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RESEARCH ARTICLE

CENTRAL OBESITY IN EMPLOYEE AGES 30-55 YEARS AT THE RECTORATEOFFICE OF TADULAKO UNIVERSITY, PALU CITY

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ABSTRACT

A simple, sensitive, linear, precise and accurate RP-HPLC method for simultaneous estimation of Zaltoprofen and Paracetamol in bulk and tablet formulation as developed and validated. Chromatographic conditions used are stationary phase Grace C18 column (250mm × 4.6mm, 5µ particle size. The mobile phase Methanol: Phosphate buffer (PH 3.0) in the ratio 75:25 v/v and flow rate was maintained 0.8ml/min, detection wavelength was 241nm. The retention times were 3.101min and 5.838min for Zaltoprofen and Paracetamol respectively. Calibration plot were linear R2 =0.9994 over the concentration range 10-18µg/ml for Zaltoprofen, R2 = 0.9994 for the Paracetamol 40-72µg/ml. No interference from any component of pharmaceutical dosage form was observed. The proposed method has been validated as per ICH guidelines, validation studies revealed that method id specific, rapid, reliable and reproducible. The developed method successfully employed for routine quality control analysis in the combined pharmaceutical dosage form.

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INTRODUCTION

Obesity these days is no longer a health problem for developed countries only, but has spread to every corner in developing countries. The occurrence of obesity due to energy imbalance in a certain period of time. Overall obesity (*generalized obesity*) can affect and resulting changes in blood volume and heart function, while regional spread around the abdominal and chest cavities (central obesity) will cause impaired respiration function, and abdominal area fat is associated with cardiovascular risk factors metabolic syndrome, including diabetes type 2, impaired tolerance to glucos, hypertension and dyslipidemia (Arisman, 2014) with higher risk of death in central obese patients (van der, 2014). Data in 2007 in Indonesia, central obesity prevalence increased by 18.8% untill 2013 amounted to 26, 6%. In Central Sulawesi population prevalence of central obesity age ≥15 is 28, 0%. Donggala Regency is the lowest prevalence of obesity at 24, 45% and the highest is Palu City at 34.9%. Central obesity can occurs due to genetic factors, marital status, lack of physical activity (Azadbakht, 2013), gender (Tzotzas, 2010), age (Coll, 2015). Approximately 80-90% cases of central obesity are estimated to be found in the adult age range. In Central Sulawesi the prevalence of central obesity was highest in the age range of 45-54 at 39.0%, age 35-44 at 35.9% and the lowest in the age range of 15-24 age at 10.9%

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(Health Research and Development Agency, 2013). In general, central obesity is related to energy imbalances in the body (Tchernof and Després, 2013). The balance energy is determined by the intake of energy from nutrients such are carbohydrates, fat, protein and our energyneeds (Soegih, 2009). Other factors that can cause central obesity are lack consumption of fruits and vegetables (Azadbakht, 2013). On the other hand, physical activity plays an important role in the occurrence of central obesity in a person. In Central Sulawesi, the average physical activity behavior in residents aged ≥10 which is included in the active category is 73,0 %. The Tadulako University Rectorate Office employees mainly work in the administration occupied and do more sitting activities which causes less physical activity. According to (9) adults can sit with a long-term frequency when they are driving, working at a computer desk and watching television will have highercentral obesity risks. In addition, the eating habits of employees who choose to eat at the stalls located around Tadulako University which provides ahigh-carbohydrate, high-fat and low fiber menu, can triggered the fat deposits. Research conducted by (Siddiquee , 2015) that high carbohydrate intake, high fat intake and low physical activity are risk factors for central obesity. Based on the preliminary study conducted on 10 employees aged 30-55 at Tadulako University Rectorate Office, There are six of them who had abdominal circumference size above ≥ 80 cm in women and ≥ 90 cm in men, so it is categorized as central obesity.

In addition, there are 4 people who have a history of obesity in the family, and 6 employees with Central obesity all have high levels of energy intake, carbohydrate intake and fat intake. Central obesity category on 6 people are known to be 4 inactive people and 2 active people while 4 who are not sustain central obesity known 1 inactive person and 3 active people. This study wants to know Central obesity risk factors for employees age 30-55 in Tadulako University Rectorate Office.

MATERIALS AND METHODS

This study uses an observational analytic method with a *case control*study approach. The research location was at the Tadulako University Rectorate Office on March 18 to June 13, 2015. The population in this study were all employees aged 30-55 at Tadulako University Rectorate Office with a *random sampling* technique. The sample selection was done by selecting a sample consisting ofemployees having central obese as cases and employees who have not central obese as controls in pairs form.

