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Vegetable and Fruits Consumption and Body Mass Index Among Farmers in Rural Areas of Indonesia: A Secondary Data Analysis

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ABSTRACT

Consumption of less vegetables and fruits in a person risks for overweight and obese. Farmers are one job with a low risk of consuming vegetables and fruit (< 250 grams) in one day. The purpose of this research was to know the association between the consumption of vegetable and fruits and body mass index among farmers in Posts of Non-Communicable Diseases (Posbindu PTM) Jenggawah Public Health Center, Jember Regency. A retrospective case-control study was used to analyze secondary data of Posbindu PTM registered from September to November 2020 among 81 farmers. The characteristics of participants, vegetable and fruit consumption, and body mass index were measured through KMS Posbindu PTM. There was a relationship between the consumption of vegetable and fruit with body mass index among farmers (p-value = 0.006; $\chi 2$= 8.725). Among 81 farmers were identified 59.3% less consumption of vegetables and fruit per day and 53,1% of obese. Farmers who consume less vegetables and fruit have a four times greater risk of being obese (OR= 4.00; 95% C = 1.562 – 10.242). Consumption vegetable and fruit is correlated with body mass index among farmers. Therefore, consuming vegetables and fruits should be improved to reduce the risk of obesity among farmers.

KEYWORDS

Vegetable and Fruit Consumption, Farmers, Body Mass Index, Obese, Non-communicable disease

1. BACKGROUND

The World Health Organization (WHO) states that non-communicable diseases (NCDs) are the largest contributor to death in the world (63% of all annual deaths) (WHO, 2014). The 2014 WHO profile estimates that 71% of deaths in Indonesia are caused by NCDs (Pranandari, 2017). Obesity is one of the non-communicable diseases (PTM) which is a risk factor for health problems where the Body Mass Index (BMI) has increased by more than 25 kg/m2. BMI indicates whether someone is obese

(Pranandari, 2017). Many factors affect the increase in BMI, such as changes in diet to be high in calories and fat and low in fiber. To prevent an increase in body mass index, it is necessary to consume adequate fiber. The body's fiber needs can be obtained from consuming vegetables and fruit (Fairudz, 2015). The fiber contained in vegetables and fruits has a function to control body weight or obesity (Santoso, 2011). Therefore, it is necessary to link the relationship between consumption and Body Mass Index at Posbindu PTM to prevent obesity in Indonesia.

The prevalence of non-communicable diseases (NCD) in Indonesia is still quite high. One of them is obesity with a prevalence of 31.0%. The prevalence of farmers/farm laborers in Indonesia who are obese is 20.6% (Kemenkes RI, 2019). Factors affecting a person's BMI include socioeconomic status, education, physical activity, carbohydrate intake, total fat, fiber foods, nuts, and fruits and vegetables (Little, 2016).

The results of basic health research in 2018 show that the consumption of vegetables and fruit in Indonesians over 15 years is only 4.5-4.7% who meet the requirements. The prevalence of farmers/farm laborers who consume enough fruit and vegetables (≥5 portions) is only 4.6% (Kemenkes RI, 2019). Fiber (soluble fiber) can be found in vegetables and fruit. Less consumption of vegetables and fruits means the body's intake of minerals and vitamins is also lacking. The need for vitamins and minerals that are less can increase the risk of degenerative diseases such as obesity. Obesity is one of the risk factors for non-communicable diseases (Susanto, 2017)

The Indonesian government has realized that non-communicable diseases cannot be taken lightly. PTM is one of the health problems and can also cause death that can threaten the economy in Indonesia. Therefore, to maintain and improve the health status of the community, the government has developed a strategy for preventing and controlling PTM with Posbindu PTM activities (Pranandari, 2017). Activities carried out at the Posbindu PTM include measuring blood pressure, measuring blood sugar, measuring body mass index, interviewing risky behavior (one of which is about the consumption of vegetables and fruit) and educating healthy lifestyle behaviors (Direktorat Jenderal Pencegahan dan Pengendalian Penyakit, 2019). 8.6% of the percentage of Villages in Indonesia carried out Posbindu PTM activities in 2015 (Pranandari, 2017).

