Risk Factors of Central Obesity among Female Students

Kartika Pibriyanti[1 *], Fathimah[2], Susi Nurohmi[3], Safira Kholifatul Ummah[4]

{ dkartika.02@gmail.com }

[1,2,3,4] Nutrition Department, Faculty of Health Science, University of Darussalam Gontor

Abstract. Central obesity is an excessive fat in abdominal cavity, wrapping around abdominal organs and considered as risk factor for several chronic diseases such as atherosclerosis, cardiovascular disease, type 2 diabetes mellitus, gallstones, pulmonary disoder, hypertension and dyslipidemia. Several factors, like low physical activity, mental emotional, less consumption of fruits and can cause obesity. This study aimed to identify the risk factors for obesity in female college students. This research used case control design and purposive sampling technique. Subjects participated in this research were 94 female students classified as normal and central obesity. Statistical analysis used Chi Square test to analyze correlation between variables. The results showed that risk factors for obesity were vegetable consumption patterns (p = 0,000; OR = 7.71) and fruit consumption patterns (p = 0.002; OR = 3.71). Nutritional knowledge (p = 0.835; OR = 1.09), physical activity (p = 0.748; OR = 0.81), and mental emotional state (p = 0.391; OR = 0.69) were neither related nor a risk factor for central obesity. Low consumption of vegetables and fruits was risk factor for obesity among female students, while nutrition knowledge, physical activity and mental emotional state were not risk factors for obesity among female students.

Keywords: Central obesity, female students, fruit and vegetable consumption pattern, mental emotional state, nutritional status, physical activity

1. Introduction

The prevalence of central obesity in Indonesia has increased in the last 5 years. The increase reached 31% in 2018 from 3.4% in 2013 (Ministry of Health, 2018). Munyogwa and Mtumwa (2018), explained that in Tanzania, prevalence of central obesity among women (35.14%) was higher than men (6.89%). In Indonesia, the incidence of obesity or central obesity is a "double burden disease" which can affect Indonesian population. Infection is a major cause of morbidity and mortality, on the other hand non communicable diseases such as central obesity can also cause death (Harbuwono et al, 2018).

Obesitas sentral merupakan faktor risiko dari beberapa penyakit sindrom metabolik diantaranya hipertensi, dislipidemia dan diabetes tipe 2 (Sofa, 2018). According to Ministry of

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Health, 2018, central obesity can be measured using indicators of waist circumference or abdominal circumference (>80 cm in women and > 90 cm in men). The incidence of central obesity is caused by poor eating patterns and consuming unhealthy foods frequently such as fast food, junk food, and softdrinks (Septiana, et al. 2017). Furthermore, low activity level causing an imbalance between energy intake and expenditure can also be a cause of central obesity (Khairani, et al, 2018). And central obesity will be risk factor for several metabolic syndrome diseases including hypertension, dyslipidemia and type 2 diabetes mellitus (Sofa, 2018).

Prevention of central obesity earlier in adolescence is very important to minimize the occurrence of central obesity in adulthood and elderly. Central obesity in adolescents also affects adolescent psychological growth. Adolescents with obesity will have a negative body image that affects their mental and emotional state and it will result in a low quality of life (Kharistik, et al, 2018)

University of Darussalam Gontor has 2 categories of student namely regular students and teacher students. Besides being a teacher and mentor for guiding high school female students in boarding school, teacher students also study as college student at University of Darussalam Gontor. These all students join together in one forum namely Student Council. Teacher students have lots of activities from the start of waking up to going to sleeping their daily life. The activities must be balanced with a good diet so they can optimize their duties as female students of college and mentors for high school students (Wardun, 2019).

Islam gives special attention regarding overweight or obesity. The Prophet, Rasulullah SAW said, *"'The best people are those living in my generation, then those coming after them, and then those coming after (the second generation. There will be some people after you, who will be dishonest and will not be trustworthy and will give witness (evidences) without being asked to give witness, and will vow but will not fulfill their vows, and fatness will appear among them.* (HR. Bukhari dan Muslim)

This study aimed to identify the risk factors for obesity in female college students of University of Darussalam Gontor

2. Instruments and Methods

This study was descriptive analytic research with case control study design and conducted in December 2019-January 2020 at University of Darussalam Gontor. Among total population of 2047 female students, purposive sampling was used to determine subjects participated in this study. The number of sample was 94 female teacher students that was devided into two group consisted of case (47 subjects with central obesity) and the control group (47 subjects with normal waist circumference). Inclusion criteria of respondents were female teacher students of University of Darussalam Gontor aged 18-21 years and living in female campus dormitory.

