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Please contact for us :

Bondhan Wiriawan, S.Si
Hp. 081328623708
Email : bondhanwi@yahoo.com,
bondhan_wiriawan@elokarsa.com

Pardiyono
Hp. 0818277376
Email : yonosecima@yahoo.com

DEPARTMENT OF PHARMACY
FACULTY OF MATHEMATICS AND NATURAL SCIENCE
ISLAMIC UNIVERSITY OF INDONESIA

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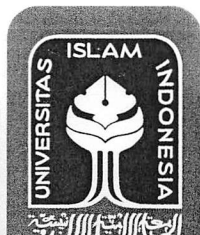
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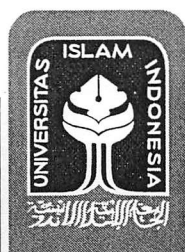
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FACULTY OF MATHEMATICS AND NATURAL SCIENCE
ISLAMIC UNIVERSITY OF INDONESIA**

Kaliurang Street Km 14.5 Yogyakarta, Indonesia, 55584

Phone : +62-274-895920

Email : pharcon@uii.ac.id

Http : pharconuii.com

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Preface

The 1st International Pharmacy Conference on Research and Practice (IPCRP) was held on 13th - 14th November 2012 at the Sheraton Hotel in Jogjakarta and organized by Department of Pharmacy, Islamic University of Indonesia. In this conference, pharmacists and other health professions from different fields have been participated. The main theme of the 1st IPCRP is "*Toward Excellent In Natural Products: Preserving Traditions, Embracing Innovations*", which breakdown into 3 sub-themes broadly representing herbal medicine; advance research in pharmacogenomics and proteomic; and also pharmacist's role in practice.

Therefore, in order to disseminate the results of the conference into the broader community, this proceeding is produced. This proceeding features a number of papers presented in the conference, either oral or poster presentation, which represent 4 themes: Industrial Pharmacy; Natural Product and Phytotherapy; Biomedical and Biotechnology; Clinical and Community Pharmacy.

On behalf of the organizing committee, sincere appreciation are expressed to the Ministry of Research and Technology Republic of Indonesia for his kindness to give keynote lecture in this conference, members of the Organizing Committee for the good teamwork and the great effort, and also for all sponsors for good collaboration in bringing forth the conference. We also would like to thank all participants for many fruitful discussions and exchanges that contributed to the success of the conference.

Finally, we hope that this proceeding will give beneficial contribution toward improving the scientific atmosphere, especially in the field of Pharmaceutical Sciences and Pharmacy Practices.

Yogyakarta, November 2012

Rochmy Istikharah, M.Sc., Apt
Chairperson of Organizing Committee

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ASSOCIATION ANTHROPOMETRIC MEASUREMENTS WITH BLOOD SUGAR LEVELS IN WOMEN POST MENOPAUSE

Syaefudin Ali Akhmad ¹, Amallia Sari Nanda ², Purborini Waluyo Khusnul ²,
Nely Ekajayanti ², Novian
Fajri ², Yostesara Maurena Santosa ², Zulfawani Limantari ²,
Muhammad Kautsar ²

¹ Departement of Biochemistry Faculty of Medicine, Islamic University of Indonesia

² Students Assisten in the Laboratory of Biochemistry Faculty of Medicine, Islamic University of Indonesia

Correspondence :

saafkui@gmail.com

Biochemistry laboratory Faculty of Medicine Islamic University
Jl. Kaliurang km 14,5 Besi Ngaglik Sleman

Abstract

One of risk factor for type 2 diabetes mellitus is excessive weight either overweight or obese. The incidence of obesity in postmenopausal women tends to increase due to the lack of activity, diet increases and the effect of decreased estrogen. Menopausal women has experience to change in body composition with the accumulation of fat in the thighs, hips, abdomen and buttocks so that the change in insulin sensitivity. Body composition changes will determine the measurement of anthropometric in postmenopausal women. We have done research by cross sectional on the association anthropometric measurment with blood sugar levels in 40 postmenopausal women in the village of Umberharjo, Prambanan Sleman District. Anthropometric measurements were waist circumference, hip circumference and ratic waist circumference with hip circumference. Blood sugar tests were done during fasting and 2 hours after a meal by enzymatic methods. Analysis have done by correlation test using SPSS 19.00 version. The results showed that based on BMI criteria there are 5% overweight and 22.5% obese. Analysis by correlation test have been obtained values of correlation (r) 0.357 (P <0.05) for blood glucose 2 hours after a meal with abdominal circumference. There are correlation between blood sugar 2 hours after a meal with the hip circumference r = 0.43 (P <0.05), and also blood glucose 2 hours after a meal correlated with a BMI r = 0.54 (P <0.05). This result showed that there are a relationship between blood glucose 2 hours after a meal with abdominal circumference, hip circumference, and BMI, and no association between glucose levels with the ratio waist-hips circumferentia.

