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Original Research

The Effect of Diabetes Mellitus Gymnastics Movement on Decreasing Current Blood Pressure Levels (GDS) in the Elderly

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Abstract

Background: Stunting is a condition of failure to thrive in children caused by chronic malnutrition during the growth period. Jeneponto Regency is the region with the highest prevalence of stunting toddlers in South Sulawesi in 2022, reaching 39.8%. This figure is up 1.9 points from the prevalence of stunting toddlers in the area in 2021 of 37.9%, so the problem of stunting is still a health problem in Jeneponto. Binamu Health Center is one of 18 Health Center in Jeneponto Regency. The results of the initial data survey from January-April 2023 found that 233 children suffering from stunting were stunted.
Objective: This study aims to determine the factors associated with the incidence of stunting in toddlers.
Methods: This research is a quantitative research with cross sectional study method. The sample in this study was toddlers totaling 278 people. The sampling technique is purposive sampling. This study used questionnaires as a data collection instrument.
Results: The results of the study found that exclusive breastfeeding obtained Chi-Square test results obtained P-value = 0.000 (P < α = 0.05), which means there is a relationship between exclusive breastfeeding and stunting incidence, maternal education with stunting incidence obtained chi-square test results obtained p-value = 0.548 (p < α = 0.05) which means there is no significant relationship between maternal education and stunting incidence and BBLR obtained chi-square test results p-value = 0.391 (P < α = 0.05), which means there is no relationship between low birth weight and the incidence of stunting in toddlers.
Conclusion: The conclusion of this study is that there is a relationship between exclusive breastfeeding and the incidence of stunting, while maternal education and low birth weight are not related to the incidence of stunting.
Keywords: Mother; Stunting; Toddler

Introduction

Introduction Stunting is a condition in which infants under the age of five (toddlers) cannot develop due to chronic malnutrition, so the child is not tall for his age (too short). According to the standard of the WHO-Multicentre Growth Reference Study (MGRS), stunted and very short toddlers are toddlers with body length (PB/U) or height (TB/U) according to their age. While the definition of stunting according to the Indonesian Ministry of Health is a toddler with a z-score of less than -2SD (short/stunting) and less than -3SD (very short) (Kusumaningati et al., 2019).

According to the UNICEF framework, the main factors causing stunting include maternal education level, early introduction of complementary foods, medical history, and low birth weight. Feeding too early, which includes breastfeeding less than 6 months, is caused by limited healthy foods that can be consumed. In giving complementary foods, you must pay attention to the amount given which refers to the quantity, quality, and form. Early introduction of complementary foods and failure of exclusive breastfeeding are also causes of stunting (Sumarni et al., 2020).

The prevalence of stunting worldwide is 22% or as many as 149.2 million people in 2021. In 2017, as many as 22.2% or around 150.8 million toddlers in the world were stunted. More than half of the world's stunted children are from Asia (55%) while more than a third (39%) live in Africa. There are 83.6 million stunted children under five in Asia, the highest proportion coming from South Asia (58.7%) and the least proportion in Central Asia (0.9%), Bangladesh (36.1%), Nepal (35.8%), and Bhutan (33.6%) (World Health Organization, 2022).

According to the Indonesian Nutritional Status Survey (SSGI) of the Ministry of Health, the prevalence of stunted toddlers in Indonesia reached 21.6% in 2022. This figure is down 2.8 points from

the previous year. East Nusa Tenggara (NTT) again occupies the top position with a stunting toddler rate of 35.3%. The prevalence of stunted children under the age of five years in Indonesia is the second highest in Southeast Asia. Its prevalence reached 31.8% in 2020 (Kementerian Kesehatan RI, 2022).

South Sulawesi, known as the granary of food, actually has a stunting rate that is higher than the national rate, and tends to increase every period. The prevalence of stunting toddlers in South Sulawesi reached 27.2% in 2022. This province is ranked 10th highest prevalence of stunting toddlers in Indonesia. South Sulawesi slightly reduced the number of stunting toddlers by 0.2 points from the previous year. In 2021, the prevalence of stunting toddlers in this province was recorded at 27.4%. Jeneponto Regency is the region with the highest prevalence of stunting toddlers in South Sulawesi in 2022, reaching 39.8%. This figure is up 1.9 points from the prevalence of stunting toddlers in the area in 2021 of 37.9%. Next, Tana Toraja Regency ranks second in the region with the largest prevalence of stunting toddlers in South Sulawesi at 35.4%, followed by Pangkajene Regency at 34.2%, North Toraja Regency at 34.1%. On the other hand, Barru Regency has the lowest stunting prevalence in South Sulawesi, which is 14.1%. Then, the position is followed by Makassar City with a stunting prevalence of 18.4% (Kemenkes, 2023).

