Original Article

Dietary Care Lots of Vegetables in Weight Loss Obesity Women of Reproductive Age

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ABSTRACT

Obesity is one of the issues contributing to the rise of non-communicable diseases such as hypertension and stroke. One of the preventive measures against obesity is the consumption of vegetables and fruits high in fiber, which is used as a strategy for weight reduction. This study aims to establish a dietary care model for reducing weight and blood lipid levels in obese Women of Reproductive Age (WRA). The research was conducted in the urban area of Makassar, specifically in the Berua sub-district, and in the suburban area of Untia sub-district, Biringkanaya district, Makassar city. The research follows a quasi-experimental design known as the 'Non-Equivalent Control Group Pretest-Posttest Design.' Data analysis utilized paired t-tests conducted before and after a 2-month education period using flipcharts and examples of vegetable portions. The research findings revealed that there were 39 samples in obesity category 1 and 21 samples in obesity category 2. Regarding risk factors, there was a significant change in knowledge (p = 0.000). The average weight of the samples decreased by 1.8 kg after a 2-month education period, with a significant effect (p = 0.000). Protein intake showed no significant impact based on statistical tests, whereas energy, fat, and carbohydrate intake demonstrated significant effects, particularly with a 300g intake of vegetables and the most common energy range being 1750-2077 kcal.The proposed model design suggests that consuming 4 portions of vegetables and a total of 1750 kcal can lead to a weight reduction of 1.8 kg over a 2-month period.

Keywords : Vegetable-Rich Diet, Women of Reproductive Age (WRA), Obesity

INTRODUCTION

Obesity is one of the nutritional problems in Indonesia that occurs in all age groups and all socioeconomic strata. Existing data shows that the prevalence of obesity has increased every year from 2013 to 2018. The prevalence of central obesity by sex, women ≥ 15 years old was 46.7%. Meanwhile, the prevalence by province in South Sulawesi is 31.6% [1].

One of the causes of obesity is the habit of eating instant foods low in fiber, sweet foods, fried foods and lack of vegetables and fruits which have provided a great opportunity for high energy intake[2]. Obesity experienced in women of childbearing age (WUS) will interfere with their reproductive cycle and menstruation due to the influence of hormones. Another impact is infertility due to anovulation which is at risk of miscarriage and fetal death.

Factors causing obesity in WUS in addition to genetics, hormones as well as excess calories, nutritional knowledge and physical activity[3].

Efforts to overcome overweight and obesity can be done in several ways, one of which is with diet care. Dietary care is a systematic activity starting from the assessment of needs, diagnosis, intervention, monitoring and evaluation for weight loss. Limiting energy intake by reducing the consumption of staple foods, especially rice, and increasing vegetable consumption[4]. Found efforts to reduce energy intake by choosing the consumption of complex carbohydrates and unsaturated fats to lose weight for people with obesity.

Education efforts and their provision are important for increasing consumption of fruit vegetables[5]. The behavior of the population in consuming fruits and vegetables is measured based on the frequency and portion

of fruit and vegetable consumption. Categorized as 'sufficient' consumption of vegetables and fruits when consuming a combination of vegetables and fruits at least 5 servings per day for 7 days a week.

The first year of research was a study to get a diet model of many vegetables that can lose weight to obese women of childbearing age. The second year of research is to apply the most vegetable multi-vegetable diet care model for weight loss in obese women of childbearing age (WUS).

METHOD

This study is quasi-experimental in the form of a diet of many vegetables to lose weight for obese LUS. The implementation time is 2 years. The first year, *obeservational* research found factors causing observations in WUS, particularly those related to consumption and activity, and designed a dietary care model and measured blood lipid levels. The second year, research into multi-vegetable diet care interventions for weight loss WUS is obese. Dessay research: "*Non Equivalent control group pretest-post test design*".

