



## THE RELATIONSHIP BETWEEN GADGET ADDICTION AND BODY MASS INDEX WITH ANEMIA IN TEENAGE GIRLS

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### ABSTRACT

Anemia is one of the nutritional problems that often occurs in teenagers, especially teenage girls. At this time teenage girls have also begun to depend on gadgets which have an impact on lack of physical activity, sleep pattern disorders and often miss time to eat because they forget. This study aims to determine the relationship between gadget addiction and body mass index (BMI) with the incidence of anemia in teenage girls at junior high schools in Teunom District Aceh Jaya Regency. This study is an analytical quantitative research using a cross-sectional approach. The sampling technique is a total sampling of 340 female adolescents, data collection techniques are carried out through the SAS google form and anthropometric examination. Data analysis uses chi-square and logistic regression. The results of this study showed that the variables that were most significantly related to the incidence of anemia in teenage girls included: teenage age (OR=1.5; 95%CI=1.14-2.07; p=0.004), maternal education (OR=3.09; 95%CI=1.86-5.14; p=0.000), gadget addiction (OR=3.09; 95%CI=1.15-8.32; p=0.025) and body mass index (OR=2.20; 95%CI=1.13-4.25; p=0.019).

Keywords: adolescent girls; anemia; BMI; smartphone addiction; teenage girls

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## INTRODUCTION

Anemia is problem global health must noticed especially in developing countries like Indonesia, it is estimated one third than the world's population suffers from anemia and teenage girls is one of the vulnerable groups For suffer from anemia. Teenage girls have a higher risk of developing anemia than boys because they experience a menstrual cycle every month and they also tend to pay more attention to their ideal body shape, so they often limit their food intake and go on diets just to maintain their appearance (Fadhylah et al, 2019). Prevalence of anemia in the world ranges from 40-88%, 25-40% teenage girls experiencing mild and severe anemia, then in Indonesia amount residents aged 10-19 years prevalence of anemia is 26.2% consisting of 50.9% male and 49.1 % female . (Kemenkes R1, 2019) Based on survey data demographics and health Indonesia year 2017 prevalence anemia on teenager with range ages 5–12 years as much as 26%, in women with range ages 13 – 18 years as much as 23 %, prevalence of anemia in men more low compared to with Woman that is as much as 17% (Apriyanti et al, 2019).

The emergence of anemia in teenagers can due to intake pattern eating the wrong thing for example eat no regular and irregular balanced. This is in line with research at State Senior High School 5 in Bukit Tinggi City, which found several main factors that cause anemia in teenage girls, including teenager lifestyle factors, lack of teenager knowledge about anemia, lack of nutritious food intake, irregular rest patterns, lack of physical activity and excessive use of gadgets (Oktavianis et al, 2023).

Addicted gadget no relate direct with occurrence anemia in teenagers , will but if use of gadgets excessive will cause disturbance pattern eating , pattern rest and activity physique reduced , things this can affecting teenage health in a way overall including balance necessary nutrients For prevent anemia for example teenagers who use gadgets for too long tend to not enough do activity physical and maybe forget For eat in the end can cause Health problems including risky the occurrence of anemia (Santika, 2024).

Community Health Center Teunom is one of the community health center under There are 9 schools under the auspices of the Aceh Jaya Health Service level continuation consisting of from 5 schools level Junior High School equal And 3 school level Senior High School equal Which located in village normal there are 5 schools , villages remote 2 schools and very remote 2 schools , Currently, the Teunom Community Health Center also fully supports the provision of iron tablets to teenage girls with its innovative program, namely Rehat Gesit, where teenagers are the main target in solving the health problem of anemia in teenagers. Objective study this aim for analyze connection addicted gadgets and Body Mass Index (BMI) with the incidence of anemia in teenage girls at school junior high school level Teunom Aceh Jaya Regency.