Based on the background description above, researchers are interested in examining factors related to the incidence of stunting in toddlers in the work area of the Binamu Health Center, Jeneponto Regency.

Methods

Study Design

This study is analytical with a "cross sectional study" design where data collection of all variables is carried out directly at one time or at a certain time to observe factors related to the incidence of stunting in toddlers in the work area of the Binamu Health Center, Jeneponto Regency

Samples/Participants

The sample in this study was toddlers totaling 278 people. The sampling technique is purposive sampling.

Instruments

The instruments used in this study were questionnaires, and stature meters were used to collect data on factors related to the incidence of stunting in toddlers.

Data Collection

The data collection procedure used was to give questionnaires directly to respondents and to calculate stunting I used the PSG Toddler application. Researchers first make self-introductions in order to establish trusting relationships with each other. At the meeting directly, the researcher will convey the purpose and purpose of conducting research, then the data collection steps will be conveyed to respondents after that provide research questionnaires to respondents.

Data Analysis

Univariate analysis is carried out to objectively analyze the variables by calculating the frequency and percentage distribution of each variable. Bivariate analysis is used to analyze the relationship between each variable. Data obtained through observation, analyzed using a cross-sectional test that aims to conclude the relationship between two variables. This test uses the help of the SPSS 21 application using the chi-square statistical test to determine the relationship with a significant level of p-value < 0.05.

Ethical Considerations

Informed consent is given prior to the study. The goal is that respondents know the purpose and purpose of the study. If the respondent is willing, then the respondent must sign the research consent sheet. If the respondent is not willing, then the researcher must respect the rights of the respondent.

Results

Characteristics of Respondents

Table 1 shows that of 278 respondents in the maternal work category as IRT, 241 respondents (86.7%), teachers 14 respondents (5.0%), entrepreneurs 8 respondents (2.9%), private employees 5 respondents (1.8%), midwives 3 respondents (1.1%), farmers 6 respondents (2.2%) and posyandu cadres 1 respondent (0.4%). Then from 278 respondents in the maternal age category 20-26 years old, 50 respondents (18.0%), 27-33 years old as many as 138 respondents (49.6%) and 34-40 years old as many as 90 respondents (32.4%).

Table 1 Distribution of respondent characteristics
in the working area of Puskemas Binamu, Jeneponto Regency

Variable	n	%
Mother's Work		
IRT	241	86,7
Educators	14	5,0
Entrepreneurial	8	2,9
Private employees	5	1,8
Midwife	3	1,1
Farmer	6	2,2
Posyandu Kadre	1	0,4
Age		
20-26 Year	50	18,0
27-33 Year	138	49,6
34-40 Year	90	32,4
Total	278	100,0

Source: Primary Data 2023

Table 2 shows that out of 278 samples, 128 samples (46.0%) were male, while 150 samples (54.0%) were female. Then the age category of toddlers 24-35 months as many as 134 samples (48.2), 36-47 months as many as 94 samples (33.8%) and 48-60 months as many as 50 samples (18.0%). Of the 278 stunting incidence samples, 22 samples (7.9%) were very short in the short category, 52 samples (18.7%) and 204 samples (73.4%) in the normal category.

Table 2 Distribution of sample characteristics
in the working area of the Binamu Health Center, Jeneponto Regency

Variable	n	%
Gender		
Man	128	46,0
Woman	150	54,0
Age of toddler		
24-35 moon	134	48,2
36-47 moon	94	33,8
48-60 moon	50	18,0
Incidence of *stunting*		
Very short	22	7,9
Short	52	18,7
Normal	204	73,4
Total	278	100,0

Source: Primary Data 2023

Univariate Analysis

Table 3 shows that the distribution of variable characteristics of *stunting incidence* was 22 toddlers (7.9%) with the very short category, 52 toddlers with short categories (18.7%) and 204 toddlers with normal categories (73.4%). Then the variable education of mothers with the basic education category was 155 people (55.8%), while the secondary education category was 93 people (33.5%) and the higher education category was 30 children under five (10.8%). In the variable of exclusive breastfeeding, as many as 102 (36.7%) of toddlers were not exclusively breastfeeding while as many as 176 (63.3%) of

toddlers received exclusive breastfeeding. In the birth weight category, as many as 26 (9.4%) of toddlers were born with BBLR while as many as 252 (90.6%) of toddlers were born with normal weight.

