling the delivery process. So that the safety of mothers and babies is guaranteed [22]. Weighing babies and toddlers regularly has no effect on the risk of stunting. This monitoring of baby growth and development is very important. A mother or parent can always monitor the baby's growth and development, besides getting nutrition counseling from cadres and health workers [23].

Hand washing with soap and clean water has no effect on the risk of stunting. This is because unclean water contains bacteria, when used the bacteria will move to the hands. So it is very important to wash your hands after defecating, before eating, feeding and breastfeeding the baby. Routine physical activity and eradicating mosquito nestshave no effect on the risk of stunting. Doing 30 minutes of physical activity every day will keep the body fit and maintain mental and quality of life. Physical activity can be done by warming up and stretching the body first to avoid injury. Cleaning the environment is important to be free from mosquito larvae as an intermediary for the transmission of dengue fever and malaria. When the immune system of children under five falls, they will be easily infected with diseases so that their nutritional intake is disrupted [23].

Eating a healthy and nutritious diet does not affect the risk of stunting. Macro and

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micronutrient supplementation such as complementary food plays a role in growth. Foods rich in protein, zinc, calcium and vitamin A also serve to increase height in children [7]. Family members who smoke have no effect on the risk of stunting. Inhaling cigarette smoke can cause lung disease. Occasional exposure to cigarette smoke does not cause health problems in children under 2 years of age. If the time is longer, it can cause health problems [22].

Exclusive breastfeeding has a significant effect on the risk of stunting. This is in accordance with research conducted by A. Semuel Ra et al., stating that exclusive breastfeeding is associated with a 2.875 times higher risk of stunting [24]. According to WHO, exclusive breastfeeding is giving babies only breast milk without giving them other food or drinks from birth to 6 months of age. Breast milk has many benefits for babies and mothers. The benefits of breast milk for infants are to encourage their development, especially for bone formation and antibodies [25].

Supplementing micronutrients such as calcium and vitamin D in breast milk plays a very important role in child growth and development. Calcium is needed for bone formation during growth, while vitamin D is needed for calcium absorption by the body and maintenance of serum calcium in normal conditions [26]. Based on the results of research by Hardya et al. obtained information that exclusive breastfeeding has a protective effect (PR 0.41 IK95% 0.25 - 0.68) on the incidence of stunting if the mother's age at the time of pregnancy ≥ 30 years [27]. Research findings in Aceh, exclusive breastfeeding poses a challenge for mothers who work in government or private organizations due to the absence of lactation rooms. Even though the government has encouraged exclusive breastfeeding since 2016. In addition, informal workers such as farmers in rural areas are also busy with their work [28].

Toddlers who do not have access to healthy toilets have a significant impact on the risk of stunting. Hygienic toilet cleanliness, according to Rahayu, has a significant association with malnutrition and stunting (p = 0.000) [29]. This finding is in line with recent findings from a research project in Ethiopia called GROW (Growth Nutrition for Mothers and Children), which showed that open defecation is strongly associated with malnutrition and stunting. Open defecation is associated with poor hygiene, which is an important factor in the transmission of diseases such as diarrhea, typhoid and cholera[30].

A previous study in Rwanda showed that children who reported diarrhea two weeks prior to the study, those from households without toilets and those who shared toilets had a higher likelihood of stunting. This is related to open defecation resulting in feces contaminated with food and water, especially untreated water triggers diarrheal diseases [31]. There is evidence of an association between sanitation and stunting in low and middle-income countries. Analysis of data collected in eight countries across three continents showed that gradual improvements in sanitation had a significant association with increased child height [32]. Another study found that reducing the percentage of open defecation in a region is more effective in reducing stunting. It was also found that every 10% increase in open defecation led to a 0.7% increase in the prevalence of stunting [33]. Based on a study in India, no significant difference was found between shared toilet use and private toilet use with child anthropometric growth. As suggested by policy makers and academics, well-managed

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shared sanitation can end open defecation in communities without proper toilets [34].

The availability of clean water has a significant influence on the incidence of stunting in the working area of UPT Puskesmas Bereng. Based on the results of research conducted in Vietnam, the mortality rate of children under 5 years old in Vietnam is 20.2 per 1,000 live births. Diarrhea is the leading cause of death in toddlers. The majority of Vietnamese children do not have access to adequate drinking water, reaching ≥ 80% in the highlands and Mekong Delta [35]. Water quality is also a contributing factor to stunting in Pakistan's frequently flooded areas. This is evidenced by the high prevalence of malnutrition (50.7%) among under-fives in flood-affected areas with poor water quality and sanitation [36].

Based on research in Uganda, the burden of diarrheal disease is high due to poor water quality, so many infrastructure projects focus on providing communal clean water such as water supply companies and boreholes. However, this is not in line with the quality of community sanitation because it does not consider the extent of easy access to clean water sources. Chronic diarrhea poses a risk of malnutrition and stunting in children under five years old [37]. Children who drank from unsafe water sources were at 3.7 times the risk of suffering from diarrhea compared to those who used safe water sources in Tigray region, Northern Ethiopia. Diarrhea and malnutrition are associated with water quality such as contamination of water sources used daily [38][39].

In this study, the economic level of the family has a significant influence on the risk of stunting. This is in accordance with M. Marbun's previous research which states that economic level is associated with stunting rates (p = 0.000) [40]. High family income makes it easier to meet the needs of life, while low family income makes it difficult to meet the needs of life. Working mothers are a factor that affects the occurrence of stunting (p = 0.017), mothers who do not work have a higher risk of stunting than mothers who do not work. Therefore, when a highly educated mother does not have access to work, her attitude towards her child's health will be affected [41][42]. In contrast to the study conducted in Iran, children of working mothers are at risk of stunting, regardless of the economic condition of the family. Therefore, working mothers need to have more time for the family [43].

Parenting has a significant influence on the risk of stunting. At the age of 6 to 24 months, children receive complementary foods, so at this age children are at a rapid growth period, are susceptible to bacteria or viruses and are physically active [1]. Poor parenting leads to an 8 times higher risk of stunting [7]. In addition, there is a correlation between authoritarian parenting and the risk of stunting, namely when mothers require their children to eat according to predetermined patterns and instructions [44]. In previous studies, authoritarian parenting was discouraged. This explains how parents provide warmth, support and responsibility to their children. However, parents tend to require their children to follow certain expectations or rules [45].

CONCLUSION

The results showed that clean water sources, exclusive breastfeeding, healthy latrines, family economic level and parenting patterns significantly influenced the risk of stunting in children

under 6-23 months. In this case, clean water sources have a greater influence than other variables. Recommendations for the UPT Puskesmas Bereng and thePulang Pisau Regency Health Office to improve access to clean water can work together with local governments and non-governmental organizations to ensure adequate access toclean water sources, and the construction of wells or clean water supply systems can be prioritized in areas with a high risk of stunting.

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