Available online www.jocpr.com

Journal of Chemical and Pharmaceutical Research, 2015, 7(10):505-508

Research Article

ISSN : 0975-7384
CODEN(USA) : JCPRC5

Lipid profile and estradiol analysis between pre-menopause and post-menopause women in Medan areas of North Sumatera, Indonesia

[1]Sahna Ferdinand Ginting, [2]Sumaryati Syukur*, [3]Sanusi Ibrahim, [4]Djong Hon Tjong and [5]Edy Fachrial

[1]Doctoral Program of Chemistry and Biomolecular Science, Faculty of Mathematics and Natural Science, University of Andalas, Padang, Indonesia
[2]Laboratory of Biochemistry/Biotechnology, Department of Chemistry, University of Andalas, Padang, Indonesia
[3]Laboratory of Organic Chemistry, Department of Chemistry, Faculty of Mathematics and Natural Science, University of Andalas, Padang, Indonesia
[4]Laboratory of Biotechnology Department of Biology, Faculty of Mathematics and Natural Science University of Andalas, Padang, Indonesia
[5]Laboratory of Molecular biology, Faculty of Medicine, University Prima Indonesia, Medan, Indonesia

---

ABSTRACT

Analysis of lipid profile and hormone status between pre menopause and post menopause women was investigated. Subject that investigated in this study amounted to 120 people and classified by group of age namely group I (30-39 years old), group II (40-49 years old), group III (50-59 years old) and group IV (≥60 years old). The concentration of lipid profile in each age group which includes cholesterol, triglycerides were determined by colorimetric enzymatic method. Apolipoprotein determined by spectrophotometry method. Estradiol and FSH level were determined by RIA method. There are significant differences in estradiols level and FSH levels in groups II and III (P < 0,001).there was no significant differences in lipid profiles in the age group, except for HDL in group III and IV as well as triglycerides in group II and III. There are significant differences for apolipoprotein B in group I and II, also in group III and IV. the reducing of oestrogen production from ovaries results change in lipid profile, leads by reducing HDL and elevating total cholesterol, triglyceride, and LDL cholesterol, thus increasing the risk of cardiovascular disease and breast cancer. The measurement of Apo-B may have great values in particular some individuals at risk of developing coronary artery disease are found to have increased level of Apo-B but have the normal concentration of cholesterol

Keywords: lipid profile, post menopause, pre menopause, estradiol

---

INTRODUCTION

Menopause is the absence of menses in the period longer that one year and begins with changes in ovarian function. Menopause leads to changes in hormonal status, metabolism and lipid profile [1]. Menopause is a natural events in aging process and signifies the end of the reproductive years with cessation of cyclic ovarian function as manifested cyclic menstruation, and the ovaries no longer release eggs and secrete progesterone and estrogen[2]. Perimenopause is defined as the time period proceeding menopause where the menstrual cycle is changing, but 12 months without menses has not yet occurred. Premenopause also describes the time leading up to the FMP, although

it is also used to describe the time leading to up to Perimenopause [3]. Menopause brings changes in the level of fats or lipids in woman's blood. Lipids are used as a source of fuel all cells. Cholesterol consisted of two components, high density lipoprotein (HDL) cholesterol, which is associated with a beneficial and have cleansing effect in the bloodstream, and low density lipoprotein (LDL) cholesterol, which encourages fat to accumulate on the walls of arteries and eventually could clog them [2].

LDL cholesterol appears to increase while HDL decreases in postmenopausal women as a direct result of estrogen deficiency. The increase of LDL level could affected the changes of molecules of LDL. The structure of HDL also changes, the concentration of HDL2 decreases, but the concentration of HDL3 increases. During menopause, concentration of triglyceride and apolipoprotein B also increases, and apolipoprotein A is decreased. The increasing of triglycerides could lead to increasing of abdominal fat amount and insulin resistance [1]. Hormonal profile also changing during menopausal transition. Increased level of follicle stimulating hormone (FSH) stimulates follicle to grow, but those follicle mainly fail to reach the final growth and maturity, which result with frequent anovulation. Progesterone production in menopause is 60% lower than in reproduction period[4]. One of the most important fat tissue hormones is leptin. It shows differences in concentration depending on sex (higher in women). The decreasing of leptin is related to decreases appetite. In menopause women, the level of leptin in decreased and also decreased level of some growth hormones, estradiol and androgens, that could cause the changes the mechanism in lipogenesis and lipolysis . This change could lead to the characteristic of distribution of adipose tissue in menopause women which resulted from a changes in lipid and carbohydrate metabolism, reduction of energetic needs and reduction of physical activity [1].