Table 3 Distribution of characteristics of research variables in the working area of the Binamu Health Center, Jeneponto Regency

Variable	n	%
Incidence of *stunting*		
Very short	22	7,9
Short	51	18,7
Normal	204	73,4
Mother's education		
Primary Education (SD and SMP)	155	55,8
Secondary Education (SMA)	93	33,5
Higher Education (Bachelor/Diploma)	30	10,8
Breastfeeding		
Not exclusive breastfeeding	102	36,7
Exclusive breastfeeding	176	63,3
Birth weight		
BBLR	26	9,4
Normal	252	90,6
Total	278	100,0

Source: Primary Data 2023

The relationship between education and the incidence of *stunting* in toddlers

Table 4 above shows that out of 155 respondents, 15 respondents (9.7%) had a basic education in the very short category, while 26 (16.8%) had a basic education and 114 respondents in the normal category. Then of the 93 respondents, 6 respondents (6.5%) had a basic education in the toddler category. Mothers with secondary education in the short category were 18 respondents (19.4%) and as many as 69 (74.2%) respondents were in the normal category. Of the 30 respondents, 1 (3.3%) of the highly educated mothers in the category of toddlers were very short, while 8 respondents (26.7%) and 21 respondents (70.0%) were highly educated mothers in the category of normal toddlers. The results of *the chi-squre* test obtained a *p-value* = 0.548 ($p < \alpha = 0.05$), which means that there is no relationship between maternal education and the incidence of *stunting* in toddlers in the work area of the Binamu Health Center, Jeneponto Regency in 2023.

Table 4 Distribution of the relationship between maternal education and the incidence of *stunting* in toddlers in the working area of the Binamu Health Center, Jeneponto Regency

Mother's education	Kejadian *stunting*						Total		P value
	Very short		Short		Normal				
	n	%	n	%	n	%	n	%	
Primary education (Elementary and Junior High School)	15	9,7	26	16,8	114	73,5	155	55,8	**0,548**
Secondary Education (SMA)	6	6,5	18	19,4	69	74,2	93	33,5	
Higher Education (Bachelor/Diploma)	1	3,3	8	26,7	21	70,0	30	10,8	
Total	22	7,9	52	18,7	204	73,4	278	100,0	

Source: Primary Data 2023

The relationship between exclusive breastfeeding and the incidence of *stunting*

Table 5 above shows that of 102 toddlers who are not exclusively breastfed in the very short category, 15 are toddlers (14.7%), 34 toddlers who are not exclusively breastfed in the short category (33.3%) and 53 toddlers who are not exclusively breastfed with the normal category (52.0%) while of the 176 toddlers who are exclusively breastfeeding with the very short category, 7 are toddlers (4.0%), 18 toddlers with exclusive breastfeeding in the short category (10.2%) and 151 toddlers with exclusive breastfeeding with the normal category (85.8%). The results of *the Chi-Square test* were obtained with a value *of P* = 0.000 ($P < \alpha = 0.05$), which means that there is a relationship between exclusive breastfeeding and the incidence of *stunting* in toddlers in the work area of the Binamu Health Center, Jeneponto Regency in 2023.

Table 5 Relationship between exclusive breastfeeding and incidence of *stunting* in toddlers in the working area of the Binamu Health Center, Jeneponto Regency

Exclusive breastfeeding	Incidence of *stunting*						Total		P value
	Very Short		Short		Normal				
	n	%	n	%	n	%	n	%	
Not exclusive breastfeeding	15	14,7	34	33,3	53	52,0	102	36,7	**0,000**
Exclusive breastfeeding	7	4,0	18	10,2	151	85,8	176	63,3	
Total	22	7,9	52	18,7	204	73,4	278	100,0	

Source: Primary Data 2023

The relationship between BBLR and the incidence of *stunting* in toddlers

Table 6 above shows that of 26 BBLR toddlers in the very short category, 1 toddler (3.8%), 3 BBLR toddlers in the short category (11.5%) and 22 toddlers with the normal category (84.6%). Meanwhile, of the 252 toddlers born with normal birth weight with a very short category, 21 were toddlers (8.3%), 49 were born with a short category and 49 were toddlers of normal birth weight with the normal category A total of 182 children under five (72.2%). The results of *the Chi-Square* test were obtained with a *value of P* = 0.391 (*P* < α = 0.05), which means that there is no relationship between BBLR and the incidence of *stunting* in toddlers in the work area of the Binamu Health Center, Jeneponto Regency in 2023.