Data collection

- Primary data is obtained directly from the place of research in Tadulako University Rectorate Office and also distributing questionnaires directly to the employee and measuring the abdominal circumference using a measuring tape.
- Secondary data used in this study are employee characteristics data and an overview of the Tadulako University Rectorate Office.

RESULTS

Risk Factors for Energy Intake of Central Obesity: The risk of energy intake towards central obesity is analyzed using *OR (Odds Ratio)* as shown in the following table. Data showsat table 1 that respondents who sustain central obesity have more high energy intake which is 41 people (89.1%), compared to those who doesn't sustain central obesity which is 9 people (19.6%), while respondents who doesn't sustain central obesity have more intake low energy, which is 37 people (80.4%), compared to those who sustain central obesity, which is 5 people (10.9%). The result of *Odds Ratio* (OR) analysis with 95% *Confidence Interval* (OR) obtained OR = 33,711 (10,358-109,720), this means that the incidence of central obesity is 33,711 times higher with high energy intake than low energy intake. Judging from OR> 1, high energy intake is a risk factor for central obesity.

Risk Factors for Carbohydrate Intake of Central Obesity: The risk of carbohydrate intake towards central obesity is analyzed using *OR (Odds Ratio)* as shown in the following table. Data shows at table 2 that respondents who sustain central obesity have more high carbohydrate intake which is 38 people (82.6%), compared to those who doesn't sustain central obesity which is 13 people (28.3%), while respondents who doesn't sustaincentral obesity have more intake low carbohydrate, which is 33 people (71.7%), compared to those who sustain central obesity which is 8 people (17.4%). The results of the *Odds Ratio* (OR) analysis with 95% *Confidence Interval* (OR) obtained OR = 12,058 (4,451-32,664), this means that the incidence of central obesity is 12,058 times higher with high carbohydrate intake than low carbohydrate intake. Judging from OR> 1, high carbohydrate intake is a risk factor for central obesity.

Risk Factors for Fat Intake of Central Obesity: The risk of fat intake towards central obesity was analyzed using *OR (Odds Ratio)* as shown in the following table. Data shows at table 3 that respondents who sustain central obesity have more high fat intake, which is 40 people (87.0%), compared to those who doesn't sustain central obesity which is 15 people (32.6%), while respondents who doesn't sustain central obesity have low fat intake, which is 31 people (67.4%), compared to those who sustain central obesity, which is 6 people (13.0%). The results of *Odds Ratio* (OR) analysis with 95% *Confidence Interval* (OR) obtained OR = 13,778 (4,790-39,631), this means that the incidence of central obesity is 13,778 times higher with high fat intake than low fat intake. Judging from OR> 1, high fat intake is a risk factor for central obesity.

Risk Factors for Fiber Intake of Central Obesity: The risk of fiber intake towards central obesity was analyzed using *OR (Odds Ratio)* as shown in the following table. Data shows at table 4 that respondents who sustain central obesity have more low fiber intake, which is 32 people (69.6%), compared to those who doesn'tsustain central obesity, which is 16 people (34.8%), while respondents who doesn'tsustain central obesity have more high fiber intake. which is 30 people (65.2%), compared to those who sustain central obesity which is 14 people (30.4%). The results of the *Odds Ratio* (OR) analysis with 95% *Confidence Interval* (OR) obtained OR = 4,286 (1,790-10,263), this means that the incidence of central obesity is 4.286 times higher with low fiber intake than high fiber intake. Judging from OR> 1, low fiber intake is a risk factor for central obesity.

Risk Factors for Physical Activity Against Central Obesity: The risk of central obesity activities was analyzed using *OR (Odds Ratio)* as shown in the following table. Data shows at table 5 that respondents who sustain central obesity have lower physical activity, which is 39 people (84.8%), compared to those who doesn't sustain central obesity, whic is 17 people (37.0%), while respondents who doesn't sustain central obesity have more physical activity. which is 29 people (63.0%), compared to those whosustain central obesity which is 7 people (15.2%). The results of *Odds Ratio* (OR) analysis with 95% *Confidence Interval* (OR) obtained OR = 9.504 (3.486-25.909), this means that the incidence of central obesity is 9.504 times higher with low physical activity than high physical activity. Judging from the OR value> 1, low physical activity is a risk factor for central obesity.