**METHOD**

The research design used is quantitative nature analytic with cross-sectional approach. Study This implemented in six school junior high school level in the sub-district Teunom Regency Aceh Jaya in May – June 2024. Population study is all over teenage girls at six school junior high school level in the sub-district Teunom Aceh Jaya Regency as many as 358 people with amount sample research that meets the requirements criteria inclusion as many as 340 people. Retrieval technique sample in study This is with using total sampling. Criteria inclusion in study This is all teenage girl at school junior high school level in the sub-district Teunom Aceh Jaya Regency, meanwhile criteria exclusion is teenager the princess who is menstruation and teenage girls who is not present on moment research. data collection techniques using questionnaires that have been adopted from Nisa et al (2020), measurement for gadget addiction is done with use questionnaire Smartphone Addictin Scale (SAS) and anthropometry. Data analysis using chi-square test . multivariate using regression test logistics done with using STATA.

**RESULT**

Table 1.  
Analysis univariate

	Variables	f	%	Mean	(SD)	Min-Max
Incidence (mg/dl)	No Anemia	255	75	12.73	1.19	9.2-16.7
	Anemia	85	25			
Age Teenagers (years)	13-14 Year	212	62.35	14.12	0.80	13-16
	15-16 Year	128	37.65			
Mother's Education	High School/College	198	58.24			
	Elementary/Middle School	142	41.76			
Work	Permanent work	72	21.18			
	Non-Permanent Work	268	78.82			
Income Family	≥ UMP	109	32.06			
	< UMP	231	67.94			
Gadget Addiction	Light	33	9.71	101	19.52	33-142
	Currently	252	74.12			
	Heavy	55	16.18			
Body Mass Index (BMI)	Normal	197	57.94	20.36	2.87	14.2-35.7
	Underweight	89	26.18			
	Overweight	54	15.88			

Table 1 shows that out of 340 teenage girls, there are more teenager girls in the category not anemic, namely 75% with an average value of 12.73 with standard deviation of 1.19 and score value 9.2 – 16.7. Teenagers who aged 13-14 years by 62.35% with average value of 14.12 with standard deviation 0.80. Teenage gilrs with education Mother high school/university level of

58.24% , respondents with Mother work No remains 78.82%, teenage girls with income family <UMP is 67.94%, gadget addiction is in the category currently namely 74.12% with average value of 101 with standard deviation 19.52 and score values 33-142 and teenage girls in the normal BMI category , namely 57.94% with average value of 20.36 with standard deviatio.

Table 2.  
Analysis bivariate

Measurement Results	Variables Anemia Incident					OR	95%CI	P-Value
	No Anemia		Anemia					
	f	%	f	%				
Age Teenager								
13-14 Years	165	77.83	47	22.17				
15-16 Years	90	70.31	38	29.69	1.54	1.14-2.07	0.004	
Mother's Education								
High School-High School	166	83.84	32	16.16				
Elementary-Middle School	89	62.68	53	37.32	3.09	1.86-5.14	0.000	
Work								
Permanent work	55	76.39	17	23.61				
Work Not fixed	200	76.63	68	25.37	1.09	0.59-2.02	0.758	
Income Family								
≥ UMP	83	76.15	26	23.85				
< UMP	172	74.46	59	25.54	1.09	0.64-1.86	0.7366	
Gadget Addiction								
Light	26	78.79	7	21.21				0.001
Currently	199	78.97	53	21.03	0.99	0.41-2.40	0.981	
Heavy	30	54.55	25	45.45	3.09	1.15-8.32	0.025	
Body Mass Index								
Normal	158	80.20	39	19.80				0.029
Underweight	62	69.66	27	30.34	1.76	0.99-3.12	0.052	
Overweigh	35	64.81	19	35.19	2.20	1.13-4.25	0.019	

