

# Relationship of Diet with Overweight Events in Disabled Youth

Titiek Hidayati

Dept. of Community and Family Medicine  
Universitas Muhammadiyah Yogyakarta  
Yogyakarta, Indonesia

Erviana

Dept. of Community and Family Medicine  
Universitas Muhammadiyah Yogyakarta  
Yogyakarta, Indonesia  
erviana\_evvi@yahoo.com

Akrom

Dept. of Pharmacology and Clinical Pharmacy  
Universitas Ahmad Dahlan  
Yogyakarta, Indonesia  
akrom@pharm.uad.ac.id

Indri Nurasa

Dept. of Community and Family Medicine  
Universitas Muhammadiyah Yogyakarta  
Yogyakarta, Indonesia  
Muslimah.mushroom@yahoo.co.id

**Abstract**—More than one billion people are estimated to live with various types of disabilities. There are around 15% of the world population, namely 110 million (2.2%) and 190 million (3.8%) people aged 15 years and over have difficulties in performing their functions. Problems that concern persons with disabilities are among them, overweight. Overweight is currently a significant health problem in advanced societies, its prevalence is increasing worldwide, and it is a high-risk factor for non-communicable diseases. **Objective:** The general aim in this study was to determine the relationship of diet, physical activity and parenting with the incidence of overweight in adolescents with disabilities. This type of research is observational analytic, with a case-control design. The sampling technique used in non-probability sampling was using purposive sampling technique. The sample used was 104 consisting of 52 case groups and 52 control groups. **Results:** The results of the study showed that the majority of the research subjects were early adolescents (70.2%), female sex (54.8%); the most types of disabilities were mental disabilities. The results of the analysis using the chi-square test showed that there was a significant relationship between diet and physical activity with the incidence of overweight in adolescents with disabilities with a value of  $p < 0.05$ . The odds ratio of the diet to overweight is 12,267 and  $p < 0.05$ . There is a relationship between diet and physical activity with the prevalence of overweight in adolescents with disabilities in Special schools for people with disabilities in West Sulawesi Province where dietary patterns tend to be excessive and physical activity tends to be mild.

**Keywords**—overweight, diet, disability, case-control

## I. INTRODUCTION

International Classification of Functioning, Disability, and Health (ICF) defines disability as a general term for disruption, restrictions on activities, and restrictions on participation [1]. There are around 15% of the world population, namely 110 million (2.2%) and 190 million (3.8%) people aged 15 years and over have difficulties in performing their functions. One health problem that can occur in people with disabilities is overweight. Obesity is currently a significant health problem in advanced societies, its prevalence is increasing worldwide, and it is a high-risk factor for non-communicable diseases [2].

Overweight is a condition where there is an accumulation of excessive fat in the body. In general, overweight is a risk factor for the occurrence of various types of degenerative diseases, such as diabetes mellitus, hypertension, coronary heart disease, and multiple types of cancer [3]. Overweight prevalence, according to WHO data (2016) is about 18% of children and adolescents aged 5-19 years and obese. In Indonesia, the prevalence of overweight in adolescents aged 13-18 years is 18.1%, consisting of 14.0% obese and 4.1% obese.

Overweight is not only related to health problems that can cause diabetes, hypertension, cardiovascular disease, and premature death but also associated with psychosocial issues and socio-economic burdens. The development of an overweight trend will create an economic difficulty on society [4]. Overweight in adolescents and adults with disabilities are thought to be influenced by various factors including poverty, physical activity, alcohol, dietary habits, living environment, drug use, gender, age, parental and genetic education [5]-[9]. The incidence of overweight in disabled youth is unclear, so research needs to be done.

## II. METHOD

### A. Research Design

The research method used is an analytic observational method, with a case-control design. The sampling technique used is nonprobability sampling using purposive sampling technique. The Ethics committee of the Faculty of Medicine and Health Sciences of the University of Muhammadiyah Yogyakarta reviewed the research protocol and approved a letter of ethical clearance.