DISCUSSION

Risk of High Energy Intake and Central Obesity: Based on the results of research conducted on employees at the Rectorate Office of Tadulako University with the risk of high energy intake to central obesity, it shows that the OR value with 95%*Confidence Interval is* 33,711 with lower values (10,358) and upper values (109,720) doesn't include the value of 1, this means that the incidence of central obesity is 33,711 times higher with high energy intake than low energy intake. Therefore the value of OR> 1, high energy intake is a risk factor for central obesity. If the evaluation of energy intake is analyzed by comparing the daily Nutrient Adequacy Rate(NAR) of energy, then we got OR=5.312, which means that the OR value includes a value>1, then energy intake is a risk factor for central obesity. This analysis is much lower when compared with using the average intake of respondents, with OR = 33,711.

Table 1 . Risk Factors for Energy Intake of Central Obesity at The Rectorate Office of Tadulako University in 2016

Energy Intake	Obesity Incidence				Total	OR (95% CI)
	Case		Control			
	n	%	n	%		
High	41	89,1	9	19.6	50	33,711
Low	5	10.9	37	80.4	42	

Table 2 . Risk Factors for Carbohydrate Intake of Central Obesity at The Rectorate Office of Tadulako University in 2016

Carbohydrate Intake	Obesity Incidence				Total	
	Case		Control			OR
	n	%	n	%		(95% CI)
High	38	82.6	13	28.3	51	
Low	8	17.4	33	71,7	41	12,058 (4,451-32,664)

Table 3 . Risk Factors for FatIntake of Central Obesity at The Rectorate Office Of Tadulako University in 2016

Fat Intake	Obesity Incidence				Total	OR (95% CI)
	Case		Control			
	n	%	n	%		
High	40	87.0	15	32.6	55	
Low	6	13.0	31	67.4	37	13,778 (4,790-39,631)

Table 4 . Risk Factors for Fiber Intake of Central Obesity at The Rectorate Office of Tadulako University in 2016

Fiber intake	Obesity incidence				Total	OR
	Case		Control			(95% CI)
	n	%	n	%		
Low	32	69.6	16	34.8	48	
High	14	30.4	30	65.2	44	4,286 (1,790-10,263)

Table 5 . Risk Factors for Physical Activity of Central Obesity at The Rectorate Office of Tadulako University in 2016

Physical activity	Obesity incidence				Total	OR (95% CI)
	Case		Control			
	n	%	n	%		
Low	39	84.8	17	37.0	56	9,504
High	7	15.2	29	63.0	36	(3,486-25,909)

This happens because the average value of respondents energy intake, which is 2373 kcal, is used for the standard of all respondents' intake, whereas when using the comparison with NAR, it is seen by age group, where different ages then different energy sufficiency. According to (The Ministry of Health, 2013) number of adequacy Daily energy for men age between 30-46 is 2670 kcal and age between 50-55 is 2325 kcal. While for women, the daily sufficiency energy recommended is lower for age btween 30-46 is 2150 kcal and age between 50-55 is 1900 kcal.

This research is in line with the research conductedby (Nisa and Fikawati, 2013) obtainedOR value with 95% *Confidence Interval* of 8.74 with lower values (2, 80) and upper values (27.33). In line with research by Waingankar (2016), that high energy intake was more risky at 2.36 times higher for having central obesity. However, it is not in line with the research conducted by (Coll, 2015) that there is no correlation between energy intake and central obesity with a value of ρ = 0.054. This research is also not in line with the research conducted by (Fridawanti, 2016) that there is no significant correlation between central obesity and energy intake (ρ = 0.326).

Risk of High Carbohydrate Intake and Central Obesity: Based on the results of research conducted on employees at the Rectorate Office of Tadulako University with the risk of high carbohydrate intake to central obesity, it shows that the OR value with 95%*Confidence Interval* was 12,058 with a lower value (4,451) and upper value (32,664) doesn't include the value of 1, this means that the incidence of central obesity is 12,058 times higher with high carbohydrate intake than low carbohydrate intake. Therefore the value of OR>1, high carbohydrate intake is a risk factor for central obesity. This research is in line with the research conducted by (Nisa, 2013) The results of the correlation test between carbohydrate intake and central obesity obtained OR=5.59. In line with the comparative analysis of the NAR values OR=6.750, it means that high carbohydrate intake has a risk of 6.750 times higher for central obesity compared to respondents with low carbohydrate intake. Research by (Siddiquee , 2015) also shows that the high carbohydrate intake is a risk factor for central obesity with a value of ρ = <0.001. This research is not in line with research conducted by (Fridawanti, 2016) which is not found significant correlation between central obesity and carbohydrates intake with a value of ρ = 0, 824. According to (Supariasa, 2013) weakness of the intake food assessment method is that the respondents must be honest and highly motivated.