Preliminary studies obtained from the performance report of the Posbidnu PTM at the Jenggawah Health Center showed different results every month. The number of visits to Posbindu PTM from July to December 2019 was 368 participants with jobs as farmers. The incidence of obesity during the six months accounted for as much as 43%. Every month, the number of farmers experiencing obesity tends to increase. This can be seen in July 2.5%, August 4.9%, September 5.9%, October 6.9%, November 15.5% and December 7.5%. The data of farmers who are obese looks fluctuates every month. The problem of obesity which can be one of the risk factors for health problems in PTM needs to be further identified as the causative factors, which may be related to less consumption of vegetables and fruit. Based on the description above, we would like to identify further the relationship between vegetable and fruit consumption and the body mass index of farmers at Posbindu PTM in Public Health Certer Jenggawah Jember Regency in 2020.

2. METHODS

This research is an observational study with a case-control design with a retrospective approach to analyze the relationship between vegetable and fruit consumption and body mass index in farmers in the Jenggawah Health Center working area, Jember Regency in 2020. The data obtained from the results of the Posbindu PTM report according to the Card Towards Healthy Risk Factors. Non-Communicable Diseases (KMS FR-PTM) Jenggawah Health Center, Jember Regency during September-November 2020.

The population in this study were all farmers in the work area of the Jenggawah Health Center in 2020 who were registered to participate in the Posbindu PTM activities spread across 3 (three) Sub-Healt Centers namely Cangkring, Wonojati and Jenggawah Supporting Health Centers with a population of 211 Posbindu PTM participants in September-November 2020 Samples were selected using the Total Sampling technique, and sorted based on inclusion criteria and exclusion criteria, of the 211 posbindu PTM participants identified 82 data on participants who were not working as farmers, 24 data on participants who were not in the age range 15-59 years and 24 data on participants with visits not in 3 consecutive months, so that a sample of 81 farmer data is obtained.

This study uses secondary data with the characteristics of the number of farmer

workers, age, gender, last education, religion, ethnicity, marital status, weight and height of farmers, and history of consumption of vegetables and fruits of farmers. Health workers assess the consumption of vegetables and fruit in the monitoring book (KMS) with the provisions that the consumption of vegetables and fruit is less if the consumption of vegetables and fruit is < 5 servings/day and if the consumption of vegetables and fruit is sufficient if the consumption of vegetables and fruit is five servings/day. this research

Data management using SPSS 22 program through editing, coding, entry and cleaning stages. Data were analyzed using bivariate analysis and univariate analysis. Univariate analysis was used to analyze categorical and numerical data presented in mean/mean (M), Standard Deviation (SD), median/mean value (Md) and 25th percentile and 75th percentile (P25-P75) or called Quartile 1 – Quarter 3 (Q1-Q3). Bivariate analysis used the Kolmogorov Smirnov normality test (p-value > 0.05) to test the normality of the data, the Chi-Square test (p-value < 0.05) to test the research hypothesis, namely the relationship between vegetable and fruit consumption and the farmer's body mass index. with Confidence Interval = 95%. The research ethics used are social value and clinical value, scientific value, usefulness, freedom, persuasion, financial benefits and replacement costs, protection of privacy and confidentiality, informed consent.

This research was approved by the Ethics Committee of the Faculty of Dentistry, University of Jember on August 25, 2020 with the number 978/UN25.8/KEPK/DL/2020. The research ethics used are social value and clinical value, scientific value, usefulness, freedom, persuasion, financial benefits and replacement costs, protection of privacy and confidentiality, informed consent. Furthermore, we obtained approval from the Faculty of Nursing, University of Jember, National Unity Agency, Politics and Community Protection (Bangkesbangpol and Linmas), Jember District Health Office and Jenggawah Health Center.

3. RESULTS

The results of this study were obtained from secondary data analysis of the performance report of Posbindu PTM in Public health center Jenggawah which included consumption of vegetables and fruits on farmers, body mass index of farmers, and the characteristics possessed, the characteristics of respondents consisted of age, gender, and last education.