### B. Subject Study

The research was conducted in SLB (extraordinary school) student in West Sulawesi Province. Sampling was carried out in 14 SLBs of 23 SLB in West Sulawesi Province. The study subjects were 104 adolescents with disabilities, overweight or non-overweight. This study used inclusion criteria consisting of 10-19 years of age, cooperative and willing to become respondents. The exclusion criteria are parents of the student, who are not ready to be respondents and respondents who

experience physical and psychological discomfort. The sampling technique used was nonprobability sampling using purposive sampling technique. The number of respondents was 104 consisting of 52 case groups and 52 control groups.

### C. Instruments and Data Collection

The measuring instrument used in this study is a questionnaire consisting of the Indonesian version of the Food Frequency Questionnaire (FFQ) questionnaire to measure diet. The Indonesian version of the feeding frequency questionnaire is used for (i) estimating nutritional intake and (ii) and estimating the level of nutritional adequacy. Scales and height meters are used to measure body mass index. Data collection is carried out by trained professionals.

### D. Data Analysis

Univariate statistics are used to describe the characteristics of respondents and consumption patterns. Bivariate statistics were used to determine the relationship of sex, age, type of disability, and diet status with the incidence of overweight (odds ratio) using the chi-square test. The multivariate analysis is used to determine the factors that influence the prevalence of overweight in young people with disabilities

## III. RESULTS AND DISCUSSION

We conducted the study by measuring height and body weight first to determine BMI in students in several specialized schools for people with disabilities of West Sulawesi Province aged 10-19 years. One hundred four students were the target sample based on the inclusion and exclusion criteria that had been obtained. A total of 52 overweight students and 52 normal weight students.

TABLE I. CHARACTERISTICS OF OVERWEIGHT AND NORMAL WEIGHT GROUPS BASED ON GENDER, AGE, DISABILITY TYPE, DIET, PHYSICAL ACTIVITY, AND PARENTING PARENTS IN SPECIAL SCHOOLS FOR PEOPLE WITH DISABILITIES OF WEST SULAWESI PROVINCE IN 2019.

Variable	Groups		
	Overweight	Normal weight	Total (%)
	n (%)	n (%)	
Age group			
Early Youth (10-16 years)	29 (55,8)	44 (84,6)	73 (70,2)
Late adolescence (17-25 years)	23 (44,2)	8 (15,4)	31 (29,8)
Average of age	16 year	14 year	15 year
Total	52 (100)	52 (100)	104 (100)
Sex			
Female	29 (55,8)	28 (53,8)	57 (54,8)
Male	23 (44,2)	24 (46,2)	47 (45,2)
Total	52 (100)	52 (100)	104 (100)
Disability types			
Mental disability	42 (53,8)	36 (46,2)	78 (75)
Physical disability	10 (38,5)	16 (61,5)	26 (25)
total	52 (100)	52 (100)	104 (100)
Diet			
Excess	32 (61,5)	6 (11,5)	38 (36,5)
Normal	20 (38,5)	46 (88,5)	66 (63,5)
Average of (nutrition adequacy rate %)	120,8	106,1	113,9
Total	52 (100)	52 (100)	104 (100)

Source: Primary Data, 2019

The characteristics of the case group respondents (Overweight) were 52 respondents, and the control group

(Normal weight) were 52 respondents. The majority of respondents based on age were 73 adolescents (70.2%), based on sex were 57 (54.8%) women, based on the type of disability were 78 (75%) mental disabilities and based on dietary habits with normal categories as much as 66 (63.5%).

TABLE II. THE DIET CONSUMPTION OF THE OVERWEIGHT AND NORMAL WEIGHT GROUP OF RESPONDENTS IN THE SPECIAL SCHOOLS FOR PEOPLE WITH DISABILITIES OF WEST SULAWESI PROVINCE IN 2019.

