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Analysis Factor Related with Incidence of Adolescents Obesity in Bulukumba, South Sulawesi, Indonesia

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Abstract

Obesity is a problem that can occur in children to adults, including adolescents. The purpose of this study was to determine the factors associated with the incidence of obesity in adolescents. This research was conducted in junior high school in Bulukumba district, South Sulawesi in 2016. The sample was 118 people, the research design was observational with cross sectional approach. The results showed that physical activity factors (p = 0.000), energy intake (p = 0.000), carbohydrate intake (p = 0.041), father's education (p = 0.003), mother's education (p = 0.002) 0.035) and a parent's history of obesity (p = 0.041) associated with the incidence of obesity in adolescents. While the gender factor (p = 0.269), structure of family (p = 0.689) and family health history (p = 0.171) were not related to the incidence of obesity. Conclusion: energy intake is the factor most associated with the incidence of obesity in adolescents. It is recommended for teenagers to adopt a healthy lifestyle.

Keywords: obesity; risk factor; adolesce.

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1. Introduction

Obesity is a state of overweight exceeding 20% of normal body weight. Obesity is characterized by excessive accumulation in various parts of the body, especially in the waist, pelvis, and upper arms [1]. 10-30% of adults with obesity have been obese since adolescence [2]. Obesity is caused by the interaction between genetic factors and environmental factors. Genetic factors or offspring of parents who are difficult to avoid, the father or the mother has excess weight, it can be passed on to the child. Environmental factors include activities, lifestyle, socio-economic and nutritional eating behaviors such as eating habits of children who likes to fast food which generally contain fat and soft drinks contain high sugar and solid foods too Early childhood [3, 4,5] Obesity prevalence in Indonesia based on Ministry of Health data year 2013, prevalence of nutritional status (IMT / U) of 5-12 year old child of 18.8% consisting of 10, 8% overweight and 8% obesity whereas in adolescents aged 13-15 years in Indonesia 10.8%, consisting of 8.3 percent fat and 2.5 percent very obese (Obesity) [6]. This study aims to determine the risk factors associated with the incidence of overweight and obesity in adolescents.

2. Method of study

The type of this research is observational research with cross sectional design. This research was conducted on 4 (four) junior high schools in bulukumba district of South Sulawesi Indonesia. The population in this study is adolescents who age 13-16 years. The number of samples in this study was 118 consisting of 59 people who are obese and 59 people who are not obese.

The sampling technique used is Purposive sampling. Data collected from children include BMI, gender, physical activity, and energy and carbohydrate intake. While the parents include education, family income, structure of family, history of obesity parents and family health history. Weight measurements using 150 Kg stepped scales with 0.1 Kg of footlessness, whereas the height measurement using microtoise scale 200 cm with 0.1 cm accuracy, then determine the BMI of children by WHO Antrho Plus software.

Biodata of children and family using biographical form include: parent's education, family's income, overweight parents history or obesity, structure of family and family health history. Physical activity of children is assessed by using Physical Activity Questionnaire for Adolescents (PAQ-A) sourced from Kowalski and his colleagues 2004. Energy and carbohydrate intake was measured using a 2x24 hour Food Recall and analyzed using the 2007 nutrisurvey software.

Parental education variables, family income, overweight parents' history or obesity, structure of family and family health history were measured using a form sheet. The result of this research is processed by using SPSS program. Data analysis included univariate, bivariate and multivariate analysis. Univariate analysis to describe the frequency distribution of each variable. Bivariate analysis using chi square test and multivariate analysis using Logistic Regression test. The degree of confidence (CI) is 95% and the significance value of α is 0.05

3. Result

3.1. Univariate Analysis

Table 1: Distribution of frequency characteristics of respondents

Variable	f	%	Variable	f	%
BMI			Mother's Education		
Obesity	59	50.0	High	51	43.2
Non Obesity	59	50.0	Low	67	56.8
Gender			Family's Income		
Male	56	47.5	High	75	63.6
Female	62	52.5	Low	43	36.4
Physical activity			Stucture of Family		
High	33	28.0	Core Family	82	69.5
Low	85	72.0	Big Family	36	30.5
Energy Intake			Parents Obesity History		
More	69	58.5	Have Risk	51	43.2
Enough	49	41.5	Have No Risk	67	56.8
Carbohydrate Intake			Family's Health History		
More	51	43.2	Have Risk	79	66.9
Enough	67	56.8	Have No Risk	39	33.1
Father's education					
High	54	45.8			
Low	64	54.2			

Result of study shows the results, Of obese respondents were 59 people (50%), most of the female respondents (52.5%), most of the low physical activity (72%), most of the more energy intake (58.5%), most of the enough Carbohydrate intake (56.8%), most of the low fahter's education (54.2%), most of the low mother's education (56.8%), most of the high family income (63.6), most of the core family structure (69.5%), Family obesity is have no risk (56.8%) and most have a family history of have risk (66.9%) (Table 1).

