

Risk Factors of Central Obesity in the Group of Tuak Drinkers and Non Tuak Drinkers Study Case Adult Male in Mataram

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Abstract Central obesity occurs because of an imbalance of energy intake with energy expenditure. The cause of central obesity is excess energy intake and low physical activity. Socio-cultural influence on obesity is consuming alcoholic beverages types of tuak are now becoming a habit that is not quite right. The aim of research to analyze the risk factors of central obesity in the group of tuak drinkers and non tuak drinkers. This study was cross-sectional study. The number of subjects were 92 men divided into two groups 46 people drink tuak and 46 people do not drink tuak. Nutrient intake was measured by recall 2x24h and data on level of physical activity obtained by calculating the physical activities level (PAL). Measurement of central obesity using abdominal circumference size. *Data was analyzed by counting prevalence ratio and method of logistic regressio.* Based on the chi-square test, risk factors for central obesity in the group drink tuak are energy intake ($p = 0.002$; PR = 5.556), carbohydrate intake ($p = 0.002$; PR = 5.556), protein intake ($p = 0.002$; PR = 5.556), fat intake ($p = 0.006$; PR = 3.818), physical activity levels ($p = 0.005$; PR = 3.956) frequency of consumption of tuak ($p = 0.026$; PR = 3.046) and the volume of consumption of tuak ($p = 0.014$; PR = 3.400). The risk factors of central obesity in the group do not drink tuak are energy intake ($p = 0.004$; PR = 1.969), carbohydrate intake ($p = 0.001$; PR = 3,529), fat intake ($p = 0.006$; PR = 3.818) and physical activity levels ($p = 0.001$; PR = 4.306). The risk factors that most influence on the incidence of central obesity have excessive protein intake, frequency of consumption and the volume of tuak with a high probability of 62.77 % in the group of tuak drinkers. The risk factors that most influence on the incidence of central obesity has excess energy intake, excessive carbohydrate intake and low physical activity with a probability of 70.72 % in the group do not drink tuak.

Keywords: *central obesity, energy intake, fiber intake, tuak consumption, physical activity*

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1. Introduction

Nutritional problems in Indonesia is currently entering multiple nutritional problems. That is, the problem of malnutrition is still not fully resolved, while it appears more nutritional problems (obesity) [1]. Central obesity is a chronic condition that excess body fat is accompanied by visceral fat accumulation in the abdominal area. It said if the results of the measurement of central obesity abdominal circumference size for men > 90 cm and women > 80 cm [2].

Central obesity may occur due to an imbalance between energy intake and energy expenditure [3]. This situation is supported by a change in lifestyle, such as high consumption of alcoholic beverages, smoking, high consumption of fatty foods, low consumption of vegetables and fruit and low physical activity [4].

The prevalence of central obesity in the adult population (> 15 years) in Indonesia amounted to 18.8% in 2008 and continued to increase to 26.6% in the year 2013 [5]. West Nusa Tenggara province had a prevalence of central obesity were high at 11%. The highest prevalence of central obesity in NTB province are in Mataram City amounted to 16.8%. Based on the characteristics of the city of Mataram, central obesity are highest at the age of 35-44 years is 16.2% [6].

Factors local culture and tradition also affects the occurrence of central obesity in this area. Because in each area would have customs, traditions, norms and culture of its own that is still practiced and trustworthy. One is the culture of "me-tuak-an" that is the tradition of drinking tuak (made from palm trees leads naturally fermented) and *sedak* types of food sources of protein from pork and chicken meat. The alcohol content of the tuak is 5.42%. Consuming alcoholic beverages in large quantities can be a positive influence on the occurrence of central obesity [6].

The tradition of drinking tuak is served when such celebration activities will celebrate the success of the harvest of rice, soybeans and tobacco. However, due to the changes in lifestyle and people's income increases, the tradition of drinking tuak is a habit that is done often or even almost every day. If done with sufficient frequency prolonged much can lead to excess energy intake. This can be one of the factors of obesity sentral [7].

Some studies show that alcohol can reduce the oxidation of fat that can lead to excess storage of fat in the body. Excessive consumption of alcohol will add calories to the diet and reduce expenditures fat from the body. Moreover, the habit of consuming alcoholic beverages can also increase cholesterol levels [8]. According to Breslow, the effect of consuming alcoholic beverages to a person's body mass index (BMI) based on two factors, types of daily drinks consumption and frequency of consumption of beverages [9].