Diet types	Consumption Average (gram)		Total
	Overweight	Normal weight	
Staple food	1707,25	1030,00	1368,63
Side dishes	301,59	286,95	294,27
Vegetables	208,77	173,09	190,93
Fruits	82,41	50,68	66,54
Milk & processed products	315,69	260,05	287,87
Snack food	433,60	286,75	360,18

Source: Primary Data, 2019

Based on table 2 shows an overview of the average dietary consumption of the most respondents in staple foods both in the overweight group and in the normal weight group.

TABLE III. ODDS RATIO (OR) VALUES FOR THE OVERWEIGHT AND NORMAL WEIGHT GROUPS BASED ON GENDER, AGE, TYPE OF DISABILITY AND DIET, SPECIAL SCHOOLS FOR PEOPLE WITH DISABILITIES IN WEST SULAWESI IN 2019.

Variable	Groups			
	Overweight	Normal weight	OR (CI95%)	p value
	n %	n %		
Age group				
Early Youth (10-16 years)	29 (55,8)	44 (84,6)	0,229 (0,090-0,582)	0,001*
Late adolescence (17-25 years)	23 (44,2)	8 (15,4)		
Sex				
Female	29 (55,8)	28 (53,8)	0,925(0,427-2,003)	0,844
Male	23 (44,2)	24 (46,2)		
Disability types				
Mental Disability	42 (53,8)	36 (46,2)	0,536(0,216-1,327)	0,174
Physical Disability	10 (38,5)	16 (61,5)		
Diet				
Excess	32 (61,5)	6 (11,5)	12,267(4,43-33,942)	0,000*
Normal	20 (38,5)	46 (88,5)		

Source: Primary Data, 2019

Based on Table 3, gender distribution, the type of disability is spread evenly in the two groups of respondents seen from the value of  $p < 0.05$ . Characteristics of respondents based on age have different distributions; the age of respondents  $< 16$  years (early adolescents) have a higher risk of overweight compared to period  $> 16$  years. Relationship of age group with overweight was proven statistically with a p-value of 0.001 ( $< 0.05$ ).

The diet influences the incidence of overweight, where an excess diet is at risk of tending to overweight compared to a normal diet as evidenced by a statistical test with a value of  $p < 0,000$  ( $< 0.05$ ) and OR 105.

TABLE IV. ODDS RATIO (OR) VALUE OF THE AVERAGE DIET CONSUMPTION OF THE OVERWEIGHT AND NORMAL WEIGHT GROUP OF RESPONDENTS IN THE SPECIAL SCHOOLS FOR PEOPLE WITH DISABILITIES OF WEST SULAWESI PROVINCE IN 2019

Category	Coefficient	S.E	Wald	df	Sig OR CI 95%
Age	-0,582	0,602	0,97	1	0,33 0,559 0,172-1,817
Sex	-2,217	0,726	9,314	1	0,002* 0,109 0,026-0,452
Disability type	0,882	0,693	1,623	1	0,203 2,417 0,622-9,392
Diet	3,639	0,784	21,558	1	0,000* 38,048 8,189-176,780

Based on table 4, the average distribution of dietary consumption of staple foods, vegetables, fruits, and milk & their processed products are spread evenly across the two groups of respondents seen from the value of  $p < 0.05$ . Distribution of respondents based on the average consumption of side dishes and snacks has a different distribution seen from the value of  $p > 0.05$ .

TABLE V. BINARY LOGISTIC TEST RESULTS FOR OVERWEIGHT AND NORMAL WEIGHT GROUPS BASED ON GENDER, AGE, DISABILITY AND DIET TYPE IN THE SPECIAL SCHOOLS FOR PEOPLE WITH DISABILITIES WEST SULAWESI PROVINCE IN 2019