Data collected were central obesity status, nutritional knowledge, vegetable and fruit eating pattern, physical activity level, and emotional mental health. Central obesity status was obtained by measuring waist circumference (WC). WC more than 80 cm was categorized as central obesity > 80 cm. Nutritional knowledge was assessed by using questionnaire containing 10 dichotom questions that had been submitted for validity and reliability. Food

Frequency Questionnaire was used to obtain vegetables and fruit eating patterns, IPAQ-SH questionnaire for physical activity and SRQ for emotional mental health.

Statistical analysis used Chi Square test with significant limit of $\alpha<0.05$ to analyse risk factors for central obesity and Odd Ratio (OR) to identify whether an exposure associate with lower or higher odds of outcome (central obesity).

This study has received research ethics from Health Research Ethics Commission of Faculty of Medichine, University of Muhammadiyah Surakarta Indonesia with licence number: 2539 / B.1 / KEPK-FKMS / XI / 2019.

3. Results and Discussion

The result showed that, good nutritional knowledge among female students was seen more frequently in control group (51.2%) as compared to central obesity group (48.8%). There was no significant association between nutritional knowledge and central obesity (p=0.835). In other words, nutritional knowledge was not risk factor for central obesity.

Nutrition is defined as food and its benefits for health so it's important to keep healthy by choosing foods that are appropriate to the life cycle and physiological functions of the body (Hardinsyah, 2017). Nutritional knowledge is very important and one of the factors influencing preference in choosing food. If in adolescents have less nutritional knowledge, efforts to maintain the balance diet may be poor and cause malnutrition (Samranah, 2017).

The result of this study is comparable with the finding of Puspitasari (2018) which stated that there was no significant relationship between nutritional knowledge and central obesity in adulthood. Nutritional knowledge didn't guarantee one's eating pattern.

No significant association between nutritional knowledge and central obesity among female students was because food consumption was not only influenced by nutritional knowledge but also several factors.

Table 1. Risk factors of central obesity among female students

Variable	Normal waist circumference		Central obesity		*p value*	Odd ratio (95% CI)
	n	%	n	%		
Nutritional knowledge						
Good	21	51.2	20	48.8	0.835	1.090
Less	26	49.1	27	50.9		(0.482-2.465)
Physical activity level						
High	41	49.4	42	50.6	0.748	0.813
Moderate	6	54.5	5	45.5		(0.230-2.875)
Emotional mental health						
Normal	28	46.7	32	53.3	0.391	0.691
Bad	19	55.9	15	44.1		(0.296-1.610)
Vegetable consumption pattern						
adequat	40	66.7	20	33.3	0.000	7.714
Inadequat	7	20.6	27	79.4		(2.868-20.751)
Fruit consumption pattern						
Adequat	22	71	9	29	0.002	3.716
Inadequat	25	39.7	38	60.3		(1.473-9.373)

Most of female students had high physical activity level in not only control group (49.4%) but also central obesity group (50.6%). There was no significant association between physical

activity and central obesity (p=0.813) so that physical activity was not a risk factor for central obesity.

No significant association between physical activity and central obesity showed that students with high physical activity level could experience central obesity (p=0.748; OR=0.813). It is known that teacher students had lots of daily activities which were focus on teaching. Based on mobility and duration, it was included in strenuous activities, but in fact this activity was carried out with more sitting and occasionally standing. Azkia and Wahyono's research (2018) also stated that there was no significant association between physical activity and central obesity (p=0.872). It was due to the absence of physical activity measurement tools and only using questionnaire and observation in collecting data of physical activity level.

Physical activity is part of body weight management and has significant contribution to long-term weight loss. It can lower health risks associated with chronic diseases (Hasriana, 2014).

