DIFFERENCES IN BODY FAT MASS AMONG VEGAN AND LACTO-OVO VEGETARIAN GROUPS AGED 15-64 YEARS IN DENPASAR VEGETARIAN COMMUNITY

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ABSTRACT

Introduction: Excess fat mass can lead to obesity and increase the risk of non-communicable diseases which will affect a person's quality of life. One of the ways to prevent the risk of non-communicable diseases is through vegetarian diet intervention. According to theory, people on a vegetarian diet have low-fat mass. However, it turns out that several studies have shown the opposite results in the form of high-fat mass or the incidence of obesity in vegetarian groups. Therefore, researchers want to clarify people's understanding of the relationship between fat mass and a vegetarian diet. **Objective**: To analyze the differences in fat mass between the vegan and lacto-ovo vegetarian groups aged 15-64 years in the Denpasar vegetarian community. **Method**: The research design is cross-sectional. The population using the vegan and lacto-ovo vegetarian group aged 15-64 years in the Denpasar vegetarian community was 103 respondents. The sample for this study was 47 vegans and 56 lacto-ovo vegetarians and all of them met the inclusion criteria. Fat mass was measured using BIA and type of diet through a respondent characteristics questionnaire. Data analysis using the Mann-Whitney test. **Result**: Based on respondent characteristics data, it was found that 75.8% of respondents were aged 25-54 years, respondents were dominated by women with a percentage of 55.3%, 64% of respondents with obesity class 1 had increased fat mass, 35.7% with obesity class 1 and 64.3% with obesity class 2 had high-fat mass. Analysis of the difference in fat mass between the vegan and lacto-ovo vegetarian groups found p=0.513 (p>0.05), which means the results were not significant. **Conclusion**: There was no difference in fat mass between the vegan and lacto-ovo vegetarian groups.

Keywords: fat mass, vegan, lacto-ovo vegetarian

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INTRODUCTION

As time progresses, the vegetarian diet pattern is becoming more popular and widespread among the community. In Indonesia, the number of registered vegetarians with the Indonesia Vegetarian Society (IVS) was 60 thousand in 2007 and increased to 500 thousand in 2010.[1] In 2018, approximately 2 million Indonesians followed a vegetarian and vegan diet.[2]

There are two main types of vegetarian diets: vegan or pure vegetarian and lactoovo vegetarian. Vegan is a type of diet that completely avoids animal products and their derivatives. Meanwhile, lacto-ovo vegetarianism is a diet that excludes animal products but still allows the consumption of derivatives or processed products such as milk, eggs, cheese, yogurt, and others.[3]

Body fat mass refers to the amount of fat present in the body.[4] Excessive body fat mass can lead to obesity and increase the risk of non-communicable diseases such as stroke, hypertension, diabetes mellitus, cancer, and more. Some theories suggest that preventing the risk of non-communicable diseases can be achieved, in part, through a vegetarian diet to prevent fat accumulation. According to the 2015 Dietary Guidelines Advisory Committee (DGAC) Scientific Report, a healthy diet is defined as one high in fiber, including fruits, vegetables, grains, low-fat products, low sodium, and low added sugars.[5]

However, some studies have shown contrasting results, such as high body fat mass or obesity in vegetarian groups. For example, research conducted by Kirana et al. indicated that the body fat mass of the vegetarian group was lower than that of the non-vegetarian group. About 38.5% or 10 out of 26 women in the vegetarian group were found to be under fat.[6] These findings differ from the research by Lian et al., which showed that 78.1% or 89 out of the total respondents experienced overfat.[7]