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An analysis of the consumption of vegetables and fruit among farmers and the body mass index of farmers is carried out to determine whether there is a relationship between the consumption of vegetables and fruit and the body mass index of farmers and the characteristics that may affect it, which will be presented in the following table.

Table 1. Characteristics among Posbindu PTM Participants in Jenggawah Public Health Center

Farmer Characteristics		n (%)
Age (years)	Md (P25-P75)	45 (37-51)
Gender	Male	17 (21)
	Female	64 (79)
Last Education	No School	0 (0)
	Primary School	79 (97,5)
	Middle School	0 (0)
	High School	2 (2,5)

Md = Median, P25-P75 = 25th-75th percentile; n(%) = total percentage of participants

From the 81 participants of Posbindu PTM in the working area of Pusksesma Jenggawah consisting of 17 male farmers (21%) and 64 female farmers (79%). The number of visitors with elementary school education was 79 farmers (97.5%) and two farmers (2.5%). Farmers who visit Posbindu PTM in Jenggawah have an age with a median value of 45 years.

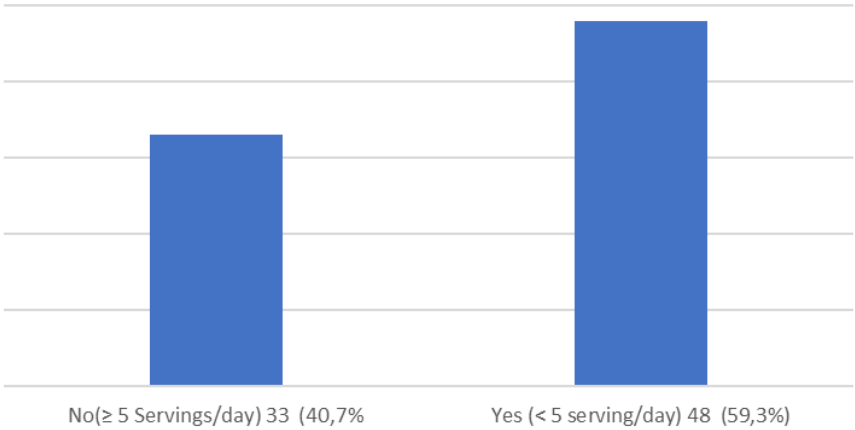

Figure 1. Distribution of Vegetable and Fruit Consumption in Posbindu PTM Jenggawah Health Center Jember Regency in September-November 2020 (n=81)

Based on Figure 1, 48 visitors/farmers consumed vegetables and fruit < 5 servings/day. The level of consumption of vegetables and fruit in this study was

sufficient consumption of fruit vegetables (≥ 5 servings) and less consumption of fruit vegetables (< 5 servings). The level of consumption of vegetables and fruit among participants of Posbindu PTM PKM Jenggawah concluded that FV consumption was less than five servings/day.

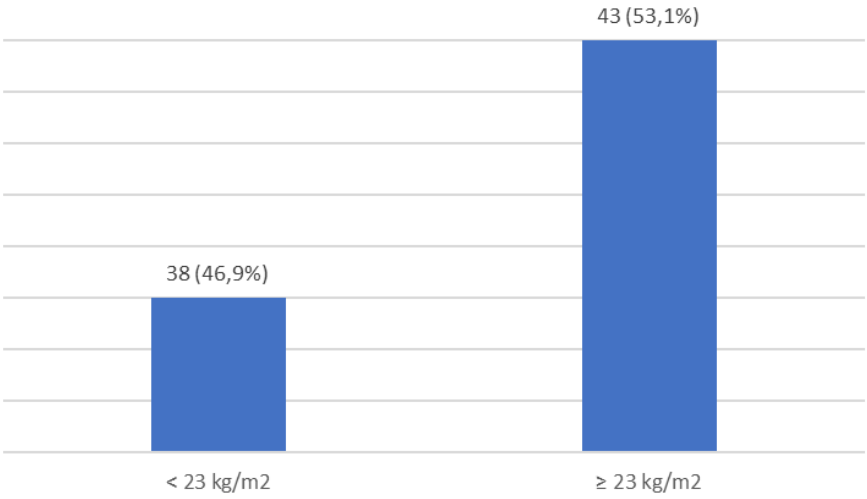

Figure 2. Distribution of BMI levels of farmers in Posbindu PTM in Jenggawah Health Center based on KMS Book (n=81)