Menopausal women who have a normal concentration of estrogen have a greater possibility to store fat in the peripheral area. This could lead by increase in disease risk . Obesity is a term commonly used to describe individual with increased body fat which associated with an increased risk of atherosclerosis, diabetes mellitus and gall bladder disease [5]. Obesity is a chronic disease lead to health risk, obstruct the quality of life and eventually leads to development of metabolic syndrome and premature mortality [6].The increase of body mass in menopause and different distribution of adipose tissue is the result of changes in estrogen and androgen level in circulation, but also is a result of changes in lipid, carbohydrates metabolism, the reduction of physical activity. This study will investigate the relation lipid profile and estradiol in post menopause women and pre menopause women and the influence of body mass index and waist hip ratio on lipid profile in post menopause women.

EXPERIMENTAL SECTION

Study population

Study area : Research was conducted by the method of cross sectional. Research subject were the are the groups of 120 women of age 30-65 years old which have been classified based into 4 group of age (30-39, 40-49, 50-59, >60) and has met the established study criteria. Patients were taken from staffs of A. Malik Hospital, Dr.Pirngadi Hospital and from public communities. The subjects that has been chosen was passed in the screening study (eligible inclusion criteria) and voluntarily agreed to participate in the study by signing the informed consent. Fasting blood samples were taken after 12-24 hours and in women who were not menstruating, the blood could be taken anytime. The blood serum was used for inspection of lipid profile and hormones.

Study criteria : The inclusion factor were patients have a normal function of liver and kidney a indicated by the levels of SGOT, SGPT and creatinine. Have been gave birth with full-term pregnancy, not in pregnant condition, no breastfeeding and never get treatments with steroid. The exclusion factor were if the patients refuse to cooperate and did not obey the established research protocol, using contraceptive hormonal, oophoterectomy, irregular bleeding, and anemia. The subject were asked to answer a few questions that asked by the researcher using the screening form. The screening process includes the following activities : anamneses, including history of birth, the use of steroid and herbs that are being or have been used that gave effect on reproductive hormones, womb surgery and had suffered a severe illness. The screening process also including menstrual diary card filling and interview and common physical examination.

Lipid profile, hormone and apolipoprotein examination

Examination of lipid profile performed on the same patients with estradiol examination. Determination of cholesterol level was conducted by using colorimetric enzymatic method with cholesterol esterase, cholesterol oxydase and 4 aminophenazone. Triglyceride level was conducted by using colorimetric enzymatic method with

glycerolphospate and 4 aminophenazon. HDL level was conducted by Burstein method [7]. Apolipoprotein A and apolipoprotein B concentration determined by spectrophotometry. Estradiol level determined by RIA method using DPC's Double Antibody Estradiol assay [8].

Statistical analysis

Calculated values were processed by Independent T Test, Pearson's Test and Linear Regression. Statistical significance was established on the level of differences smaller than 5% and 1%. SPSS version 16 was used for data processing.

RESULT AND DISCUSSION

Total values of and FSH concentration in woman of 4 groups are shown in **Table 1**.

Table 1. **Estradiol and FSH level in each age of groups**

Age of groups (years old)	Estradiol level (pmol/L) ±SD	FSH level (mUI/ml)
I. (30-39)	111,79±79	7,81±3,56
II. (40-49)	106,66±97	10,69±10,74
III. (50-59)	10,08±08	63,97±35,79
IV. ≥60	4,55±5,45	97,87±39,14
I-II	P>0,05	P>0,05
II-III	P<0,01	P<0,01
III-IV	P>0,05	P<0,01

Estradiol level in group 1 was the highest but was not statistically significantly higher than group II (P>0,05). But estradiol level was significantly lower in group III than in group II (P<0,01), and the lowest estradiol level found in group IV. Women were considered premenopause if they had regular periods in the year preceding their examination and had a serum estradiol level >10pg/ml (>36,71pmol/L) [9]. FSH level in group I and II was not significantly higher (P>0,05). But FSH level significantly increase in group III (P<0,01). Women also considered premenopausal if their examination serum of FSH <30mUI/mL. Based on the data the women in group III and IV were categorized in post menopausal.

Table 2. **Total values of cholesterol, triglyceride, LDL and HDL in blood in each age of groups**

Age of groups (years old)	Cholesterol (mmol/L)	Triglyceride (mmol/L)	HDL(mmol/L)	LDL (mmol/L)
I. (30-39)	4,94±1,00	1,13±0,50	1,34±0,17	3,17±1,05
II. (40-49)	5,39±1,07	1,35±0,56	1,36±0,20	3,52±0,99
III. (50-59)	6,06±1,66	1,68±0,71	1,24±0,28	4,06±1,59
IV. ≥60	5,85±1,13	1,74±0,71	1,02±0,40	4,05±0,95
I-II	P>0,05	P>0,05	P>0,05	P>0,05
II-III	P>0,05	P<0,05	P>0,05	P>0,05
III-IV	P>0,05	P>0,05	P<0,05	P>0,05