METHOD

This research utilized an observational analytic method with a cross-sectional study design. The population consisted of vegan and lacto-ovo vegetarian groups aged 15-64 in the vegetarian community of Denpasar. The sample included the entire population meeting the inclusion criteria: 1) Following a vegan or lacto-ovo vegetarian diet for at least 1 year, 2) Not pregnant, and 3) Willing to participate as research respondents. Exclusion criteria were: 1) Using a pacemaker or heart pacemaker device, 2) Taking long-term medication for a minimum of 1 year (e.g., corticosteroids). The sample size was calculated using the formula for two independent groups, requiring a minimum of 29 individuals in both the vegan and lacto-ovo vegetarian groups. Data on the type of vegetarian diet were obtained through a questionnaire on

respondent characteristics. Body fat mass was measured using the Bioelectrical Impedance Analysis (BIA) scale, specifically the Xiaomi MI Scale 2. Simultaneously, respondent height was measured using a microtome. Data were analyzed using the Mann-Whitney two-sample comparison test.

RESULT

Table 1. Distribution of Respondents Based on Age at Maha Vihara Maitreya and Guru Ching Hai Meditation Center in 2023

Age	Number (n)	Percentage (%)
15-24	9	8,7
25-54	78	75,8
55-64	16	15,5
Total	**103**	**100**

Based on the data in Table 1, the number of respondents in the age group of 15-24 years is 9 people (8.7%), the age group of 25-54 years is 78 people (75.8%), and the age group of 55-64 years is 16 people (15.5%).

Table 2. Distribution of Respondents Based on Gender at Maha Vihara Maitreya and Guru Ching Hai Meditation Center in 2023

Gender	Number (n)	Percentage (%)
Male	46	44,7
Female	57	55,3
Total	**103**	**100**

Based on the data in Table 2, it was found that the number of female respondents is higher, namely 57 people (55.3%), compared to males with a total of 46 people (44.7%).

Table 3. Description of Body Mass Index with Body Fat Mass at Maha Vihara Maitreya and Guru Ching Hai Meditation Center in 2023

Fat Mass	Body Mass Index					Total
	Under-weight	Normal	Over-weight	Obe-sity I	Obe-sity II	
Very Low	6 (85,7)	1 (14,3)	0 (0%)	0 (0%)	0 (0%)	7 (100)
Low	2 (9,1)	20 (90,9)	0 (0%)	0 (0%)	0 (0%)	22 (100)
Normal	0 (0%)	17 (48,6)	18 (51,4)	0 (0%)	0 (0%)	35 (100)
Increa-sed	0 (0%)	0 (0%)	9 (36%)	16 (64)	0 (0%)	25 (100)
High	0 (0%)	0 (0%)	0 (0%)	5 (35,7)	9 (64,3)	14 (100)
Total	**8 (7,8%)**	**38 (36,9)**	**27 (26,2)**	**21 (20,4)**	**9 (8,7)**	**103 (100)**

Based on the data in Table 5.3, respondents with very low body fat mass were found to have 6 individuals (85.7%) classified as underweight and 1 individual (14.3%) classified as having a normal nutritional status. Respondents with low body fat mass included 2 individuals (9.1%) classified as underweight and 20 individuals (90.9%) classified as having a normal nutritional status. Those with normal body fat mass consisted of 17 individuals (48.6%) with a normal nutritional status and 18 individuals (51.4%) classified as overweight. Respondents with increased body fat mass comprised 9 individuals (36%) classified as overweight and 16 individuals (64%) classified as having obesity class 1. Individuals with high body fat mass included 5 individuals (35.7%) classified as having obesity class 1 and 9 individuals (64.3%) classified as having obesity class 2.