Risk of High Fat Intake and Central Obesity: Based on the results of research conducted on employees at the Rectorate Office of Tadulako University with the risk of high fat intake showed that the OR with *confidence interval* of 95% was 13.778 with a lower value (4.790) and upper value (39.631)

doesn't include the value of 1, this means that the incidence of central obesity is 13,778 times higher with high fat intake than low fat intake. Therefore the value of OR>1, high fat intake is a risk factor for central obesity. This research is in line with the research conducted by(Nisa, 2013) values obtained OR = 5.76 with a lower value (2.47) and upper (13.43), which indicates that high fat intake risk 5.76 times more likely to develop central obesity. This is in line with research by (Krachler, 2006). The obtained value of ρ = <0001 which means there is a relation between excessive fat consumption and central obesity. Fat intake was also analyzed based on the comparison of daily fat NAR values, then OR=6.111 which means that the OR value includes a value of>1, fat intake is a risk factor for central obesity. This research is not in line with the research conducted by (Fridawanti, 2016) where the value of ρ *is* obtained = 1.000, also research by (Coll, 2015) that there is no relation between total fat energy and central obesity, both in men and women with a value of ρ = 0.136 and 0.611. This is because of using *cross sectional* research design, which according to (Coll, 2015) the design of this study provides a limited ability to explain the relation between the risk factors studied. In accordance with theory (Notoatmodjo, 2010) that the lack of such design is it has weak validity and doesn't explain the causal relation because the risk and effect data are carried out at the same time.

Risk of Low Fiber Intake and Central Obesity: Based on the results of research conducted on employees at the Rectorate Office of Tadulako University with the risk of low fiber intake to central obesity, it shows that that the OR value with a 95%*Confidence Interval* of 4,286 with a lower value (1.790) and upper value (10,263) doesn't include the value of 1, this means that the risk of central obesity is 4,286 times higher with low fiber intake than high fiber intake. Which means that the value of OR>1, fiber intake low is a risk factor for central obesity. This research is in line with the research conducted by (Du, 2010) that the value of ρ *is* obtained = <0.005 which means there is a significant relationship between fiber intake and central obesity. The higher fiber intake consumed, the lower the risk for central obesity. But it is not in line with the research by (Burhan, 2013) , obtained Value (*Odds Ratio*) OR = 1 shows that low fiber intake is not a risk factor for central obesity. As with research by (Mckeown, 2009). The obtained value of ρ = 0.29 the meaning there is no correlation between low fiber intake and central obesity.

Risk of Low Physical Activity and Central Obesity: Based on the results of research conducted on employees at the Rectorate Office of Tadulako University with the risk of low physical activity indicate that the OR value with 95% *Confidence Interval is* 9.504 with lower values (3.486) and upper values (25,909) doesn't cover the value of 1, this means that the incidence of central obesity is at risk of 9.504 times higher with low physical activity than high physical activity. Because the value of OR>1, low physical activity is a risk factor for the incidence of central obesity. This research is in line with research by (Azadbakht *et al*., 2013) obtained OR =2.11 (1.40-2.53). This means that low physical activity is risk 2,11 higher with the incidence of central obesity. Similarly, research conducted (Pradeepa, 2015) obtained value ρ = <0.005, which means that low physical activity is have a relationship with central obesity. In addition, this study is not in line with research by (Hasriana, Sukriyadi, 2014) that the value of ρ = 0.525 is obtained which means there is no relationship between physical activity and central obesity. The research was conducted at sugar factory employees, the weakness of this study did not explain the instrument for assessing physical activity on employees. However, the researcher explained that the research was carried out outside of the milling period, so that most respondents came just chatting with fellow employees, consequently there was no significant difference between physical activity of employees who had normal weight and central obesity.

Conclusion and suggestion: The incidence of central obesity are at higher risk on high energy intake, high carbohydrate intake, high fat intake, low fiber intake, low physical activityon employees at the Recto rate Office of Tadulako University. It is expected that the Rectorate Office will conduct socialization and counseling related to central obesity, and urge employees to often carry out physical activities. In addition, employees should avoid consuming high-fat snacks such as fried foods. As well as for further researchers add other factors that can affect the incidence of central obesity such as stress factors and smoking status.

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