Key words: anthropometry, blood sugar levels, postmenopausal women

Introduction

During the last century it has been changing of people's lifestyle in many aspects such as diet, lack of physically activity, and hasty habits. The phenomenon lead to the increase of degenerative disease incidence, such as metabolic syndrome, diabetes melitus, and cardiovascular disease. Diabetes mellitus is one of diseases which have high prevalence in Indonesia. Even from the results of the epidemiologic study of diabetes mellitus in the world, it is estimated that in 2030 there will be 10 countries with the highest incidence of diabetes mellitus in the world. Being in the 4th rank, Indonesia which has 8,4 million people with diabetes in 2000, is estimated to have 21,3 million people in 2030. (Wild, S.,

Postmenopause is signed by significantly decreases of estrogen hormon when the ovary is no longer produce eggs (BodylogicMd., 2012). Normally, estrogen can also stimulate fatty acid metabolism, so the decreased estrogen in postmenopausal women cause accumulation of fatty acid, especially in the abdomen area which is also known as central obesity (Akhmad,et.al., 2012; Lipoeto, 2007). The decreased estrogen in menopause is also believed to increase the risk of having diabetes, cardiovascular disease, and osteoporosis in postmenopause (Rouen, 2009).

The effect of estrogen in the course of type 2 diabetes mellitus is enormous. In fact, blood glucose and plasma insulin in the body is affected by the increase and the decrease in estrogen levels. Tissues of the body have two specific receptors of estrogen; estrogen receptor alpha (ESR α) and beta (β ESR). Estrogen-receptor complex is involved in carbohydrate metabolism, where carbohydrate metabolism process is associated with type 2 diabetes mellitus. The role of estrogen are affecting fatty acid metabolism, lowering glucose production from the liver, protecting the function of pancreatic beta cells, increasing expression of GLUT-4 and increasing glucose uptake. Besides, controlling the induction of IDDM or insulin dependent diabetes mellitus is also roled by estrogen (Akhmad, et.al., 2012)

Anthropometry definitively can be assumed as a study which associated with measurement of shape, size, weight, etc. In this study, antropometry aspect to measure obesity due to the bad diet which authors used was hip circumference, abdominal circumference, and ratio between waist and abdominal circumference. The criteria of normal abdominal circumference according to WHO is < 80 cm for women, while ≤ 0.85 cm for the normal ratio circumference between hip and abdominal circumference (Katz, E.G., et.al., 2010)

Risk of diabetes mellitus may increase in older ages more over in women 45 years of age with post-menopause. This condition becomes the background to conduct further research to find association between anthropometry of post-menopausal women with high blood sugar level as risk factor as diabetes mellitus. The aim of this research is to know the association of anthropometric measurements with blood sugar levels in women post menopause

Methcdology

Research Design

We carried out a cross-sectional study during July 2011 over 40 post menopause women aged 45 to 70 years. Forty post-menopause women from village Sumberharjo Prambanan subdisrict, Sleman Distric was choosen for the study. The research was conducted in 2011 with funding from the Faculty of Medicine Islamic University of Indonesia.

Measurements

Anthropometric measurements were waist circumference, hip circumference and ratio waist circumference with hip circumference. Waist and hip circumference was measured using portable microtoise to the nearest 0,1 cm.

Biochemical analysis or examination carried out on venous blood samples after at least 12 hours of fasting and 2 hours after a meal that includes an examination of blood sugar by enzymatic method using commercial kit from *DiaSys* Germany. The result of enzymatic reaction of blood sugar was analyzed using spectrophotometer.

Statistical analysis

Correlation test with $P < 0,05$ using SPSS version 19.00 was used to find the association between anthropometric measurements and blood sugar as risk factor of diabetes mellitus.

Results and Discussion

The complete result of the study is presented in the table 1, shown the average BMI, abdominal circumference, and waist which are considered as normal. Also, the average blood glucose and 2-hour after meal blood glucose are considered as normal under 200 mg mg/dl and the average of fasting glucose under 126 mg/dl as shown in table 1.

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Table 1. Anthropometry subject population

Anthropometry index	Women (n= 40)
Age (yr)	53.20 (3.480)
Height (cm)	150.60 (5.912)
Weight (kg)	51.83 (10.061)
BMI	22.83 (4.195)
AC (cm)*	80.98 (10.923)
HC (cm)**	94.35 (9.893)
WHR ***	0.8577 (0.05512)
Fasting blood glucose (mg/dl)	85.56 (14.731)
2 hours after a meal (post prandial) (mg/dl)	112.73 (26.353)

*AC = abdominal circumference, ** HC = hip circumference, ***WHR = waist to hip ratio

The results of measurements of BMI, abdominal circumference, and hip circumference hereafter were made in a categorization as shown in table 2. The percentage of obese patients is 5% based on the criteria of BMI, and 22.5% for overweight. Based on the abdominal circumference category the percentage of patients at risk is 42.5%. Based on the hip circumference category the percentage of patients at risk is 50%, while based on the ratio of the abdominal circumference and hips the percentage of patients at risk 47.5%.

