IJCNP Indonesian Journal of Clinical Nutrition Physician
p-ISSN: 2597-4297
e-ISSN: 2775-5215
Volume 5 No 2, Agustus 2022

SOCIODEMOGRAPHIC PROFILE, PHYSICAL ACTIVITY, DIETARY PATTERNS, AND NUTRITIONAL STATUS OF VEGETARIANS

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Abstract

Vegetarianism is one of the most popular dietary patterns in the world, including among Indonesians. This study was conducted to determine the profile of vegetarians in Palembang based on socio-demographic characteristics, physical activity level, dietary type, total energy intake, total macronutrient intake, and nutritional status. The design of this study was a descriptive observational study with a cross-sectional design. Maha Vihara Maitreya Duta (MVMD) was the vegetarian population in this survey. Participants who agreed to take part in the survey were at least 18 years old, have been vegetarian for at least three years, were not pregnant or planning to become pregnant, and did not have any chronic ailments. A total of 148 samples were acquired using a consecutive sampling technique. To establish nutritional status, primary data were collected by completing food recall interviews during the last 24 hours on two non-consecutive days. Height and weight were measured to determine nutritional status. The highest age range of participants was 30–49 years (54,1%). The majority of the population was female (61,5%) and was a college graduate (56,1%). Most participants had permanent jobs (85,8%), engaged in light-to-moderate physical activity, and were in a normal body mass index range (68,2%). Most subjects were lacto-ovo-vegetarian (59,5%). Most participants were vegetarian for 6-10 years (31,1%). Most motivations for becoming a vegetarian are health-related (45,3%). Vegans consumed more calories, carbs, and protein than non-vegans, but less fat. Most vegan and non-vegan respondents had good nutritional status and were in the less category for achieving calorie and protein requirements.

Keywords: total energy intake, macronutrients, nutritional status, vegetarian.

Introduction

Asian countries have the greatest percentage of vegetarians in the world.[1] According to a 2018 worldwide poll, Indonesia had the third-highest growth rate in vegetarianism.[2] The number of restaurants and vegetarian cafes shows that the number of vegetarians in Palembang City is also growing fast.[3] According to the Indonesia Vegetarian Society (IVS), which is part of the International Vegetarian Union (IVU), vegetarians are split into three distinct categories. First, lacto-ovo-vegetarians are vegetarians who continue to consume dairy and egg products. Lacto-vegetarians are vegetarians who continue to consume milk and milk products. Thirdly, vegans are strict vegetarians who consume only plant-based foods, such as vegetables, fruits, nuts, and seeds.[4]

People embrace a plant-based diet for a variety of reasons, including health,

p-ISSN: 2597-4297
e-ISSN: 2775-5215
Volume 5 No 2, Agustus 2022

sensory/taste/disgust, animal welfare, environmental concern, and weight loss.[5] Adopting a vegetarian diet can lead to greater physical health, ethically acceptable feelings, a sense of belonging (to a vegetarian group), and fewer environmental impacts. On the other side, variables beyond an individual's control, such as their environment and social/cultural group, gender-based disparities, economic factors, and limited access to plant-based diets, might negatively affect the individual quality of life.[1]

A vegetarian's dietary selection, in terms of quantity and kind, will be influenced by a number of factors. An individual's nutritional status can be affected by both excessive and inadequate food intake. In Indonesia, there is still a paucity of studies and data concerning the balance of total energy intake and macronutrients in vegetarians and the daily adequacy of total energy and macronutrients in the vegetarian population. In addition to the paucity of data linking the vegetarian group's total calorie and macronutrient intake to their nutritional status.

The aim of the study was to determine the profile of vegetarians in Palembang based on socio-demographic characteristics, physical activity level, dietary type, total energy intake, total macronutrient intake, and nutritional status. This study can identify whether there was a risk of malnutrition in vegetarians.