Total subjects with high level of physical activity was 83%. All activities in University of Darussalam Gontor and its dormitory or never stop 24 hours a day. It has slogan, "Alha`hadu Laa Yanaamu Abadan" which means" This boarding school will never sleep". It means that all the activities in Gontor never stop for 24 hours. Both day and night there will always be lots of activities carried out by students or teachers.

Masri and Sari (2019) explained that those who had high level of physical activity didn't mean free from the risk of central obesity. It's because the habit of high fat diet could be one of the factors affecting central obesity. According to the interview, respondents consumed high fat diet such as fried foods frequently. This habit should be aware of because based on previous research conducted by Hidayati and Pibriyanti (2018), women had risk 2.9 times greater of having high blood sugar levels that lead to hyperglycemia or even diabetes mellitus compared to men.

The proportion of normal emotional mental in central obesity and control group was 53,3% and 46,7% respectively. This study showed that there was no significant association between mental emotional with central obesity (p=0.391;OR=0,691). Mental emotional was not considered as risk factor for central obesity.

Research of Pibriyanti (2018) also showed that there was no significant association between mental emotional and central obesity. Normal and central obesity students tended to hava the same emotional mentality status. It could be due to the capability to adapt and habitual factors of female students in regulating mental emotion so that they could adapt to the situations quickly. They got used to be trained since undergoing education at high school level of Kulliyatul Mu'allimin al-Islamiyah (KMI) at Boarding School of Darussalam Gontor. They had adapted for 6 years if entering KMI since junior high school, or 4 years if Teacher students who entered KMI at the junior high school level had adapted for 6 years, while those who entered KMI since the high school level had adapted for 4 years.

Adequate vegetable consumption among female students was seen more frequently in control group (66,7%) as compared to central obesity (33,3%). Vegetable consumption pattern had significant association with central obesity ($p<0.05$; OR=7.711). It meant that female students with inadequate vegetable consumption had risk 7,714 times greater to have central obesity compared to those consuming adequate daily vegetables. Previous research conducted by Triandhini, et al (2018), showed that there was significant difference of vegetable

consumption between normal and obese children (p=0.001). Children with normal nutritional status consumed vegetables more frequently because their parents worked as vegetable farmers.

Vegetables and fruits are rich of micronutrients, source of vitamins, minerals and dietary fiber needed for development, growth and maintaining health. Green vegetables as well as colored fruits and vegetables are also sources of bioactive compounds as antioxidants. It can be obtained from colored vegetables such as red spinach purple, sweet potatoes, carrots, and tomatoes (Ministry of Health, 2017)

Consumption of fiber can reduce body weight by limiting energy consumption, so that someone with overweight or obese will be more motivated to have weigh loss diet (Ledoux, et al, 2011). The different pattern of vegetable consumption between normal and central obesity group was due to eating preference of only a few kinds of vegetables such as spinach, long beans and carrots, while students sometimes didn't like the existing vegetables provided in dormitory. It's sometimes considered to be overcooked so that students didn't like it and prefered to buy vegetables in cafeteria.

The proportion of adequate fruit consumption among normal group was higher (71%) than central obesity group (29%). Fruit consumption pattern was associated with central obesity (p=0.002; OR=3.716). It meant that female students with inadequate fruit consumption had risk 3,716 times greater to have central obesity compared to those consuming adequate daily fruits.

Previous research by Bahreynian, et al (2018) showed that fiber consumption was significantly related to weight loss and central obesity (p=0.006; p=0.008). Most respondents with obesity or central obesity consumed small amounts of dietary fiber and didn't meet RDA. It is strongly recommended to consume dietary fiber derived from fruits, vegetables or others to prevent degenerative diseases in adolescents such as metabolic syndrome, type 2 diabetes mellitus and coronary heart disease.

Prevalence of Indonesian people aged >10 years old that consume adequate and inadequate consumption of fruits and vegetables was 3.3 and 93.5% and 3.3% respectively. It could be seen that Indonesian people were lack of fruit and vegetable consumption in their daily eating habits. Ministry of Health (2019) recommended to consume 3-4 servings of vegetables and 2-3 servings of fruit every day or a half plate containing fruit and vegetables (more vegetables) at every meal.