2. Method

This study design was observational with cross-sectional study [10]. The study was conducted in the District Mataram and District Cakranegara of Mataram City in Indonesia. Decision-location research based on the highest prevalence of central obesity were carried out in February-March 2020.

The subjects were adult males aged 30-64 year amounted to 92 people consisting of 46 groups of 46 people drink tuak and groups do not drink tuak. The dependent variable was the incidence of central obesity. The independent variable is the intake of energy, carbohydrate, protein, fat intake, fiber intake, physical activity levels and frequency and the volume of tuakconsumption.

Intake nutrient and drink consumption tuak obtained through direct interviews with food recall method 2x24h and physical activities level data obtained by calculating the physical activities level (PAL). Energy intake, carbohydrate intake of protein and fat intake, categorized into quite $\leq 100\%$ RDA and excess $> 100\%$ RDA. Fiber intake categorized into quite ≥ 25 g / day and less than < 25 g / day. Physical activity levels were categorized into mild (PAL values from 1.40 to 1.69) and moderate (PAL values from 1.70 to 1.99). The frequency of consumption of palm tuak ≤ 10 times categorized into light and heavy consumption of tuak > 10 times in 30 days and the volume of tuak consumption ≤ 10 bottle categorized into low and high > 10 bottles in 30 days.

Analysis of data using univariate, bivariate analysis using Chi-square test with a confidence level $\alpha \leq 0,05$ (95%) and using the prevalence ratio (PR). Multivariate analysis performed by the regression test logistic [10].

3. Result

3.1. Characteristics of Subjects

Analysis of subject characteristics such as age, education level, employment income in the group drink tuak and do not drink tuak.

Table 1. Frequency Distribution Based Research Respondents Respondent Characteristics

Characteristics	Frequency	%
Age		
Drinkers		
30-49 years	30	65,2
50-64 years	16	34,8
Amount	46	100,0
Not Drinkers		
30-49 years	32	69,9
50-64 years	14	30,4
Amount	46	100,0
Level of Education		
Drinkers		
No school	22	47,8
Elementary	11	23,9
Junior High	2	4,3
Senior High	8	17,4
Undergraduate	3	6,5
Amount	46	100,0
Not Drinkers		
Elementary	2	4,3
Senior High	40	87,0
Undergraduate	4	8,7
Amount	46	100,0
Type of Work		
Drinkers		
Farmer	2	4,3
Labor	24	52,2
Trader	1	2,2
Private	15	32,6
Police	1	2,2
No work	3	6,5
Amount	46	100
Not Drinkers		
Farmer	2	4,3
Labor	4	8,7
Trader	9	19,6
Private	27	58,7
Government Employe	4	8,7
Amount	46	100,0
Income		
Drinkers		
Above UMR	18	39,1
Under UMR	28	60,9
Amount	46	100,0
Not Drinkers		
Above UMR	28	60,9
Under UMR	18	39,1
Amount	46	100,0

Table 1 shows that the average age of the respondents in the group of drinkers was 48.12 years and in the group of drinkers was 47.09 years. Based on educational level, the group of tuak drinkers most of the respondents 47.8% are not in school and in the group do not drink tuak most of the respondents' education level 87% finish high school. The type of work the respondents in the group of tuakdrinkers majority worked as a laborer/builders 52.2% and the group did not drink tuak majority work as private as a realtor soil and rice milling enterprises 58.7%. Based on the level of income, the group of tuak drinkers mostly below the minimum UMR and the group did not drink tuak mostly above the minimum UMR.

3.2. Overview Genesis Central Obesity

In a study to describe the risk factors of sentral obesity is to measure abdominal circumference respondents. It said central obesity when the abdominal circumference values > 90cm [11].

Table 2 shows that the size of the abdominal circumference of respondents in the group of tuak drinkers mostly 89.1% had abdominal circumference >90 cm size with a median size of 97 cm abdominal circumference respondents \pm 8.08. In the group did not drink tuak, mostly 71.7% had abdominal circumference \leq 90 cm with a median size of abdominal circumference of 2.97 cm \pm 84 respondents.