Materials and Methods

This study was a descriptive observational study with a cross-sectional design, conducted at Maha Vihara Maitreya Duta (MVMD) Palembang. Using the approach of consecutive sampling, a total of 148 vegetarians from MVMD Palembang participated in the study. The inclusion criteria for this study were adult vegetarians (18 years or older) who had been vegetarians for at least three years and were willing to participate in the research. In this study, the independent variables were adequate total calorie intake and macronutrients. The study's dependent variable was nutritional status.

Data were collected by filling out a questionnaire about the research respondents' characteristics, conducting interviews about meal recalls from the previous 24 hours, and assessing height and weight to determine nutritional status by Body Mass Index (BMI). Body weight was measured using a digital weight scale (SECA) and height was measured using a microtoise. Body Mass Index was categorized according to the guidelines from the Indonesian Ministry of Health.[6]

Participants were also asked why they were vegetarian, how long they had been vegetarian, and what kind of vegetarianism they did (vegans, Lacto-ovo vegetarians, lacto-vegetarians, ovo-vegetarians). The level of physical activity was obtained from the IPAQ questionnaire (short form). The percentage of the Indonesian Recommended Dietary Allowances (RDA/ Angka Kecukupan Gizi) 2019 was used as a reference for the recommended level of energy and protein needs.[7] The category of total energy intake is very less (70% of RDA), less (70–100% of RDA), sufficient (100-130% RDA), or more than enough (>130% RDA). The category of protein was very less (80% of RDA), less (80–100% of RDA), sufficient (100-120% RDA) or more than enough (>120% of RDA).[8] The distribution and percentage of each research variable were determined using descriptive data analysis.

Research Results

The data were taken from the moderate MVMD Palembang community, and as many as 148 people met the research criteria. Table 1 displays the characteristics of the research subjects. The highest age range was 30–49 years, the majority of the population was female, and the highest degree of education was college. The majority of subjects were employed, engage in light-to-moderate physical activity, and fit into the normal range for nutrition.

Table 2 depicts the typical spread of vegetarian consumption trends. Lacto-ovo-vegetarian eating was the most common. Vegans are plant-based vegetarians who don't eat animal goods or their by-products. Non-vegan vegetarians consume milk, eggs, and their processed products but are plant-based. Lacto-vegetarians eat milk and milk products. Ovo-vegetarians eat eggs and egg products. Most research subjects had been vegetarian for 6-10 years (31,1%). The majority of the reasons for becoming a vegetarian were health-related.

Vegetarianism was not a guarantee against malnourishment. There were still some people who were underweight or overweight in the vegan and non-vegan categories, despite the fact that the majority of respondents had acceptable nutritional status (Table 3).

We further attempted to compare the total intake characteristics of the vegan and non-vegan groups (Table 4). The vegan group had higher total calories, carbohydrates, and protein than the non-vegan group, except for fat intake.

It turns out that vegans were able to meet their protein needs better than non-

vegans when their protein needs are identified in greater depth (Table 5). Most people, both vegans and non-vegans were in the less category, that only get 70-100% of their RDA for energy and 80-100% of their RDA for protein. For the level of sufficient of calorie consumption, non-vegans have a greater percentage in the group than vegans. However, for protein adequacy, the vegan group apparently had slightly outperformed non-vegans, even 2 of them were able to meet protein exceeding 120% RDA.

Discussion

The decision to adopt vegetarian eating habits is an individual one that can only be made by an adult group because it needs dedication. It is necessary to have adequate knowledge of vegetarian nutrition in order to prevent deficiencies or excesses of particular nutrients. Similar to the studies done in Vietnam, the largest age group in this study was that young adult. However, this does not represent the whole number of vegetarians in Palembang.[9] In this survey, most vegetarians were female. This conclusion was in line with the observations of the previous study, where the proportion of females was higher than males.[5,10] Most of the respondents completed senior secondary education and tertiary education, and most of them were employed. This illustrates that the respondents in this population are at a fairly good socioeconomic level. Vegetarianism or veganism was perceived more positively by older respondents, respondents with greater levels of education, and respondents with higher incomes, according to a previous study.