Table 2 shows that the incidence of anemia is higher in teenagers aged 15-16 years, namely (29.69%) compared to those aged 13-14 years (22.17%). The incidence of anemia is higher in teenagers with mothers' education at elementary school - junior high school level (37.32%) compared to mothers with high school - university education (16.16%). The incidence of anemia is higher in teenagers with parental income (both father and mother) < UMP (25.54%) compared to those with parental income ≥ UMP (23.85%). The incidence of anemia is higher in teenagers with severe gadget addiction (45.45%) compared to addicted moderate (21.03%) and mild (21.21%). The incidence of anemia is higher in teenagers with overweight BMI (35.19%) compared to underweight (30.34%) and normal (19.80%). From the results of statistical tests show that There is connection age adolescents (OR=1.5; p=0.004), mother's education (OR=3.09; p=0.000), gadget addiction (OR=3.09; p=0.025) and body mass index (OR=2.20; p=0.019) with the incidence of anemia in teenage girl and addicted gadget level heavy is factor which most at risk.

Table 3 shows that the results of the multivariate test of model 1 are visible variables education the most dominant mother relate with anemia incidence, teenage girls who is educated Mother elementary-junior high school level 3.13 times risk for experience incident anemia compared to with education Mother level High School- College and Age teenagers. statistical test results shows that Pseudo R2 is 0.0730, which means on variables respondents with education Mother level Elementary-Middle School age teenager capable predict 7.3 % incident anemia on teenage girl. In model 2 it shows variables Severe gadget addiction more dominant For experience the incidence of anemia in teenage girl , teenage girl with gadget addiction / SAS is 4.14 times more severe risky experiencing anemia compared to with Addicted light , when variables Which other constant (AOR = 4.14 ; 95%CI (0.66 - 26.0); p= 0.129), statistical test results shows that Pseudo R2 is 0.0981, meaning that the component characteristics This capable predict 9.8% rate the incidence of anemia in teenage girl.

In model 3 it shows heavy gadget addiction more dominant for experience the incidence of anemia in teenage girl , teenage girl with gadget addiction level fallow 4.12 time more risky experience

anemia compared to with Addicted light , when other variables were constant (AOR = 4.12; 95%CI = 0.65-26.1); p= 0.133), statistical test results shows that Pseudo R2 is 0.1193, meaning that the component variables This capable predict 12% rate the incidence of anemia in teenage girls. In the 4 level gadget addiction model also heavier dominant For experience anemia on teenage girl , teenage girl with addicted gadget level 4.32 times heavier risky experiencing anemia compared to with addicted light , when other variables were constant (AOR=4.32; 95%CI=0.67-27.8; p=0.123 statistical test results show The Pseudo R2 value is 0.1212, which means that the variable This capable predict 12% rate the incidence of anemia in teenage girl.

Table 3.

**Analysis multivariate**

Variables	Model 1		Model 2		Model 3		Model 4		
	AOR	95%CI	p-value	AOR	p-value	AOR	p-value	AOR	p-value
Age Teenager									
13-14 Year	1.56		0.005	1.42	0.051	1.43	0.048	1.43	0.048
15-16 Year	(1.15-2.12)			(0.99-2.03)		(1.00-2.04)		(1.00-2.04)	
Mother's Education									
High School-High School Elementary	3.13		0.000	3.35	0.000	3.44	0.000	3.49	0.000
School-Middle School	(1.87-5.24)			(1.92-5.83)		(1.99-5.93)		(1.97-6.16)	
Mother's Job									
Permanent work				0.81				0.75	
Job No Still				(0.41-1.60)	0.549			(0.37-1.50)	0.416
Income Family									
≥ Minimum Wage				1.13				1.16	
< Minimum Wage				(0.61-2.11)	0.693			(0.62-2.19)	0.640
Gadget Addiction									
Light				1.15	0.835	1.13	0.850	1.13	0.849
Currently				(0.31-4.18)		(0.31-4-05)		(0.31-4.14)	
Heavy				4.14	0.129	4.12	0.133	4.32	0.123
				(0.66-26.0)		(0.65-26.1)		(0.67-27.8)	
BMI									
Normal Underweight						2.74	0.037	2.80	0.035
						(1.06-7.08)		(1.07-7.30)	
Overweight						1.64	0.347	1.65	0.344
						(0.58-4.60)		(0.58-4.68)	
Pseudo R2	0.0730			0.0981		0.1193		0.1212	