Table 6 Relationship between low birth weight and *stunting incidence* in toddlers in the working area of the Binamu Health Center, Jeneponto Regency

Birth weight	Incidence of stunting						Total		Nilai *p*
	Very Short		Short		Normal				
	n	%	n	%	n	%	n	%	
BBLR	1	3,8	3	11,5	22	84,6	26	9,4	**0,391**
Normal	21	8,3	49	19,4	182	72,2	252	90,6	
Total	22	7,9	52	18,7	204	73,4	278	100,0	

Source: Primary Data 2023

Discussion

Characteristics of Respondents

Based on the largest group of respondents' jobs owned by respondents in this study, it was found that IRT work was 241 respondents (86.7%) and the least was posyandu cadres as many as 1 respondent (0.4%). This is in line with research conducted by Rahmandiani et al. (2019) which said that most of the respondents' jobs were IRT as many as 193 (79.8%) respondents.

The age group of respondents was most aware of the age group of 27-33 years, which was 138 respondents (49.6%) and the least was the age group of 20-26 years, which was 50 respondents (18.0%). This is in line with research conducted by Novayanti et al. (2021) which said that most respondents aged 26-35 years were 49 (44.55%) respondents.

Based on sex groups, the most samples were 150 female (54.0%) and 128 male (46.0%). This is in line with research conducted by Alfarisi et al. (2019) which said that most toddlers are female, namely as many as 132 (55.7%) toddlers.

Based on the age group, the most samples were aged 24-35 months, which was 134 toddlers (48.2%) and the least was the age of 48-60, which was 50 toddlers (18.0%). This is in line with research conducted by Sutarto et al. (2021) which said that most toddlers aged 24-35 years, namely 41 (47.7%) toddlers.

Based on the group of stunting incidents, the most samples were the normal category as many as 204 (73.3%) and the least that was very short as many as 22 toddlers (7.9%). This is in line with research conducted by Asriawal and Jumriani (2020) which said that the most were normal category toddlers as many as 16 (34.8%) toddlers and the least were very short categories as many as 7 (15.2%) toddlers.

The relationship between maternal education and the incidence of stunting in toddlers

Formal education as a process of processing information into knowledge can have an impact on a person's health or nutritional condition. Education instills reading, arithmetic, critical thinking skills, and provides direct information about health to women or mothers. Mothers with a good level of education can influence the preparation, procurement, and selection of nutritious foods for children, especially

children under five. A high level of education in mothers will also increase mothers' knowledge and attitudes towards information related to nutrition and health (Rahmah et al., 2023). According to Riskesdas, the incidence of stunting is influenced by low income and education of parents, especially mothers whose role is very important in childcare, shopping for food and serving food (Mutmainnah et al., 2022).

The mother's education level plays an important role and influences a person in carrying out an action. Mothers with a high level of education will be more concerned about the condition of their babies in exclusive breastfeeding to MP-ASI after the age of six months, while mothers with low levels of education will tend to be indifferent to the condition of their babies (Amanda, 2021).

Maternal education is related to the nutritional status of children based on mothers who take direct care of their children, including in terms of preparing and feeding children. The level of maternal education has a positive impact on child growth, mothers who increasingly understand the importance of health care such as fulfilling family nutrition, child nutrition parenting and also good knowledge have an influence on healthy lifestyles including food consumption given to toddlers. The growth and development of toddlers needs to be based on good parenting at home, one of the factors is maternal education (Shodikin et al., 2023).

Based on the results of research between maternal education and the incidence of stunting, chi-square test results obtained p-value = 0.548 ($p < .05$) which means there is no significant relationship between maternal education and the incidence of stunting in the work area of the Binamu Health Center, Jeneponto Regency in 2023. This research is in line with research conducted by Mutmainnah et al. (2022) the results showed that the results of data analysis with the Chi-Square test obtained a value of $p = 0.827$. Thus, a p value of > .05 can be concluded that there is no relationship between maternal education level and stunting in toddlers aged 12-60 months. This research is also supported by research conducted by Shodikin et al. (2023) the results of the study show that the results of the Chi-Square test obtained a p-value of 0.427 ($p > .05$) meaning that there is no relationship between the level of maternal education and the incidence of stunting in toddlers in Kaloran Village, Gemolong District, Sragen Regency. In research conducted by Widya (2019) the results showed that maternal education was not related to stunting with p values (0.127) < .05.

The relationship between exclusive breastfeeding and the incidence of stunting in toddlers

Exclusive breastfeeding is breastfeeding for 6 months without other additional foods such as formula milk, oranges, honey, tea water, water, and solid foods, bananas, papaya, milk porridge, biscuits, rice porridge, and teams from birth to infants aged 6 months (Sutarto et al., 2021). Breast milk is a liquid that comes out naturally from the mother's breast, the most perfect, practical, cheap and safe food for the baby. Breast milk is needed by infants to meet the adequacy of their nutritional needs in the first six months of life. The main content of breast milk, namely carbohydrates, fats, proteins, multivitamins, water, creatinine and minerals is very easily digested by infants (Novayanti et al., 2021).