Fruit and vegetable consumption patterns can be influenced by nutritional knowledge, food availability, and social media exposure (Rohman, et al. 2017). Nutrition knowledge obtained from social media is not guaranteed to be valid and verified. People with good nutritional knowledge, but obtained from invalid literature couldn't yet be ensured to have good eating habit. In addition, there are several factors that can affect vegetables and fruit consumption pattern. One of these factors is availability depending on the season. In some seasons, fruit and vegetable availability or consumption can be higher or even lower (Layade, 2014).

4. Conclusions

Inadequate consumption of vegetables and fruits was a risk factor for central obesity among female students, while nutritional knowledge, physical activity and mental emotional state were not risk factors for central obesity among female students of University of Darussalam Gontor.

References

[1] Al-Hadist

[2] Azkia., F., I dan Wahyono., T., Y., M. 2018. Hubungan Pola Konsumsi Makanan Berisiko Dengan Obesitas Sentral Pada Wanita Usia 25-65 Tahun di Bogor Tahun 2011-2012.Jurnal Epidemiologi Kesehatan Indonesia. 2(1).

[3] Bahreynian., M., Qarbani., M., Motlagh., M., E., Riahi., R., Kelishadi., R. 2018. *Association of Dietar Fiber Intake With General and Abdominal Obesity in Children and Adolescents : The Weight Disorder Survey of The CASPIAN-IV Study*. Mediterranean Journal of Nutrition and Metabolism

[4] Bukhori.,S dan Andriani., F. 2019. Hubungan Pengetahuan Gizi Dan Aktivitas Fisik Terhadap Ukuran Lingkar Perut Pada Penderita Obesitas Sentral Di Karawang. Jurnal Unsika. 4(2).

[5] Chew., W., F., Leong., P.,P., Yap., S., F. 2017. Risk *Factors Associated With Abdominal Obesity in Suburban Adolescents from a Malaysian District.* Singapore Med Journal. 59(2).

[6] Du, H., Daphne, L., Van der, A., Boshuizen, H.C., Forouhi, N.G., Wareham, N.J., Halkjaer, J., Tjonneland, A., Overvad K., Jakobsen, M.U., Boeing, H., Buijsse, B., Masala, G., Palli, D., Sorensen, T.I., Saris, W.H., Feskens, E.J. *Dietary Fiber and Subsequent Changes in Body Weight and Waist Circumference in European Men and Women*. Am J Clin Nutr 2010;91: 329-336.

[7] Fatimah., P., N, Dieny., F., F, Murbawani., E., A, Tsani., A., F., A. 2018. *Latihan Yoga Terhadap Berat Badan, Persen Lemak Tubuh dan Lingkar Perut pada Wanita Dewasa Overweight*. Jurnal Gizi Klinik Indonesia. 14(4).

[8] Harbuwono.,D,S, Praamono.,L.,A, Ynir.,E, dkk. 2018. Obesity and Sentral Obesity in Indonesia ; Evidence From A National Health Survey. Med Journal Indonesia. 27(2). ISSN 0853-1773.

[9] Hardinsyah dan Supariasa. 2017. *Ilmu Gizi Teori & Aplikasi.* Penerbit Buku Kedokteran EGC. Jakarta.

[10] Hidayati, KN., Pibriyanti, K. 2018. *Anak perempuan dan obesitas sebagai faktor risiko kejadian kadar gula darah tinggi pada anak sekolah das*ar. Jurnal Gizi Klinik Indonesia.6(2).

[11] Khairani., N, Effendi., S., U, Utamy., L., W. 2018. *Aktifitas Fisik dan Kejadian Obesias Senral Pada Wanita di Kelurahan Tanah Patah Kota Bengkulu*. CHMK Nursig Acientific Journal. 2(1).

[12] Kharistik., Y., Lanti., Y., R., D, Wekadigunawan., C., S., P. 2018. *Path Analisys on The Psycholosocial Impact of Obesity or Overweight in Adolescents in Surakarta, Central Java*. Journal of Epidemiology and Public Health. 3(2).