## DISCUSSION

### Connection Age Teenager with Incident Anemia in Teenagers

Study show that No There is significant relationship between age teenager with anemia status in teenage girls. 6 Things in line with study that at the age of risky (35 years) likely risky get anemia compared to with Mother pregnant at the age of No risky Because woman pregnant who has age risky can harm health Mother and growth fetus, proven in a way statistics state There is connection age Mother pregnant with incidence of anemia (Astrian, 2017). Age between 20-35 years is the safest period for pregnancy and giving birth, because of age the function tool reproduction in optimal condition. In the group the not enough risky complications pregnancy as well as own reproduction healthy. This is related with condition biological and psychological from pregnant women (Silalahi et al, 2018).

Age in teenagers is age growth children towards the maturity process man adults. At the age of teenagers, it happens changes in physical, biological and psychological someone and it happens in a way keep going continuously during age teenagers. Imbalance between intake and needs nutrition resulting in the occurrence of problem nutrition, good nutrition not enough and nutrition more so that can influential to incidence of anemia (Nuradhiani, 2017). Researchers assume during teenagers, there is Lots change physiological, such as growth rapid and puberty, which affects need substance iron. Relationship between age teenagers and the incidence of anemia is greatly influenced by nutritional intake nutrition, because period this important or growth physical, physiological, and psychological. Teenagers experience change significant that can affect nutritional

status and are at risk against anemia. At the age of 15-16 years, teenage girls start active menstruation, often using gadgets, and maintaining form body.

### **Connection Education Mother with Incident Anemia on Teenager**

Mother's education is a key asset in supporting the family's economy, playing a role in preparing family meals, and in caring for and nurturing children. Families with higher levels of education are more likely to receive health information, particularly on nutrition, which can broaden their knowledge and apply it to their daily lives. A higher level of education means a person's ability to access and absorb information to meet their nutritional needs is enhanced (Supriasa, 2017). Anemia tends to occur in population groups with low levels of education, for various reasons. In general, low-educated population groups have less access to information about anemia and its management, less understanding of the effects of anemia, less ability to choose nutritious foods, especially those containing high iron, and less ability to utilize available health services. On the other hand, those with higher education have sufficient knowledge and access to information about various things, including health problems, especially nutritional problems (anemia) and how to overcome them (Prawita, 2020).

A mother with a low level of education pays less attention to the food her child consumes and less attention to fulfilling balanced nutritional needs. The higher the level of education, the easier it is for her to accept new things and adapt to them. In theory, maternal education can be related to the incidence of anemia. Maternal education is a very important factor. The mother's level of education can directly and indirectly determine the knowledge and skills in determining the family menu, which in turn will affect the family's health status, including the incidence of anemia in her child. Mothers with low levels of education also do not allow their children to consume iron-containing tablets due to a lack of awareness of their benefits. (Nurbaya, 2019)

### **Connection Mother's Work with the incidence of anemia in Teenager**

The results of this study are not in line with research which states that parental occupation is related to the occurrence of anemia in teenage girls. This is because parents who work as civil servants or employees have sufficient or more income to provide nutritious and balanced food so that none of the teenagers suffer from anemia. (Farinendya. A. Muniroh. L.& Buanasita. A. J. A. N., 2019) Researchers assume that maternal occupation has no significant relationship with the incidence of anemia in teenagers. This is because maternal occupation does not directly influence the incidence of anemia, which is more determined by other factors such as eating habits, physical activity, and nutritional status of adolescents. Teenagers' diets and nutritional intake are also often more influenced by personal preferences and overall family eating habits, rather than solely by the mother's occupation. For example, even if the mother works, teenagers may still get adequate food intake if there is a good family support system.