The first year's research activity is to find factors that cause obesity in women of childbearing age (WUS), by analyzing the type, nutritional value and composition of food in daily dishes from the results of 2x24-hour consumption recall, food frequency and lipid profile. Furthermore, a draft of the diet care model was then carried out trials and improvements.

RESULTS

Table1. Characteristics of WUS Samples in Berua and Untia Villages

Aspects	Category	Berua	Untia	Total	
		n	n	n	%
Age	15-24 years	3	6	9	15
	25-34 years	9	11	20	33,3
	35-44 years	12	10	22	36,7
	45 years old	6	3	9	15
Sum		30	30	60	100
IMT	Obesity 1 (BMI 25-29.9)	19	20	39	65
	Obesity 2 (BMI >=30)	11	10	21	35
Sum		30	30	60	100

The characteristics of the WUS sample include gender, namely all samples are female and age according to the village. In the table above, it is obtained that there are four age categories based on the *World Health Organization* (WHO). Berua Village with the highest proportion was in the age group of 35-44 years as many as 12 samples, while Untia Village the highest proportion was in the age group of 25-34 years as many as 11 samples. s edangkan for the lowest proportion in the age group of 15-24 years in Berua Village as much as 3 to l, in Untia Village the lowest proportion in the 45 year age group was 3 samples.

Based on the aspect of Body Mass Index (BMI) or nutritional status of WUS samples, two categories of obesity were obtained, namely obesity 1 and obesity 2. Obesity 1 is a sample that has a BMI of 25-29.9, while obesity 2 is a sample that has a BMI of >30. Berua Village with the highest proportion is in obesity group 1 as many as 18 samples, while for Untia Village with the highest proportion, namely in obesity group 1 as many as 28 samples.

Table2. Knowledge Table of WUS samples in Berua and Untia Villages

Knowledge	PreTest		PostTest		*p-value*
	n	%	n	%	
Good	23	38,3	60	100,0	0,000
Less	37	61,7	0	0,0	
Total	60	100,0	60	100,0	

Knowledge of WUS obesity samples in Berua and Untia Villages based on the table above, before education there were 37 samples or 61.7% had knowledge of less than 60 samples. After education using the media of backsheets and examples of vegetable portions, there was a significant change, namely that all samples of 60 people had good knowledge or 100%.

This research is a study on changes in knowledge before and after nutrition education is carried out on obese WUS samples using backsheet media and examples of vegetable portions. However, previously measurements of sample food intake were carried out using *the food recall* method and food frequency calculations were also carried out using food *frequency*.

The level of knowledge of WUS samples before nutrition education was given and examples of more vegetable portions that had less knowledge, both in Berua Village and in Untia Village, thiswas due to several factors such as lack of exposure to samples with information and knowledge about nutrition and health. In a study conducted by Simbolon, et al, 2018 which stated that there was an influence of nutrition education on increasing adolescent knowledge in the intervention group regarding obesity.

The level of knowledge in the two villages was educated through the media of backsheets and examples of vegetable portions and two months after being given nutritional knowledge there was a significant change, namely all samples had good knowledge, namely 100% which was previously 61.7%. The media used is a backsheet media, lembar balik is used because it is classified as the most effective media as a health promotion media and the scope of messages conveyed is quite wide. The backsheet, which is used as a nutrition education medium, is able to interactively meet the aspects of protectingthe community and making it easier for officers to convey messages. This is what makes the sample knowledge increase after being given nutrition education specifically discussing obesity and health, in addition to being given an example of a portion of vegetables that use household sizes so that WUS samples are easily applied at home for consumption according to the amount needed.

Nutrition education was carried out in two different places, namely in Berua Village and Untia Village with the number of all samples as many as 60 samples. The results of the *Paired T-test statistical test* were carried out to see the statistical significance at both research sites. This shows that in this study there is a meaningful influence of knowledge, namely from the results after education through the feedback sheet and the example of the portion of vegetables given, namely $p = 0.000$.