[13] Kemenkes RI. 2019. Hasil Riset Riskesdas 2013. Mari Makan Sayur Dan Buah Yang Berkhasiat Baik Bagi Tubuh Untuk Keluarga Indonesia Sehat. Pusat Analisis Determinan Kesehatan.

[14] Kemenkes RI. 2018. Hasil Utama Riskesdas 2018.

[15] Kemenkes RI. 2018. Cek Lingkar Perut Anda. Direktorat Pencegahan Dan Pengendalian Penyakit Tidak Menular.

[16] Kemenkes RI. 2017. Nusantara Menuju Masyarakat Hidup Sehat. Dipublikasikan pada: Rabu, 25 Januari 2017. http://www.depkes.go.id/article/

[17] Kemenkes RI. 2014. *Pedoman Gizi Seimbang.* Dirjen Bina Gizi Kesehatan Ibu dan Anak. Jakarta.

[18] Layade., AI. 2014. *Fruit and Vegetable Consumption Among Student of Tertiary Institution in Oyo State*. Rjoas. 6(3).

[19] Ledoux A., Hingleand M. D. Baranowski T. *Obesity Preventionobr Relationship of fruit and vegetable intake withadiposity:* a systematic review.

[20] Masrul. 2018. *Epidemi Obesitas dan Dampaknya Terhadap Status Kesehatan Masyarakat Serta Ekonomi Sosial Bangsa*. Majalah Kedokteran Andalas. 41(3). Hal. 152-162.

[21] Munyogwa.,M.,J and Mtumwa., A.,H. 2018 The Prevalence of Abdominal Obesity and its Correlate Among the Adult in Dodoma Region, Tanzania A Community-Based Crossectional Study. *Hindawi Advances in Medicine*

[22] Palupi., M., P. 2016. Faktor Risiko Obesitas Sentral Pada Orang Dewasa Di Indonesia. *Tesis.* Institut Peranian Bogor. Bogor.

[23] Pibriyanti. K. 2018. *Studi Obesitas Sentral Pada Mahasiswa Prodi Kesehatan Masyarakat Univet Bangun Nusantara Sukoharjo*. Jurnal Kesehatan. 11(1). ISSN : 1979-7621.

[24] Puspitasari., N. 2018. Faktor Kejadian Obesitas Sentral Pada Usia Dewasa. HIGEA. 2(2).

[25] Rohman., B., N., Mustika., I., G., Kusuma., A., W. 2017. *Faktor yang Berhubungan dengan Perilaku Konsumsi Buah dan Sayur Siswa SMP di Denpadar*. The Indonesian Journal of Nutrition. 6(1).

[26] Septiana., P, Fajar., A., N, Catur., S., W. 2017. *Konsumsi Junkfood dan Serat pada Remaja Putri Overweight dan Obesitas yang Indekos*. Jurnal Kedokteran Jakarta. 30(1).

[27] Sofa., I., M. 2018. Kejadian Obesitas, Obesitas Sentral dan Kelebihan Lemak Viceral pada Lansia Wanita. Umerta Nutrition. 228-236.

[28] Sudikno., Syarief., H., Dwiriaani., C., M., Riyadi., H. 2015. *Faktor Obesitas Sentral Pada Orang Dewasa Umur 25-62 Tahun Di Indonesia(Analisis Riset Kesehatan Dasar 2013).* Peelitian Gizi dan Makanan. 38(2).

[29] Tluway., F., D., Leyna. C.,H., Mmbaga., E.,J. 2018. Magnitude and Factors Associated With Overweight and Obesity Among Adolescents in Semi-Rural Area of Babati Distric, Tanzania. Tanzania Journal of Health. 20(2).

[30] Yoshinda., Y., Briyles., S., Scribner., R. 2018. Social Support Modifies the Negative Effect of Acculturation on Obesity and Central Obesity in Mexican Men. Ethnicity & Health. ISSN : 1465-3419.

[31] Wardun (Warta Dunia Pondok Modern Darussalam Gontor). 2019. Vol. 72. ISSN 2087-0175.

[32] Yoshinda., Y., Briyles., S., Scribner., R. 2018. Social Support Modifies the Negative Effect of Acculturation on Obesity and Central Obesity in Mexican Men. Ethnicity & Health. ISSN : 1465-3419.