3.2. Bivariate analysis

Result of study in Table 2 shows that obese people are greater in female sex (57.6%), low physical activity (100%), more energy intake (83.1%), more carbohydrate intake (52.5%), high father's education (67.8%), high mother's education (71.2%), history of obese parents have risk (52 %) and family health history have risk (72.9%). Non-obese were greater in male sex (52.5%), high physical activity (55.9%), enough energy intake (66.1%), enough carbohydrate intake (66.1%), high father's education (59.3%), Low mother's education (61.0%), high family income (54.2%), core structure of family (67.8%), history of obese parents have no risk (66.1%) and family health history have risk (61.0%). Based on chi square analysis result showed that physical activity factor ($p = 0.000$), energy intake ($p = 0.000$), carbohydrate intake ($p = 0.041$), father's education ($p = 0.003$), mother's education ($p = 0.002$) Family's income ($p = 0.035$) and a history of parent's obesity ($p = 0.041$)

associated with obesity in adolescents. While the child sex factor (p = 0.269), structure of family (p = 0.689) and family health history (p = 0.171) were not related to the incidence of obesity.

Table 2: The Relationship of Variable Obesity In Adolescent

Variable	Obesity		Non Obesity		p value	OR	CI 95%	
	n	%	n	%			Lower	Upper
Gender					0.269	0.664	0.321	1.373
Male	25	42.4	31	52.5				
Female	34	57.6	28	47.5				
Physical activity					0.000*	0.306	0.222	0.421
High	59	100.0	26	44.1				
Low	0	0.0	33	55.9				
Energy Intake					0.000*	0.105	0.044	0.249
More	49	83.1	20	33.9				
Enough	10	16.9	39	66.1				
Carbohydrate Intake					0.041*	0.463	0.22	0.974
More	31	52.5	20	33.9				
Enough	28	47.5	39	66.1				
Father's education					0.003*	0.326	0.153	0.692
High	40	67.8	24	40.7				
Low	19	32.2	35	59.3				
Mother's Education					0.002*	0.298	0.139	0.639
High	42	71.2	36	61.0				
Low	17	28.8	23	39.0				
Family's Income					0.035*	2.268	1.051	4.894
High	43	72.9	32	54.2				
Low	16	27.1	27	45.8				
Stucture of Family					0.689	1.174	0.535	2.572
Core Family	42	71.2	40	67.8				
Big Family	17	28.8	19	32.2				
Parents Obesity History					0.041*	2.159	1.027	4.537
Have Risk	31	52.5	20	33.9				
Have No Risk	28	47.5	39	66.1				
Family's Health History					0.171	1.717	0.79	3.733
Have Risk	43	72.9	36	61.0				
Have No Risk	16	27.1	23	39.0				

3.3. Multivariate Analysis

Table 3: Multivariate Analysis of the Obesity Adolescents

Variable	B	p value	OR	CI 95%	
				Lower	Upper
Physical activity	-22.1	0.997	0.000	0.000	
Energy Intake	2.93	0.000	18.856	4.678	76.007
Carbohydrate Intake	-1.09	0.102	0.338	0.092	1.239
Father's Education	1.639	0.028	0.338	0.092	1.239
Mother's Education	1.085	0.13	2.959	0.728	12.034
Family's Income	-1.72	0.026	0.179	0.039	0.813
Parents Obesity History	-0.71	0.304	0.491	0.127	1.906

Multivariate analysis using logistic regression test using to determine the strength of variable relationship with the incidence of obesity from the largest to the smallest is the energy intake (OR = 18.856), mother's education (OR = 2.959), parents obesity history (OR = 0.491), carbohydrate intake (OR = 0.338), father's education (OR = 0.338), family's income (OR = 0.179) and physical activity (OR = 0.000).