Table 4. Differences in Body Fat Mass in Vegan and Lacto-Ovo Vegetarian Groups at Maha Vihara Maitreya and Guru Ching Hai Meditation Center in 2023

Type of Diets	Fat Mass					Total
	Very Low	Low	Normal	Increased	High	
Vegan	3 (6,4)	14 (29,8)	11 (23,4)	14 (29,6)	5 (10,6)	47 (100)
Lacto-ovo Vegetarian	4 (7,1)	8 (14,3)	24 (42,9)	11 (19,6)	9 (16,1)	56 (100)
Total	7 (6,8)	22 (21,4)	35 (34%)	25 (24,3)	14 (13,6)	103 (100)

	Fat Mass
Mann-Whitney U	1.220.500
Wilcoxon W	2.348.500
Z	-654
Asymp. Sig, (2-tailed)	.513

The analysis of the difference in body fat mass between the vegan and lacto-ovo vegetarian groups was conducted using the SPSS program. Based on the Mann-Whitney test, the result obtained was p=0.513 (p>0.05), indicating non-significant results. This suggests that there is no significant difference in body fat mass between the vegan and lacto-ovo vegetarian groups.

DISCUSSION

In the research results, it was found that the respondents were predominantly female compared to males. This finding aligns with Nugroho et al., which stated that 64.5% of the respondents were female and 34.5% were male.[8] According to Rosenfeld, through research aimed at analyzing differences between men and women in interpreting or perceiving the preferences of vegetarian diets, it is stated that meat is often associated with masculinity. Therefore, fewer men choose to follow a vegetarian diet. On the other hand, when considering motivation and compliance levels, female vegetarians have higher motivation and compliance levels in adhering to the diet compared to males.[9]

Based on the results of the analysis of the difference in body fat mass between the vegan and lacto-ovo vegetarian groups using the Mann-Whitney test, a significance value of p=0.513 (p>0.05) was obtained, indicating that there is no significant difference in body fat mass between the vegan and lacto-ovo vegetarian groups. This finding is consistent with a study by Pěgo et al. in 2021, which aimed to compare Fat Mass Mann-Whitney U 1220.500 Wilcoxon W 2348.500 Z -.654 Asymp. Sig. (2-tailed) .513 body composition in vegetarian-vegan women with omnivores.

Several reasons contributing to the non-significant results in this study include the variation in daily food consumption among respondents. The quality and quantity of macronutrient intake, especially carbohydrates and fats, can influence body fat mass. Vegan diets tend to have a higher carbohydrate intake compared to lacto-ovo diets. Apart from being the primary source of energy, carbohydrates also serve as a substitute for saturated fats not obtained in the lacto-ovo vegetarian group (from dairy and eggs). Excessive carbohydrate consumption not balanced by energy

expenditure through physical activity can result in increased fat storage in the liver and adipose tissue. If the calorie intake exceeds the calories expended or used by the body, weight gain occurs, and the excess energy is stored as fat. This is supported by the increased or high body fat mass in respondents accompanied by obesity status. The higher an individual's body mass index (BMI), the higher the percentage of body fat, so excessive fat accumulation can lead to obesity, impacting one's health.

In a vegetarian diet, food ingredients are often processed by frying or sautéing, which can increase cholesterol levels in the body. Elevated lipid profile levels can lead to obesity.[10,11] Some studies state that amino acids such as glutamate and tryptophan can increase the risk of obesity. Glutamate is commonly found in wheat protein or gluten, as in bread, cakes, and pasta. Tryptophan can be found in various plant sources such as legumes and grains.[12] Other examples of foods that can also increase the risk of metabolic diseases like obesity, dyslipidemia, and diabetes include processed carbohydrates, foods, and beverages high in sugar or sweeteners, ultra-processed foods (such as nuggets, sausages, and other analog meats), and cooking oils.[13]

CONCLUSION

Excessive body fat mass can lead to obesity and increase the risk of non-communicable diseases, which is currently a matter of urgency for the public and can impact an individual's quality of life. A vegetarian diet is known to have positive effects on health by maintaining body fat mass. The results of this study indicate no significant difference in body fat mass between the vegan and lacto-ovo vegetarian groups. Although the research results show that 34% of respondents have normal body fat mass, there are 37.9% of respondents with above-normal body fat mass (increased and high). Therefore, a vegetarian diet does not necessarily guarantee that an individual's body fat mass will be normal or low.

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