

Original article

Anthropometric indices are associated with LDL cholesterol in postmenopausal Javanese women

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Abstract:

Introduction: Lipid abnormalities are seen to be linked lack of physical activity, obesity, metabolic syndrome and diabetes melitus. Postmenopausal women experience the changes of body composition by increasing the visceral fat. The study was aimed to explore relationship between anthropometric indices and lipid level in postmenopausal Javanese women. **Methods:** This cross sectional study included 34 healthy postmenopausal Javanese women, age range between 46-59 years, from Dusun Trukan, Karanggede dan Marangan Prambanan subdistrict, Sleman district. Anthropometric measurements were carried following standard procedure. Appropriate statistical tools were used to analyze data using SPSS Version 17. A p value <0.05 was taken as level of significance. **Results:** Abdominal circumference showed significant positive association with LDL level ($r=0.289$, $p=0.049$) but not with triglyceride, HDL level and total cholesterol level. BMI also showed significant positive association with LDL level ($r=0.336$, $p=0.026$) but not with other variables. **Conclusion:** The data concluded that abdominal circumference and BMI are positively association with LDL cholesterol but not with other components of the lipid profile in Javanese postmenopausal women. Further studies, however, needed to warranted to understand the causal relationship involving large number of subjects multiple centres.

Keyword: Anthropometric Indices, Lipid Profile, Javanese Women

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Introduction:

Postmenopause is a natural phenomenon experienced by every woman. For most of the women menopause or postmenopause transition imparts notable physical and psychological changes¹. A fall of estrogen in blood of postmenopausal found to increase the risks of diseases such as diabetes mellitus, metabolic syndrome, cardiovascular (CVD), dislipidemia, and osteoporosis²⁻⁴.

Dislipidemia is the main cause of cardiovascular disease (CVD) which recently becomes the serious concern due to the increasing of CVD morbidities and mortalities in women⁵. Dislipidemia is commonly experienced by the obese women including the postmenopausal state⁶. Dislipidemia of postmenopausal women is correlated to metabolic syndrome disease which could increase its incidence and prevalence due to the aging process⁷.

This issue was demonstrated by the difference of lipid levels in women of premenopausal and postmenopausal period. Postmenopausal women have the higher level of total cholesterol, LDL, and triglyceride than the premenopausal women⁴.

Intra abdominal fat deposition found to become the important predictor of lipid abnormality of postmenopausal women. At the beginning of menopause fat tissue tends to be hoarded on hip area or in an area of thigh and posterior (gluteo-femoral). In line with changes of menopause and postmenopause period, the fat accumulation lies intra-abdominal area known as central obesity. Central obesity is linked to insulin resistance, metabolic syndrome, the low level of HDL and the high level of triglyceride (TG)⁴.

This study was aimed to investigate the relationship between anthropometric indices and lipid profile on healthy Javanese woman of menopause.

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Ethical and Legal Procedure

This study was approved by ethics committee of Medical Faculty of Muhammadiyah University of Jogjakarta.

Methods:

This was a cross sectional study. The subjects were healthy Javanese menopausal women, age range between 46-59 years, from Dusun Trukan, Karanggede dan Marangan Prambanan Sleman.

A total number of 34 subjects not suffering from diabetes mellitus, hypertension and metabolic syndrome were recruited. Women on hormone replacement therapy and with history of ovarian operation were excluded. Height, weight and abdominal circumference were measured following standard procedure. Blood pressure was recorded. Overnight fasting (10-12 hrs) blood samples were collected following all aseptic preparation. Serum separated within 30mins and lipids were estimated using standard laboratory methods.

Data were expressed as mean±SD. Pearson’s correlation analysis was performed. Statistical analyses were performed using SPSS program version 17. P value <0.05 was taken as level of significance.

Results:

Characteristics of the study subjects were presented in the table 1. Mean values appeared to be within normal range.