4. Discussion

Based on the Odds Ratio analysis on physical activity variables OR 0.306 with 95% CI (0.321-1.373), it means that adolescents with low physical activity have a probability 0.306 times obesity compared with adolescents who have high physical activity. In other words, the probability of adolescents with low physical activity to be obese is 23.4%. Environmental factors include nutritionally related lifestyles and activities. Obesity is not only caused by most intake in terms of carbohydrates, fats, and proteins, but also because of a lack of physical activity [5]. Physical activity in children affects the occurrence of Obesity. It used to be a lot of children's play is a physical game that requires children to run, jump, or other movements, but is now replaced with children's games that do not play as electronic games, computers, internet, or television is enough to do just sitting in front of him must move. Based on the Odds Ratio analysis on variable energy intake OR 0.105 with 95% CI (0.044-0.249), it means that adolescents with more energy intake have a likelihood of 0.105 times obesity compared with adolescents who have sufficient energy intake. In other words, the probability of adolescents who have high energy intake for obesity is 9.5%. Based on Odds Ratio analysis on carbohydrate intake variable OR 0.463 with 95% CI (0.220-0.974), meaning that adolescents with more carbohydrate intake have a probability 0.463 times obesity compared with adolescents who have sufficient carbohydrate intake. In other words, the probability of adolescents who have high carbohydrate intake for obesity is 31.6%. The high intake of energy and carbohydrates may be caused by the consumption of fast food that has become a common practice both in big cities and small in Indonesia. In general, the composition of fast food type of food is high energy, fat, salt but low in fiber. In the nutritional aspect of high-calorie diet and high cholesterol along with eating behaviors

such as eating habits of children who likes to fast food in general contain fat and soft drinks contain high levels of sugar and solid foods too early in infancy may increase the risk of Obesity [7,3]. The consumption of fast food and soft drinks can lead to overweight and obesity [7, 8]. The same is also revealed in the study Duffey and his colleagues [9] suggests that fast food and restaurant food consumption The differential effect is cross-sectional on body mass index (BMI). Increased availability of fast food and access to television entertainment may contribute to increasing the incidence of Obesity in the United States, time spent watching television and the amount of soft drinks consumed significantly associated with obesity [9]. Based on the Odds Ratio analysis on the father education variable the value of OR 0.326 with 95% CI (0.153-0.692), it means that adolescents with low father's education have a probability 0.326 times obese than teenagers who have high father's education. In other words, the probability of adolescents who have low dad education for obesity is 24.6%. Based on the Odds Ratio analysis on the mother education variable the value of OR 0.298 with 95% CI (0.139-0.639), means that adolescents with low mother's education have a probability 0.298 times obesity compared with adolescents who have high mother's education. In other words, the probability of adolescents who have low mother's education for obesity is 23%. Education is closely related to knowledge. Parents who have higher education will have an impact on knowledge, especially mothers in preparing balanced nutrition to the family. Knowledge is part of the area of behavior, but it does not yet ensure that a person with sufficient knowledge possesses the same behavior [10]. Knowledge of obesity, both concerning the cause, and consequently need to know the crowd, especially for teenagers to inhibit the increase in the incidence of excess body weight and its complications. This is in line with qualitative research conducted in Tehran said that teenagers in the country have a good level of knowledge on nutrients that can affect the perception of food, which will ultimately also affect eating behavior. Knowledge is obtained either from parents, mass media or from school [11]. Based on the Odds Ratio analysis on the family's income variable the value of OR 2.268 with 95% CI (1,051-4,894), it means that adolescents with high family's income have 2.268 times more likely to be obese than teenagers with low family's income. In other words, the probability of adolescents who have high family's income for obesity is 69.4%. Feed intake greatly affects the nutritional status of children. When the intake of eating more children will experience excess energy and carbohydrates that can cause more nutrients. Food fulfillment efforts are influenced by family income. Revenue is needed to meet the nutritional needs of children. If the family has a high income, will be able to prepare food according to the needs of growth and development of children, the nutritional status of children will be better. The higher the family income the more diverse consumption of food provided, thus affecting the child's intake. Based on the Odds Ratio analysis on the parental obesity history variable the value of OR 2.159 with 95% CI (1.027-4.537), it means that adolescents with a history of obese parents have risk of having 2.159 more likely to be obese than teenagers who have a history of obese have no risk. In other words, the probability of adolescents who have a history of obesity are at risk for obesity is 68.3%. Genetic factors or offspring of the elderly are difficult to avoid, if the father or mother is overweight, it can also be passed on to the child. Research in America shows that obesity at age 1-2 years with normal parents, about 8% becomes obese adults, are obese at age 10-14 years with one obese parents, 79% will become adult obesity [12].

5. Conclusion

Obesity is associated with lifestyle factors and genetic factors. It is important to manage the lifestyle, especially

the pattern of dietary intake and physical activity to prevent obesity and improve the quality of life.

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Competing Interest

The authors declare that they have no competing interests.

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