Table3. Weight Table of WUS samples in Berua and Untia Villages

Berua and Untia

	Average weight	Total		*p*
		n	**%**	
Pre test	70.7 kg	60	100	0,000
Post test	68.9 kg	60	100	

The weight aspect of WUS before being given education the average body weight of 60 samples was 70.7 kg, after being given a backsheet media education and an example of a portion of vegetables two months later measured the average body weight of 68.9 kg. It can be seen from the measurement results after education that there was a weight loss of 1.8 kg, as well as the results of the *Paired T-test statistical test*, there was a significant influence, namely $p = 0.000$.

There are several ways to regulate the mechanism of weight loss including behavior, genetic and physiological factors. In obesity, between food intake and energy expenditure there is an imbalance in which there will be a state of excessive fat accumulation and consequently have a bad influence on health. One of the main factors that cause the increasing incidence of obesity around the world is inappropriate and inappropriate food intake as well as energy use and lack of physical activity[6].

Based on the results of this study, data on the weight aspects of WUS who are obese there is weight loss before and two months after being given education through a backsheet and an example of a portion of vegetables that decreased by 1.8 kg. It can be seen that there is a contribution to the role of providing education

and examples of vegetable portions to WUS obesity and there is a significant influence based on statistical tests[7]. In their study also found a weight loss of 1 kg after 5 weeks of nutritional education interventions[7].

Table4. Energy and Nutrient Intake of WUS Samples in Berua and Untia Villages

Intake	Category	Pre		Post		p
		n	%	n	%	
Energy	More	0	0	0	0	0,042
	Enough	44	73,3	31	51,7	
	Less	16	26,7	29	48,3	
Total		60	100	60	100	
Protein	More	0	0	0	0	0,519
	Enough	18	30	16	26,6	
	Less	42	70	44	73,4	
Total		60	100	60	100	
Fat	More	0	0	0	0	0,008
	Enough	42	70	32	53,3	
	Less	18	30	28	46,7	
Total		60	100	60	100	
Carbohydrates	More	0	0	0	0	0,000
	Enough	53	88,3	13	21,6	
	Less	7	11,7	47	78,4	
Total		60	100	60	100	

Description: More >110% AKG, Enough: 80-110% AKG, Less: <80% AKG

Energy and nutrient intake is divided into three categories (proteins, fats and carbohydrates) based on the percentage of nutritional intake. The process of calculating nutrient intake uses the 24-hour *food recall* consumption survey method or measurement of individual nutrient intake is carried out twice. In the results of *recall* before (pre) and after (post) education and examples of vegetable portions in Berua and Untia Villages for all energy and nutrient intake with more than none or 0% category. In the proportion of energy intake before education using the feedback sheet and example portion of vegetables category enough as many as 44 samples or as much as (73.3%) and there was a decrease after education and examples of vegetable portions, namely 31 samples or (51.7%). Meanwhile, the proportion of protein intake with less categories was 42 samples (70%) before education and examples of vegetable portions and post-education increased by 44 samples (73.3%). Pre-educational fat intake and sample vegetable portions with sufficient categories were 42 samples (70%) and there was a decrease of 32 samples (53.3%) after education and examples of vegetable portions. The highest proportion of carbohydrate intake with the moderately pre-educational category and the example of vegetable portions was 53 samples (88.3%) and there was a decrease in post-education and examples of vegetable portions by 13 samples (21.6%). Protein intake can be seen from the results of statistical tests that there is no meaningful change while the intake of energy, fats and carbohydrates has a meaningful change, namely $p < 0.005$. In line with the research of [8] that for fat and carbohydrate intake there is a significant relationship with central obesity, but for protein intake it is seen that there is no significant relationship [8]. Carbohydrates are macronutrient components that provide energy as well as fats that contribute a large amount of energy in the composition of the diet so that it is a contribution to excess energy intake which can become weight gain.