Figure 2 illustrates the level of BMI of farmers based on the category of KMS Posbindu PTM produced with a total of 81 farmers, 38 farmers (46.9%) have a BMI < 23 kg/m2, 43 farmers (53.1%) are in the obese group or have a BMI 23 kg/m2. The dominance of farmers BMI based on yield is abnormal BMI. Furthermore, to determine the relationship between the consumption of vegetables and fruit with the body mass index of farmers. The results of the chi-square analysis are presented in the following table.

Table 2. Relationship of Vegetable and Fruit Consumption with Farmers Body Mass Index at Posbindu PTM Public health center Jenggawah Jember Regency (N=81)

Vegetable and Fruit Consumption	Body Mass Index (BMI)				Total		RR (95% CI)	*p-value*
	BMI excess		Normal BMI					
	Total	(%)	Total	(%)	Total	(%)		
< 5 servings/day	32	39,5	16	19,8	48	59,3	4,000 (1,562-10,242)	0,006
≥ 5 servings /day	11	13,6	22	27,1	33	40,7		
Total	43	53,1	38	46,9	81	100		

Table 2 shows a relationship between vegetable and fruit consumption among farmers in the working area of the Jenggawah Health Center as evidenced by the p-value < 0.05 = 0.006. A total of 32 farmers (39.5%) consumed <5 servings of vegetables and fruit/day who had a BMI of 23 kg/m2 or were obese, while 16 farmers (19.8%) who consumed <5 portions/day of vegetables and fruit had a BMI < 23kg/m2. The 95% CI value is 1.562 – 10.242 with an OR of 4,000, meaning that farmers who consume less than five servings of fruit and vegetables daily have four times the risk of having a BMI of 23 kg/m2 (obesity).

4. DISCUSSION

The results of this study are supported by Pratiwi & Mardiyanti (2018), which state that the consumption of vegetables and fruit can be used to control and prevent overweight and obesity. Consumption of vegetables and fruit can significantly affect changes in body weight. A diet high in vegetables and fruit has a relationship in reducing the risk of being overweight and obese.

Research conducted by Li et al. (2012) shows that the lack of consumption of vegetables and fruit can be caused by education and knowledge factors. Knowledge of good vegetable and fruit consumption is essential for adequate vegetable and fruit intake. Moreover, geographical conditions can also affect the level of consumption of vegetables and fruit. The majority of agricultural products in the form of tobacco and rice are also one of the factors for the lack of consumption of vegetables and fruits by farmers. The agricultural area used for vegetable and fruit gardening is only 23 ha for chili, 3 ha for cabbage and 2 ha for tomatoes (BPS Jenggawah, 2020). Therefore, family support is needed to meet the daily needs of vegetables and fruit by utilizing part of the agricultural area for vegetable and fruit gardening.

The results showed that an abnormal BMI dominated the BMI of farmers in Posbindu PTM in Jenggawah. These results are based on an assessment of PTM risk factors. Farmers who suffer from overnutrition can also be caused by the lack of several weekly working days (Santoso, 2011). Increasingly sophisticated agricultural technology makes farmers rely on mechanical machines to do their work, so the calories expended by farmers are few (Yanti, 2020). In addition to the factors of fiber consumption and lack of physical activity, abnormal BMI may occur due to

differences in gender characteristics because this study was dominated by women (79%). The prevalence of obesity in women is higher than in men with a value of 10.1% in men and 14.8 in women (Chooi, 2019). Therefore, female farmers must consider risk factors that can lead to obesity.