Based on the results of research between exclusive breastfeeding and stunting events, chi-square test results obtained p-value = 0.000 ($p<\alpha = 0.05$), this means that there is a significant relationship between exclusive breastfeeding and the incidence of stunting in toddlers in the work area of the Binamu Health Center, Jeneponto Regency. Exclusive breastfeeding is one of the efforts to meet nutritional needs during toddlerhood. This is in line with Rivanica and Oxyandi who said that breast milk (ASI) plays a role in fulfilling toddler nutrition. WHO (2005) recommended exclusive breastfeeding given to infants during the first 6 months of life, because breastfeeding provides all the energy and nutrients needed by infants during the first 6 months of life. Exclusive breastfeeding can reduce infant mortality rates caused by various diseases (Purnamasari & Rahmawati, 2021).

Exclusive breast milk contains antibodies that are not owned by formula milk with high nutritional value. Breast milk is easily digested, because in addition to containing appropriate nutrients, it also contains enzymes to digest the nutrients contained in the milk. Breast milk contains high-quality nutrients that are useful for the growth, development and intelligence of infants / children (Sutarto et al., 2021). Children under five who do not get exclusive breastfeeding have a greater risk of stunting compared to toddlers who are exclusively breastfed. Toddlers who are not exclusively breastfed have a 3.7 times greater risk of stunting than toddlers with exclusive breastfeeding (Pramulya et al., 2021).

According to Wahyuningsih et al. (2021), exclusive breastfeeding is protective of the incidence of stunting in children, but exclusive breastfeeding is not the only factor that contributes to the incidence of stunting in children. Improvement of nutritional status during preconception and during pregnancy, as well as household economic status is expected to reduce the incidence of stunting in children. One of the factors that influence stunting is family habits. Family habits include feeding, parenting habits and health care habits.

WHO defines Low Birth Weight (LBW) as <2500 gr. Newborns can weigh <2500 grams due to premature birth or birth with a gestational age of less than 37 weeks (Ramdaniati & Nastiti, 2019). Low

birth weight is a picture of public health malnutrition encompassing mothers with long-term malnutrition, poor health, hard work and poor health care and pregnancies. Individually, low birth weight is an important predictor in newborn health and survival and is associated with a high risk to children. Birth weight in general is strongly associated with long-term growth and development. Thus, the continued impact of LBW can be in the form of failure to grow (growth faltering). A baby born with low birth weight will find it difficult to catch up with early growth. Growth that lags behind normal will cause the child to become stunted (Murti et al., 2020).

Based on the results of research between LBW and the incidence of stunting, chi-square test results obtained p-value = 0.391 ($p < \alpha = 0.05$), which means there is no relationship between LBW and the incidence of stunting in toddlers in the working area of the Binamu Health Center, Jeneponto Regency in 2023. This is in line with research conducted by Hartati & Uswatun (2020) who obtained a p value = 0.680 which means there is no relationship between birth weight history and the incidence of stunting in toddlers aged 24-60 months at the Jogonalan Health Center. This research is also supported by research conducted by Hidayati (2019), which produced a p value of 0.966. Thus, the null hypothesis is accepted, namely that there is no relationship between birth weight and the incidence of stunting of children under five in North Jebed village, Taman District, Pemalang Regency.

The absence of a relationship between low birth weight and stunting has a discrepancy with the theory that states that a history of low birth weight will increase the risk of undernutrition events compared to children who do not have a history of low birth weight. This may happen because children born with low weight have the opportunity to experience disorders of the nervous system so that their growth and development will be slower than children born with normal weight. Babies with low birth weight have a lower immune system than babies born normally, thus babies with low body weight will be susceptible to diseases, especially infectious diseases. As a result of these problems, infants with low birth weight are at risk of malnutrition (Komalasari et al., 2020). Babies born normally and babies with less birth weight can experience stunting if they get less nutritional intake and are accompanied by other comorbidities (Widya, 2019).

Conclusion

Based on the results of the study showed that there was no relationship between maternal education and the incidence of stunting in toddlers. There is a relationship between exclusive breastfeeding and the incidence of stunting in toddlers, as there is a relationship between low birth weight and the incidence of stunting in toddlers. For further researchers, it is recommended to find out other variables related to stunting in toddlers and for future researchers it is also expected to be able to make it a reference material for future research using different designs.

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