Table5. WUS Sample Diet in Berua and Untia Villages

Diet	n	%
Good	33	55
Less	27	45
Total	60	100

Description: Good ≥ average FFQ score, Less ≤ average FFQ score

Based on the diet table of all WUS samples, the obese ones had more good categories than those with less categories. Samples from 60 WUS had a good category of 33 samples or 55%. WUS obesity diet is obtained through recording food intake using a semi-quantitative *food frequency* questionnaire (FFQ), namely filling in the questionnaire fields available for each type, number of and the

frequency of food intake in the past two months. Research by [9] illustrates that there is a relationship between diet and the incidence of obesity in college students where good dietary arrangements can lose weight[9]. Obesity in WUS has become a very important problem because it can make complications of concomitant diseases, besides that an unbalanced diet will cause nutritional status in a person to be excessive.

Table6. Lipid Profile of WUS samples

Profile Lipids	Usual		Not Usual		Total	
	n	%	n	%	n	%
LDL	59	98,3	1	1,7	60	100
HDL	25	41,7	35	58,3	60	100
Triglycerides	56	93,3	4	6,7	60	100
Total Cholesterol	51	85,0	9	15,0	60	100

Description: *LDL<130mg/dl, HDL<45-65mg/dl, Triglycerides<200mg/dl, Total Cholesterol<200mg/dl*

The results of the blood lipid profile examination show LDL levels, Triglycerides and Cholesterol total average samples showed normal values of 98.3%, 93.3% and 85%, respectively, while HDL examination of normal sample numbers was 41.7% lower than the number of abnormal samples where the results were 58.3%.

Lipid profile is a state of blood fats in terms of LDL, HDL, Triglycerides and

total cholesterol content in the blood. The normality of the body always maintains a good balance, so it is not easy for atherosclerosis to occur. This study showed that obese WUS samples were seen as the result of blood lipid profiles such as cholesterol, triglyceride and LDL more normal but HDL levels more WUS samples tend to be low or abnormal values, this situation will cause the coronary vessel walls to thicken.

Table7. Vegetable Intake WUS Obesity

Total Vegetable Intake /day	Pre		Post		p
	n	%	n	%	
Enough	0	0	38	63	0,000
Less	60	100	22	37	
Total	60	100	60	100	

Desc. Enough ≥ 300 gr/day, less < 300 gr/day

The vegetable intake table shows that the daily vegetable intake in the WUS sample before being educated on the backsheet media and the vegetable portion example, there were all samples with the less category, namely 60 WUS samples and after being educated and the vegetable portion example there was an increase with a sufficient category of 38 samples or 63%. Likewise, the results of the *Paired T-test* show a significant change in vegetable intake, namely *p* = 0.000.

Vegetable intake is measured based onthe amount of vegetables consumed per one meal, namely one bowl of 75-100 grams without vegetable water, so that in one day you can consume as much as 300 grams of vegetables / day. So that the intake of vegetable consumption is divided into two categories, namely enough if it is ≥300 grams / day and less if it is <300 grams / day. The measurement of vegetable consumption intake is carried out 2 times, namely before and after providing education using a backsheet and examples of vegetable portions.

Table8. WUS Vegetable Portion

Portion of Vegetable Intake an/Day	Pre		Post	
	n	%	n	%
4 Servings (>300gr)	0	0	32	53
3 Servings (300gr)	0	0	6	10
2 servings (200<300gr)	0	0	0	0
1 Serving (100<200gr)	60	100	22	37
Total	60	100	60	100

Based on the portion of vegetable consumption in the pre, as many as 60 samples or 100% only consumed 1 serving of vegetables per day. After an evaluation, 32 samples or 53% consumed vegetables in 4 servings per day.

Table 8 shows that WUS samples who were obese after education using backsheet media and given examples of vegetable portions, mostly consumed 4 servings of vegetables, indicating that the sample was able to meet PUGS recommendations with the provision that the frequency of vegetable intake was at least 3 times / day according to the portion, but there are still those who consume vegetables 1 serving / day, this is because there is no motivation to change the habit of eating vegetables. The results of statistical tests in the research of Henu Bey showed that the number of vegetable consumption frequencies in female students is a risk factor for overweight events with less frequency of vegetable consumption.