The results also showed that 46.9% of farmers had a BMI in the normal category. This percentage is smaller than the results of Riskesdas in 2018 which stated that the normal BMI of farmers was 65.4% (Putra, 2022). Normal BMI in farmers can occur because the physical activity of farmers is quite high. The physical activity carried out with moderate intensity and carried out regularly can reduce the risk of obesity, because there is a balance between energy consumed and energy expended (Putra, 2022). Farmers who are active/work five days/a week with less than 30 minutes of rest every day can reduce the possibility of being overweight (Susanto, 2016).

The results showed that as many as 32 farmers consuming vegetables and fruit < servings/day had a BMI ≥ 23 kg/m2 (74.4%) and there were 16 farmers consuming vegetables and fruit <5 servings/day having a BMI <23kg/m2 or normal (42, 1%). Normal BMI in farmers occurs because the samples used are farmers who generally have a physical activity that can affect body mass index (Suryadinata, 2022). A total of 11 farmers who consumed vegetables and fruit five servings/day had a BMI of 23 kg/m2 or were obese (25,6%). This result is also supported by the results of a study conducted by Yuan et al. (2018), which states that the consumption of vegetables and fruit is associated with significant weight loss among Chinese men and that weight loss in women in China is not significant. Besides that, the occurrence of obesity in farmers is not only due to the influence of the consumption of vegetables and fruits, but also other factors such as age, gender, eating habits, and physical activity. This is also supported by Sattar et al. (2013), which say that many factors can affect a person's body mass index, namely age, gender, eating habits and physical activity.

The results also obtained an OR value of 4,000. An OR value > 1 shows that farmers who consume vegetables and fruit < 5 servings/day have four times the chance to be obese compared to farmers who consume enough vegetables and fruit. The results of the study are also supported by research from Yanto et al. (2020), which states that the amount of vegetable consumption that is less has a risk of overnutrition of 2,652 times higher and the

sample who does not consume fruit has a risk of 4.912 times higher than the sample which is sufficient in consuming vegetables and fruit. The fiber found in vegetables and fruit can delay gastric emptying, suppress hunger, improve digestion and contribute to weight control.

Consuming vegetables and fruit can affect the body mass index, which is one indication in determining the occurrence of obesity. Research conducted by Winarti (2020) explains that consuming vegetables and fruit can reduce the risk of obesity. The fiber content in vegetables and fruit can reduce the risk of being overweight and obese. Soluble fibers, such as pectin and some hemicelluloses can bind water and form fluids in the digestive tract. Foods rich in fiber take a long time to digest, fiber will bind to water and give you a feeling of fullness longer, preventing you from consuming more food. Foods with high fiber contain low calories, low sugar and fat content which help to reduce the occurrence of obesity (Santoso, 2015)

Nurses can develop several plans for promoting and preventing occupational diseases in farmers. Nurses can implement the Community-Based Occupational Health Promotion Program (COPH) (Susanto, 2020). Consumption of vegetables and fruit is one of the important factors affecting farmers' BMI needs to be discussed and focused on further. Creating new menus and making food as attractive as possible in accordance with the availability of vegetables and fruits in the surrounding environment can be done by farming families to increase farmers' appetites. Consumption of vegetables and fruit can be a preventive measure against an increase in BMI.

5. CONCLUSION

There is a relationship between the consumption of vegetables and fruit with body mass index in farmers in the work area of the Jenggawah Health Center, Jember Regency. Consumption of vegetables and fruit among farmers in Posbindu PTM Jenggawah Public health center is dominated by less consumption of vegetables and fruit. The body mass index of farmers in Posbindu PTM Public health center Jenggawah Most have an excessive BMI. Things that may affect the consumption of vegetables and fruit are age, education and knowledge factors. Therefore, it is important to provide an understanding of the impact of less consumption of vegetables and fruits on the body mass index of farmers.

Future researchers should use primary data and more specific questionnaires regarding the consumption of vegetables and fruits and the body mass index of farmers. Researchers can add other variables or characteristics that can affect body mass index.

AUTHOR CONTRIBUTIONS

Substantial contributions to conception, data collection, data analysis, and writing: Nur Oktavia Rhosani, Tantut Susanto, and Hanny Rasni. Drafting or revising the article critically for important intellectual content: Nur Oktavia Rhosani Siti Ma'fuah, and Fahruddin Kurdi.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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