Diet types	Groups		Total (%)	P Value OR CI
	Overweight n (%)	Normal weight n (%)		
The main food				
Excess Normal	48 (92,3) 4 (7,7)	20 (38,5) 32 (61,5)	68 (65,4) 36 (34,6)	0,000* 19,200 6,001- 61,429
Total	52 (100)	52 (100)	104 (100)	
Side dishes				
Excess Normal	44 (84,6) 8 (15,4)	36 (69,2) 16 (30,8)	80 (76,9) 24 (23,1)	0,063 2,44 0,940- 6,360
Total	52 (100)	52 (100)	104 (100)	
Vegetables				
Excess Normal	50 (96,2) 2 (3,8)	36 (69,2) 16 (30,8)	86(82,7) 18 (17,3)	0,000* 11,111 2,403- 51,371
Total	52 (100)	52 (100)	104 (100)	
Fruits				
Excess Normal	41 (78,8) 11 (21,2)	9 (17,3) 43 (82,7)	50 (48,1) 54 (51,9)	0,000* 17,808 6,688- 47,417
Total	52 (100)	52 (100)	104 (100)	
Milk				
Excess Normal	37 (71,2) 15 (28,8)	14 (26,9) 38 (73,1)	51 (49,0) 53 (51,0)	0,000* 6,695 2,840- 15,783
Total	52 (100)	52 (100)	104 (100)	
Snack Food				
Excess Normal	40 (76,9) 12 (23,1)	31 (59,6) 21 (40,4)	71 (68,3) 33 (31,7)	0,58 2,258 0,965- 5,285
Total	52 (100)	52 (100)	104 (100)	

Source: Primary Data, 2019

Based on table 5 the results of the binary logistic test showed that the most important variable on the incidence of overweight in adolescents with disabilities was Diet with a wald value of 21.558, a sig value of 0.000 ( $p < 0.05$ ) and an OR value of 38.048.

Based on the results of the analysis using the chi-square test, the results showed that there was a significant relationship between diet and overweight incidence in disability adolescents with a p-value of 0,000 ( $< 0.05$ ). The relationship parameters used were ORs with a value of 12,267 and CI 4,433-33,942, which meant that young people with disabilities with excess diets were more likely (odds) 12,267 times overweight compared to teenagers with disabilities with a normal diet. Smetanina (2015), in her study, suggested the results that over-eating breakfast and eating food were associated with the incidence of overweight with a value ( $p < 0.05$ ).

Teen et al. (2018) [10] in their study revealed that daily overeating habits and having dinner habits contribute positively to the incidence of overweight. While regular breakfast and maintaining food portions and with a normal duration of eating can reduce the risk of overweight. Research conducted by Mikulovic et al. (2011) [11] reveals that children with disabilities prioritize the taste of food and explain that when eating the most crucial factor is they are happy and full. While in general teenagers who do not have disabilities maintain a diet to make their bodies remain ideal.

Grumstrup & Demchak (2019) [12] in qualitative research conducted on seven children with disabilities said that 3 of these children preferred foods with high fat intake and refused to eat vegetables and fruits with a frequency of eating more than three times a day. The taste of these foods triggers the tendency of those with disabilities to choose foods with high intake. Also, the study revealed that children with disabilities had limited knowledge, weak dietary preferences, drug side effects, and oral motor difficulties. The conclusions that can be drawn from the study are that children with disabilities have limited knowledge about healthy foods, allowing them not to choose and sort the food they eat. Inability to select and sort menu and the tendency to like cooking with a sense of causing an unhealthy diet that triggers overweight [13]-[16]

Overweight based on the average dietary consumption that most influences the incidence of overweight is staple food and vegetables. The results of this study were supported by a study conducted by Musaigar (2016) [13], [17]-[20] which revealed that although in his research there was no excessive snacking habits macronutrient intake such as excessive carbohydrate consumption could increase the incidence of overweight. The relatively high consumption of vegetables in this study is associated with the fact that many types of plants are included in traditional dishes of residents in West Sulawesi Province.

#### IV. CONCLUSION

There is a relationship between the diet and the incidence of overweight in adolescents with disabilities in special school for children with disabilities in West Sulawesi Province, where diet tends to be mild.

## V. SUGGESTION

Future researchers are expected to conduct development research from this study, for example, by conducting intervention research to address the incidence of overweight in disabled youth

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