Table 2. Category of BMI, HC, AC and HWR

Validity	Frequency (n) (%)	Percent
Category of BMI		
Low	7	17.5
Normal	22	55
Overweight	9	22.5
Obese	2	5
Category of AC		
Normal	23	57.5
Risk	17	42.5
Category of HC		
Normal	20	50
Risk	20	50
Category of HWR		
Normal	21	52.5
risk	19	47.5

NOTE : The correlation between Anthropometry and blood glucose levels

Anthropometric values used in this study were abdominal circumference, hip circumference, ratio between abdominal circumference and hip circumference, and BMI, which were associated with fasting blood sugar levels and 2-hour after meal blood sugar levels.

From this study, it was found that there was no correlation between body mass index and fasting blood sugar levels, with $r = 0.245$ ($p > 0.05$). There is a significant correlation between body mass index and post prandial blood sugar levels of research subjects whose $r = 0.543$ ($p < 0.05$). It was also found that there was no correlation between abdominal circumference and fasting blood sugar levels of research subjects whose $r = 0.202$ ($P > 0.05$). Then, there is an association between abdominal circumference and 2 hour after meal blood glucose levels of subject whose $r = 0.357$ ($P < 0.05$). There is no correlation between hip circumference and fasting blood sugar levels in of the research subjects whose $r = 0.272$ ($p > 0.09$). Then, there was a correlation between hip circumference and post-prandial blood sugar of research subjects whose $r = 0.430$ ($p < 0.05$). In the relationship between the ratio between abdominal circumference and hip circumference and fasting blood sugar levels, there were no significant results and there is a negative correlation between the ratio between abdominal circumference and hip circumference and fasting blood glucose levels of subjects whose $r = -0.018$ ($P > 0.05$). There is no correlation between the ratio between abdominal circumference and hip circumference and 2-hours after meal blood glucose levels of subjects whose $r = 0.26$ ($p > 0.05$). Thus, from the four values of anthropometry that has significant relationship with blood sugar levels is BMI. But the correlation between BMI and blood sugar levels is very low. Meanwhile, the relation of abdominal circumference, hip circumference and ratio between abdominal circumference and hip circumference was not significant and was not correlated with each other.

In our study we found a strong correlation between body mass index with blood sugar level of 2 hours post prandial (PP) in subjects with valuer of $r = 0.543$ ($p < 0.05$). Abdominal circumference and waist circumference have a strong enough relationship to blood sugar level of 2 hours PP with value of $r = 0.357$ ($P < 0.05$) for waist circumference and $r = 0.430$ ($p < 0.05$) for hip circumference. The ratio of waist to hips do not have a relationship with glucose level of 2 hours PP. All anthropometric measures in this study did not have a relationship with a fasting blood sugar level. Study conducted in Chinese and European subjects had a relationship between BMI, waist circumference, hip circumference and waist-circumference to hips ratio against glucose intolerance (Unwin N., et.al., 1997).

This result supports our findings, but different to the relationship between the ratio of the abdomen and hip on blood glucose levels. Research conducted by Lipoeto *et al.* in the district of Padang Pariaman, Indonesia to 70 persons of the adult population aged over 70 years found no correlation between waist circumference, hip circumference and waist-hip ratio with blood glucose levels. This result is contrary to our research. Research conducted by Katz *et al.* in 2011 with the subject of the Chinese people both men and women aged 28-69 years found that women with larger hip circumference have a lower risk of metabolic syndrome, but this has nothing to do with increased blood glucose levels. This is contrary to the theory that the metabolic disorders associated with type 2 diabetes mellitus with an increase in blood glucose levels. Metabolic disorder patients are also obese. Type 2 diabetes mellitus have linked to obesity (Jalal F., et.al., 2006).

Study have been conducted by Hardiman *et al.* in 2007 on the South Cipete, South Jakarta, Indonesia with a subject men and women ages 40-60 years showed that there is a relationship between waist circumference and blood glucose levels, while BMI, hip circumference and waist to hip circumference ratio has no significant relationship on blood sugar (Hardiman SL, et.al., 2009). Okosun et al. (2000) reported in their study that waist circumference was positively correlated with fasting blood glucose.

Conclusion

In conclusion the result showed that there is statistically significant association between BMI, AC and HC with blood glucose levels especially 2 hours post prandial in menopause wopen of Javanese people. WHR in this study have no association with blood glucose level either fasting glucose and 2 hours post prandial.

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