Table 1: Characteristics of study subjects (n=34)

Characteristics	Value (mean±SD)
Age	53.41±3.29
Blood pressure (mmHg)	
Systole	125±17
Diastole	79±9
Height (cm)	151.2±6.1
Weight (Kg)	51.41±9.96
BMI	22.43±3.85
Abdominal circumference (cm)	80.68±10.89
Total cholesterol (mg/dl)	172±33
HDLc (mg/dl)	51.3±15.1
LDLc (mg/dl)	102±32
Triglyceride (mg/dl)	109±71

Furthermore, the correlation test was performed between anthropometric indices and lipid levels. Before conducting correlation test, normality of data were tested using Kolmogorov smirnov test which confirmed the normal distribution of data (p>0.05). Correlation analyses between anthropometry indices

and lipid profile were shown in table 2.

Table 2: Correlation analyses between anthropometric indices and lipid profile of the study subjects

Lipid variable	BMI		Abdominal circumference	
	r	p	r	p
Triglyceride (mg/dl)	0.122	0.246	-0.050	0.339
Total cholesterol (mg/dl)	0.247	0.079	0.227	0.098
HDLc (mg/dl)	-0.140	0.215	0.052	0.335
LDLc (mg/dl)	0.336	0.026	0.289	0.049

BMI and abdominal circumference showed significant positive correlation with LDLc. Coefficient value for BMI and abdominal circumference was 0.336 (p=0.026) and 0.289 (p=0.049) respectively with LDLc. Triglyceride, total cholesterol and HDLc did not any relationship with BMI and abdominal circumference.

Discussion:

Postmenopause women have the potential risks to suffer from metabolic syndrome characterized by dislipidemia, insulin resistance, hypertension, and obesity. A correlation of postmenopause and lipid profile as a part of metabolic syndrome is not consistent in different studies.

It is assumed that menopause could increase a risk of cardiovascular illness not depending on normal age. A study conducting longitudinally among Japanese population showed that menopause status was associated with the increase of cholesterol level independent of blood pressure and BMI⁷.

Postmenopausal women suggested having increased risks for 60% to suffer from metabolic syndrome, though confounding variables such as age, BMI, income, and physical inactivity were eliminated. The senarion is different from men who are less susceptible to suffer from metabolic syndrome. This is still to be debated that gender issue plays greater role in the relationship between anthropometric indices and lipid profile. Other factors which might affect this relationship are age and race, that is why post menopause and Javanese women were chosen as the subjects in this study.

Study conducted by Janssen et al demonstrated that BMI and abdominal circumference independently brought contributions as visceral fat predictor, abdomen, and subkutan⁹. Another study conducted by Hardev et al. showed that waist hip ratio correlated to cholesterol serum, TG, and LDL in diabetic patients¹⁰. Whereas a study by Valiollah showed that of the anthropometric indices (BMI, abdominal cir-

cumference and waist hip ratio) only abdominal circumference had significant correlation to TG level¹¹ which is consistent with the study carried out by Chehrei et al in Iran¹². The present study on Javanese post menopausal women showed significant positive correlation between BMI and, abdominal circumference and LDL cholesterol which is supposed to put them at risk suffering from cardiovascular illness¹³. This result is in contrast to findings of Valiollah who demonstrated correlation between abdominal circumference and TG. However, finding of the present study is almost similar to that of by Janssen et al in 2002. According to Al-Dahhan et al LDL levels is associated with duration of postmenopausal period-longer menopausal period higher the level the level⁵. The present study is, however, in sharp contrast with the study of Pongsatha et al³ who demonstrated absence of relationship for BMI and abdominal circumference with LDLc level.

It is proposed that a lack of estrogen of post menopause women could increase the risk for cardiovascular disease. Postmenopausal women who have ever carried ovarian operation could both have both higher total cholesterol and LDL level than that of premenopausal and premenopausal women⁵. Kuller et al have showed lack of significant difference of LDL level on pre, per, and post menopausal women¹⁴.

Conclusion:

BMI and abdominal circumference showed significant association with LDLc level of post menopausal Javanese women. Due to inconsistencies in this regard further studies are warranted to involving reasonably large number of samples from different centers.

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