Nutritional status is a condition induced by a balance between nutritional intake from meals and metabolic demands. Depending on their age, gender, level of physical activity, weight, and height, each individual has a unique nutrient intake requirement.[11] The combination of regular physical activity (exercise) and the choice of a vegetarian diet can bring benefits, including a lower risk of death when compared to the choice of a vegetarian diet or the performance of exercise alone.[12] In this study, there are still a significant number of respondents with low levels of physical activity, therefore it must be enhanced further. It is projected that this will enhance the nutritional condition of certain respondents, bringing them within the normal range.

Research in Bangladesh on 50 vegetarians and 50 non-vegetarians showed that most had normal nutritional status. According to the findings of this study, 4% of vegetarians and 12% of non-vegetarians were underweight, while 26% of non-vegetarians and 24% of vegetarians were overweight.[13]

p-ISSN: 2597-4297
e-ISSN: 2775-5215
Volume 5 No 2, Agustus 2022

Research on the vegan community in Yogyakarta involved 102 respondents. The results revealed that the nonvegan group had a higher average fat and energy intake, while the vegan group had a higher average carbohydrate and protein intake. However, the mean difference did not differ considerably. In addition, this study revealed that the total energy and carbohydrate intake in the vegetarian group (vegans and non-vegans) was less than 80 percent of the RDA, however, the vegetarian group's protein and fat intake was above 100 percent of the RDA, indicating that it was adequate. This study also demonstrates that the nutritional status of vegetarians (vegans and non-vegans) is good (normal).[14]

A vegetarian diet can be adopted for a variety of reasons. Ethical concerns are the main reasons, building on the idea that animal slaughter for human consumption is morally inappropriate. Another important motivation is health and the potential beneficial effects of vegetarianism. Religions that encourage abstaining from meat consumption and concerns about the environmental impacts of meat production are also important motivators for adopting vegetarianism.[10,15]

Many chronic diseases arise from eating animal foods that are high in cholesterol and saturated fat. Based on the Indonesian Basic Health Research in 2018, the prevalence of people with heart disease was 1.5%, and the prevalence of people with stroke increased to 1.09% from 0.7% in 2013.[16] Vegans restrict all kinds of animal foods from the daily menu. Animal foods have more fat than plant foods. Animal source foods also tend to be high in calories. This is clearly seen in the comparison of the amount of intake between vegans and non-vegans in this study, where the amount of fat was higher in the non-vegan group.

In this study, the vegan group also consumed slightly more total calories on average than the non-vegan group. Even so, most were still in the range of calorie intake that was less than it should be. According to previous research, recent plant-based product innovation has focused more on organoleptic properties (texture, taste, and appearance) and formats (nuggets and burgers), rather than developing innovative ways to increase the nutrient density of plant-derived foods and ensure a balanced nutrient profile similar to animal-derived products.[17] Previous research also has found no substantial variation in calorie intake between vegetarians and non-vegetarians.[18] This shows that the control of the amount of calorie intake should still be done, regardless of diet choices.

p-ISSN: 2597-4297
e-ISSN: 2775-5215
Volume 5 No 2, Agustus 2022

The risk of protein deficiency in both groups was very large, because protein intake was mostly in the inadequate range. The intriguing thing was that a tiny fraction of vegans were able to achieve their protein requirements, with a higher percentage in the group than non-vegans. This shows that being a vegans is not necessarily unmet protein needs. A previous study found that low and non-meat eaters consumed more high-protein meat alternatives (soy, legumes, pulses, nuts, seeds) and other plant-based foods (whole grains, vegetables, fruits) and less refined grains, fried meals, alcohol, and sugar-sweetened beverages than regular meat-eaters.[19] According to research conducted in Yogyakarta, the vegan group consumed more protein and carbohydrates, whereas the non-vegan group consumed more fat and calories.[13]

A vegetarian diet, like any other form of diet, can meet nutrient and calorie requirements; but it can also lead to malnutrition. In all types of diets, the amount and type of food consumed remain a top emphasis. This study did not analyze the type of food consumed, which is an interesting matter for further research. The risk of energy and protein deficiency can be further confirmed through physical and laboratory examinations to determine overall health status.