### **Connection Income Family with Incident Anemia on Teenager**

Father's education and occupation Father no relate in a way significant, matter This can caused by the father's education variable does not yet definitively describe the father's knowledge about nutrition and health and father's work variables observed in various types of work in this study do not clearly describe the level of family income, family income has the potential to influence food fulfillment family (Nadiyah et al, 2022). This research contradicts research that states that female students with family incomes above the minimum wage (UMK) have an easier time meeting all their basic and secondary needs. A high family income can provide good nutrition for their family members, which can influence nutrition and the availability of a variety of foods, which can affect iron intake. Conversely, a low family income can prevent adequate food supply for family members, which can affect adolescents' nutrient intake, resulting in iron deficiency (Listiana, 2016).

Low iron intake into the body that comes from iron nutritional intake from daily food is one of the causes of anemia. Teenage girls who have parents with high incomes are easier to get all their

needs, both primary and secondary needs, and with a high income, parents can provide a variety of nutritious foods for their children, in contrast to teenagers who have parents with low incomes, they have to accept the food given by their parents because they cannot ask for more due to limited parental income.

Researchers assume that the incidence of anemia is higher in adolescents with parental income  $<$  UMP compared to adolescents with parents who earn  $\geq$  UMP. This is because adolescents who have parents with low incomes cannot provide good access to food and adequate nutritional intake to their children so that the child is more at risk of experiencing anemia. This can cause iron deficiency which contributes to anemia, and low-income parents often have unhealthy habits because they cannot provide a supportive environment for healthy growth and development for their adolescents.

### **Connection Gadget Addiction with the incidence of anemia in Teenager**

Gadget own impact negative for teenager if used in a way excessive, many teenage girls use gadgets for activities such as studying and socializing with friends on social media, therefore teenagers spend their time playing with gadgets at home. (Oktavianis. O. Sari. N. W. Nurhayati. N. & Yuniliza.Y, 2023) Frequently teenager interact with gadgets make it often late even forget for possible meal impact on hemoglobin levels . (Ummah et al, 2024).

Some teenagers are also more choose buy internet quota compared buy food in accordance with need his body which results in a lack of frequency consumption food. There are advertisements product food fast serving or style life latest in the media can influence pattern consumption or even style life in a way general. Advertisement through media mass will support teenager in election food. Children and teenagers tend Lots consume advertised food, and food the contains salt, sugar, fat, calories, and drinks highly carbonated. Researchers assume that Teenagers who experience heavy gadget addiction own connection significant with problem health . They often use gadgets more from 4 hours a day for access information and social media, so that ignore time eat and often late sleep . As a resul, they often feel dizzy, difficult concentrate, and easy tired, which can bother health and reduce intake nutrition, risk causes anemia.

### **Connection Body Mass Index (BMI) with Incident Anemia on Teenager**

Study This in line with study show majority respondents with index mass thin body (BMI) suffers from anemia, while respondents with normal BMI in part big No experiencing anemia. Respondents with BMI fat is also the majority No suffering from anemia. The results of the analysis show existence connection between index mass body and the incidence of anemia in teenage girls. (Zuiatn, 2022). Index mass body (BMI) or Body Mass Index (BMI) is mark Which taken from calculation heavy body (BB) in kilo grams And tall body (TB) in meters. Body Mass Index (BMI) is alternative For action body fat measurement because cheap as well as method screening category weight loss is easy to do . (Supu et al, 2022).

Researchers assume teenager marked with activity more physical tall compared to childhood, which requires more Lots energy . Teenagers the princess also lost substance iron moment menstruatio, so that important for they for consume food that fulfills need calories and nutrition, including carbohydrates, fat, protein, vitamins, minerals, fiber, and water, for prevent anemia. Teenagers with Body Mass Index (BMI) thin is more prone to against anemia because lost substance iron and activity tall physique , while intake substance iron and nutrition other tend more low.

## **CONCLUSION**

Gadget addiction can impact negative on health physical, especially anemia in teenage girls. Research show that excessive use of gadgets relate with anemia due to reduce activity physical and affect pattern eating. Lifestyle no healthy, including lack of activity physical and habits poor eating , increasing risk of anemia. In addition, high BMI or overweight is also related with anemia due to

lack of physical activity and pattern eat something that is not balanced, which results in lack of intake nutrition For hemoglobin production.

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