Table 2. Frequency Distribution of Respondents by Size of Abdominal Circumference

Variabel Abdominal Circumference	Frequency	%
Drinkers		
≤ 90 cm	5	10,9
>90 cm	41	89,1
Amount	46	100,0
Not Drinkers		
≤90 cm	33	71,7
>90 cm	13	28,3
Amount	46	100,0

3.3. Risk Factors Central Obesity of Group Tuak Drinkers

Table 3. Analysis of Risk Factors Central Obesity In Group Drinkers Tuak

Variabel		Respondent Status		Valuep	PR (95% CI)
		Normal (%)	OS (%)		
Energy Intake	Enough	5 (83,3)	1 (16,7)	0,002	5,556 2,447-12,613
	Excess	6 (15,0)	34 (85,0)		
Carbohydrate Intake	Enough	5 (83,3)	1 (16,7)	0,002	5,556 2,447-12,613
	Excess	6 (15,0)	34 (85,0)		
Fat Intake	Enough	6 (54,5)	5 (45,5)	0,006	3,818 1,441-10,117
	Excess	5 (14,3)	30 (85,7)		
Protein Intake	Enough	5 (83,3)	1 (16,7)	0,002	5,556 2,447-12,613
	Excess	6 (15,0)	34 (85,0)		
Fiber Intake	Enough	3 (27,3)	8 (72,2)	0,765	0,838 0,268-2,623
	Less	41 (74,5)	51 (92,7)		
Physical Activity	Medium	5 (62,5)	3 (37,5)	0,005	3,958 1,594-9,829
	Low	5 (9,1)	30 (31,8)		
Frequency ConsumptTuak	Low	6 (46,2)	7 (53,8)	0,026	3,046 1,123-8,266
	High	5 (15,2)	28 (84,8)		
Volume Consumpt Tuak	Low	6 (50,0)	6 (50,0)	0,014	3,400 1,266-9,129
	High	5 (9,1)	30 (31,8)		

Energy intake, carbohydrate intake, fat intake, excessive protein intake, physical activity levels and frequency and volume low tuak consumption is a risk factor for central obesity to drink tuak group ($p < 0.05$), while fiber intake is not a risk factor for obesity central ($p > 0.05$).

3.4. Risk Factors Central Obesity In Groups Non Tuak Drinkers

Table 4. Analysis of Risk Factors Against Obesity In Group Non Tuak Drinkers

Variabel		Responden Status		Valuep	PR (95% CI)
		Normal (%)	OS (%)		
Energy Intke	Enough	27 (84,4)	5 (15,6)	0,004	1,969 1,056-3,671
	Excess	6 (42,9)	8 (57,1)		
Carbohydrate Intake	Enough	30(88,2)	4 (11,8)	0,001	3,529 1,315-9,476
	Excess	3 (25,0)	9 (75,0)		
Fat Intake	Enough	32 (78,0)	9 (22,0)	0,006	3,818 1,441-10,117
	Excess	1 (20,0)	4(80,0)		
Protein Intake	Enough	29 (70,7)	12 (29,3)	1,000	0,884 0,547-1,430
	Excess	4 (80,0)	1 (20,0)		
Fiber Intake	Enough	19 (70,4)	8 (29,6)	0,806	1,047 0,728-1,506
	Less	14 (73,7)	5 (26,3)		
Physical Activity	Medium	31 (86,1)	5 (13,9)	0,001	4,306 1,238-14,976
	Low	2 (20,0)	8 (80,0)		

Energy intake, carbohydrate intake, excess fat intake, level of physical activity lightweight is a risk factor in the incidence of central obesity of group non drink tuak group ($p < 0.05$), while less fiber intake and high protein intake is not a risk factor for the incidence of central obesity ($p > 0.05$).

3.5. Logistic Regression Analysis

Table 5. Results of Logistic Regression Test Analysis

Group	Variabel	B	Sig	Exp(B)	95% CI	
					Lower	Upper
Drinkers Tuak	Protein Intake	3,344	0,004	28,333	2,796	287,10
	Constant	-1,735	0,000	0,176		
	Fat Intake	3,344	0,110	3,502	1,98	22,285
Non Tuak Drinkers	Energy Intake	3,037	0,035	4,801	3,01	80,303
	Carbohydrat Intake	3,027	0,021	4,870	4,20	63,033
	Physical Activities	2,993	0,024	3,421	4,12	67,877
	Constant	-7,643	0,000	85,197		

Variables that are used in the test regresi logistis candidate is the variable that has a value in the bivariate analysis $p \leq 0.25$ [10]. Based on Table 5, of all the independent variables analyzed, the most influence on central obesity in the group drink wine is a protein with a value of $p = 0.004$ (PR=28.333) means people who have a protein intake of excess to experience central obesity 28.333 times greater than those with sufficient protein intake in the group of wine drinkers. In the group did not drink tuak most influential central obesity in the group do not drink tuak is the intake of carbohydrates with a value of $p = 0.021$ (PR = 4.870) means people who have the intake of carbohydrates to experience central obesity 4.870 times greater than those with the lowest intake carbohydrate group did not drink tuak.