Conclusions and Recommendation

The age range of the respondents is young adults, the percentage of women is slightly higher, and most of them are highly educated. Most participants had permanent jobs, engaged in light-to-moderate physical activity, and were in a normal body mass index range. Most are lacto-ovo-vegetarian, have followed this lifestyle for 6-10 years, and are motivated by health reasons. Vegans consumed more calories, carbs, and protein than non-vegans, but less fat. Most vegan and non-vegan respondents had good nutritional status and were in the sufficient category for achieving calorie and macronutrient requirements. Further research should be conducted to determine the sorts of foods consumed by vegetarians, and their relationships to clinical and laboratory finding, in order to achieve optimal nutritional intake and nutritional status.

Acknowledgement

This study would not have been possible without the generous participation of the residents of Maha Vihara Maitreya Duta (MVMD), we would like to express our sincere gratitude.

Competing Interest

The authors declare that there are no competing interests related to the study

Authors' Contribution

Author 1 – developing a research proposal, collecting data, data analysis, and publication manuscript.

Author 2 – research idea, developing a research proposal, data analysis, publication manuscript
Author 3 – developing a research proposal and data analysis.

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p-ISSN: 2597-4297
e-ISSN: 2775-5215
Volume 5 No 2, Agustus 2022

Table 1. Distribution of sociodemographic characteristics, physical activity, and BMI

Characteristics	n (%)
Age (years old)	
19-29	65 (43.9%)
30-49	80 (54.1%)
50-64	3 (2.0%)
Gender	
Male	57 (38.5%)
Female	91 (61.5%)
Education level	
Junior high school	7 (4.7%
Senior high school	58 (39.2%)
College	83 (56.1%)
Work status	
Unemployed	21 (14.2%)
Employed	127 (85.8%)
Physical activity level	
Low	68 (45.9%)
Moderate	66 (44.6%)
High	14 (9.5%)
Body mass index	
17,0 – <18,5	11 (7.4%)
≥18,5 – 25	101 (68.2%)
>25,0 – 27,0	16 (10.8%)
>27,0	20 (13.5%)

Table 2. Characteristics of vegetarian dietary patterns among participants

Characteristics of vegetarians	n (%)
Vegetarian type	
Vegans	39 (26.4%)
Lacto-ovo vegetarians	88 (59.5%)
Lacto-vegetarians	4 (2.7%)
Ovo-vegetarians	17 (11.5%)
Duration of being vegetarian (years)	
3-5	37 (25.0%)
6-10	46 (31.1%)
11-15	27 (18.2%)
>15	38 (25.7%)
Reasons for being a vegetarian	
Health-related	67 (45.3%)
Environmental consideration	17 (11.5%)
Spiritual related	59 (39.9%)
Human physiology	5 (3.4%)

p-ISSN: 2597-4297
e-ISSN: 2775-5215
Volume 5 No 2, Agustus 2022

Table 3. Comparison of nutritional status between vegans and non-vegans

Nutritional status	Vegan group (n=39)	Non-vegan group (n=109)
Underweight	2 (5.1%)	9 (8.3%)
Normal	31 (79.5%)	70 (64.2%)
Overweight	6 (15.4%)	30 (27.5%)
Total	39 (100%)	109 (100%)

Table 4. Comparison of the amount of food intake between vegans and non-vegans

Dietary intake	Vegan group (n=39)	Non-vegan group (n=109)
Total calories (Kcal)	1999.9	1974.4
Carbohydrate (grams)	309.9	291.7
Protein (grams)	58.1	52.4
Lemak (grams)	58.9	67.0

Table 5. Comparison of total caloric intake and protein level between vegans and non-vegans

Intake level	**Vegans (n=39)**	**Nonvegans (n=109)**
Total calories		
Very less	6 (15.4%)	16 (14.7%)
Less	32 (82.0%)	81 (74.3%)
Sufficient	1 (2.6%)	12 (11.0%)
Protein		
Very less	0 (0.0%)	13 (11.9%)
Less	31 (79.5%)	83 (76.1%)
Sufficient	6 (15.4%)	13 (11.9%)
More`	2 (5.1%)	0 (0.0%)