Table9. Total Energy with BB

Total Energy (kcal)/day	Weight				Total	
	Climb		Go Down			
	n	%	n	%	n	%
1750 - 2077	1	1.7	30	50	31	51.7
1698 - 1745	2	3,3	27	45	29	48,3
Sum	3	5	57	95	60	100

Table 9 illustrates that energy input of 1750-2252 kcal/day, which is a sufficient category of 80-110% AKG (Nutritional Adequacy Figure) in the WUS sample that is obese is associated with Weight Loss (BB) the value drops by 30 samples or by 50%, although it appears that Total Energy is sufficient, but weight loss is because the portion of vegetables also contributes energy. It can also be seen that the Total Energy of 1698-1745 kcal with a category of less than <80% AKG value weight loss by 27 samples, this is in line because it is clear that the energy input is less than it should be.

Table10. BB with Vegetable Portion Intake

BB	Vegetable Portion								Sum	
	4		3		2		1			
	n	%	n	%	n	%	n	%	n	%
Climb	1	1,7	0	0	0	0	2	3,3	3	5
Go down	31	51.7	6	10	0	0	20	3 3.3	57	95
Total	32	53.4	6	10	0	0	22	36,6	60	100

The portion of vegetables seen based on weight loss and weight gain was the highest value for 4 servings of vegetables with weight loss of 31 samples or 53.4%, but there was 1 sample (1.7%) that rose even though the vegetable intake was 4 servings, while the lowest weight loss was found in 3 servings of vegetables, namely 6 samples (10%). It can be seen that overall based on the portion of vegetables consumed, it will lose weight by 57 samples or by 95% even though there is only 1 serving of vegetables consumed.

Based on the results of research and analysis of WUS samples obesitas so Was one type Upbringing Diet many vegetables as next:
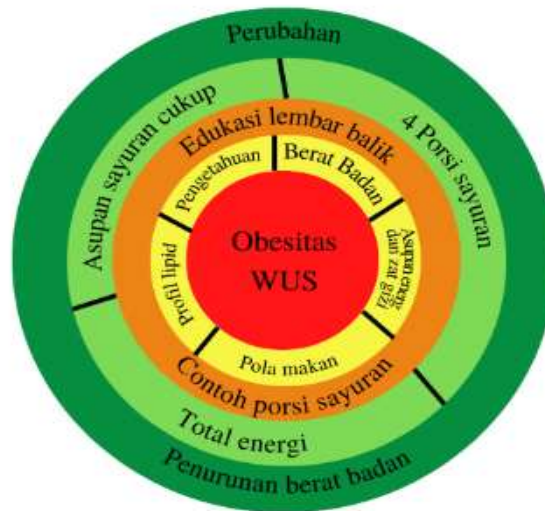
Figures 1. Model of Vegetable Diet

Description:

Layer 1 → Obesity WUS
Layer 2 → WUS obesity risk factors
Layer 3 → Education backsheet media and examples of vegetable portions
Layer 4 → Sufficient Vegetable Intake, vegetable portion (4 servings) and total energy (1750 kcal)
Layer 5 → Changes in Weight Loss (1.8 kg)

CONCLUSION

From the results of the study, it was concluded that the average body weight of the sample after 2 months of education decreased by 1.8 kg. the largest diet of WUS samples that are obese in the good category was 33 samples (55%). There is a significant influence on vegetable intake and the most vegetable portion in portion 4, which is >300 gr of vegetables while the highest total energy is 1750-2077 kcal. HDL examination of normal sample count was 41.7% lower than the number of abnormal samples where the result was 58.3%. Subsequent studies were conducted with a larger number of samples compared to previous studies to improve the accuracy and validation of the research.

CONFLICTS OF INTEREST
The authors declare no conflict of interest.

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