4. Discussion

Central Obesity because of an imbalance between intake and energy expenditure [11]. The results of this study are consistent with the theory that the energy intake exceeds Nutrition Adequacy Score or angka kecukupan gizi (AKG) in Indonesia is a major cause of obesity [8]. Energy is a nutrient that the body needs, where the amount of energy a person needs depends on age, sex, weight and body shape. Energy intake can be obtained from food ingredients that contain carbohydrates, protein and fat. Method of measuring energy intake is done using 2x24-hour recall method.

In this study has measured the contribution of energy from sugary drinks and alcoholic intake so as to describe the actual conditions. Sweet drinks and alcoholic beverages in question is wine. Types of food and sugary drinks contribute energy high enough that from sukrosa [12] sugar content. Respondents have the habit of drinking this wine at night after their work. This habit is often done with a frequency dangat up every day and the volume of consumption too much.

Contributions of this drink can influence the reduction / consumed a low intake of respondents each day. Hence, in the calculation of energy intake most respondents classified as excess and no respondents were classified as having energy intake is less than the RDA. Tuak consumption average respondent 1-2 bottles (600-1200ml) in a day so drink this tuak can be accounted for about 600-750 kcal. This study said energy intake had a significant influence on the incidence of central obesity.

Results The study was supported by research conducted by Mustamin in 2018 that there was a significant

association between energy intake with the incidence of central obesity ($p = 0.022$) [13]. This study are consistent with previous research conducted by Yulianti stating that the main factor cause of obesity is excess energy intake. Good energy intake or as needed if it is not balanced with physical activity, the remains will be the accumulation of fat, especially in the abdominal area [14].

Carbohydrates are the main source of energy for the body. Excess carbohydrates in the body will be converted into fat and stored in the body that can cause weight gain badan [15]. The results are consistent with the results of research Arttisto Muhammad Adi Yussac of 2017 which states that there is a positive relationship between the intake of carbohydrates with central obesity. In the study said that the excessive intake of carbohydrates can be at risk for obesity kejaian sentral [16]. The human body can not store excess protein, a protein that is consumed than the body needs to be converted and stored as fat.

This study coincides with findings Gunnarsdottir and Thorsdottir stating that there is a significant correlation between protein intake with obesitas [17]. Physical activity consists of activities during work, sleep and at times senggang [18]. These findings are consistent with research conducted by Cristina Dilla who explains that there is a positive relationship between physical activity with central obesity. The study explained that the exercise was not routine (low) have a higher risk for obesity compared with the central sports rutin19. Physical activity can influence the change of central fat tissue, even in children. Mustelin et al. in 2009 found that there is a strong relationship between physical activity and abdominal circumference [16].

5. Conclusion

Risk Factors of central obesity in the group of tuak drinkers are energy intake, carbohydrate intake, fat intake, protein intake, physical activity levels and frequency and the volume of tuak consumption. While the risk factors of central obesity in the group do not drink tuak is energy intake, carbohydrate intake, fat intake and physical activity levels. Risk factors related to obesity in both groups were energy intake, carbohydrate intake, fat intake and physical activity levels.

The risk factors that most influence on the incidence of central obesity have excessive protein intake, frequency of consumption and the volume of tuak with a high probability of 62.77 % in the group of tuak drinkers. The risk factors that most influence on the incidence of central

obesity has excess energy intake, excessive carbohydrate intake and low physical activity with a probability of 70.72 % in the group do not drink tuak.

6. Suggestion

Based on the research results, the necessary improvement in the quality of public health in preventing and minimizing degenerative diseases as well as changing lifestyles community by the following measures: Provide information through counseling and counseling to the public related to patterns of behavior and habits that are less precise. Information should contain about nutrition, weight monitoring, the energy needs of each individual, the type of food to be consumed and the importance of physical activity as well as explain the disease risks that arise when someone is having central obesity. For government agencies and health care system should be able to improve the promotion of healthy lifestyles and nutrition conscious families as central obesity prevention efforts by increasing intervention planning, monitoring, and evaluation of degenerative disease control programs. Benefits theoretically require further research on the causes of central obesity is more profound that central obesity cases can be observed, controlled and dealt with as soon as possible.

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