Total values of cholesterol, triglyceride, LDL,and HDL levels in each groups are shown in **Table 2**. Total values of cholesterol is a little higher in group III and group IV than in groupI and II and there were not statistically differences between the groups. Triglyceride concentration in post menopausal women (group III and IV)also was also higher than pre menopausal. The triglyceride concentration in group III was significantly higher than in group II (P<0,05). There were not statistically important differences in LDL concentration in each groups (P>0,05). But the HDL concentration is significantly lower in group IV than in group III. The similar result reported by Mesalic and Haskovic [1]. Mesalic and Haskovic [1] in their research has been determined the lipid profile between post menopause dan pre menopause women. There were no significant differentiation in concentration of cholesterol, triglyceride and LDL, but HDL concentration in post menopausal women was significantly than in control (P<0,05). Kilim and Chandala [10] has been investigate the relationship between menopausal status and related hormonal variation of oestradiol with plasma lipid concentration. HDL concentration level was significantly significantly decreased in post menopausal women as compared with pre menopausal women (P<0,001). After the menopause the reducing of oestrogen production from ovaries results change in lipid profile, leads by reducing HDL and elevating total cholesterol, triglyceride, and LDL cholesterol, thus increasing the risk of cardiovascular disease. The protective mechanism of that involves HDL may be due to its role in reverse cholesterol transport, which leads to redistribution of cholesterol away from artery wall and by inhibition of monocyte adhesion and antioxidative

activities, that could prevent the oxidation of LDL. Kanwar *et al*[11] recruited non pregnant females consist of 25 premenopausal and 25 postmenopausal and lipid profile including HDL, LDL, VLDL and triglyceride then determined. There was no significant difference in the total serum cholesterol and triglyceride between the two groups, but there was a significant reduction of HDL and VLDL in post menopausal group (P<0,005). The elevated LDL and the reduction of HDL is and indication that menopause is and independent risk factor for cardiovascular disease.

Table 3. total values of apolipoprotein A, apolipoprotein B levels in blood in each age of groups

Age of groups (years old)	Apo-A (g/L)	Apo-B (g/L)
I. (30-39)	1,44±0,33	0,9±0,35
II. (40-49)	1,44±0,22	1,13±0,32
III. (50-59)	1,42±0,25	1,16±0,29
IV. ≥60	1,54±0,21	1,34±0,34
I-II	P>0,05	P<0,05
II-III	P>0,05	P>0,05
III-IV	P>0,05	P<0,05

Apolipoprotein A and apolipoprotein B concentration in each groups are shown in **Table 3**. There were not statistically differences for apolipoprotein A concentration in each groups, but for apolipoprotein B the highest concentration was in groups IV. Apolipoprotein B concentration in groups II was significantly higher than group I (P<0,05) and apolipoprotein B concentration in group IV was significantly higher than in group III (P<0,05). There is a correlation between the increased of low density lipoprotein (LDL) and coronary heart disease (CHD). Most recent studies have intimated that the measurement of Apo-B may have great values in particular some individuals at risk of developing coronary artery disease are found to have increased level of Apo-B but have the normal concentration of cholesterol. Hussain *et al* [12] have been measured the cholesterol, triglyceride and Apo-B level in 3 groups consist of premenopausal, early postmenopausal and late menopausal women, and found that the mean values of cholesterol and triglycerides are non significant (P>0,05) except that of Apo-B.

CONCLUSION

It may be concluded that in post menopausal women there were a reduction level in estradiol that could lead in reducing of HDL. There were no significant differences in lipid profile among each groups, but there were a significant reduction (P<0,05) in HDL and significant increase (P<0,05) of Apo-B level in post menopause that could lead to coronary heart disease (CHD) and breast cancer.

Acknowledgement
Thank to the Rector at University of Andalas Padang, to give an opportunity to allow this Program and peoples to supports this research.

REFERENCES

[1] L Mesalic ; E Haskovic . *Journal of Health Sciences.*, **2012**, 2(2) , 122-126
[2] M Renu ; A Khushbu . *Indian Journal of Public Health Research & Development*., **2014**, 5(3), 104-108
[3] C Kim . *Women's Health.*, **2012**; 8(2) , 155-167
[4] L Mesalic . *Journal of Health Science*., **2014**, 4(1) , 12-18
[5] M Khanam ; MAH Khan ;MR Rahman ; R Parvin ; S Akhter ; S Ferdousi . *Chattagram Maa-O- Shishu Hosp. Med. Col. J.*, **2014** , 13 ,47-50
[6] AN Alwachi ; FAK Khazaal , JH Yenzeel; NAR Karim . *European Journal of Health.*, **2013**, 7, 1-16
[7] M Burstein ; HR Scholnick ; J Morfin. *J. Lipid Res.*, **1970**, 11, 585-595
[8] EM Oestreicher ; C Guo ; EW Seely ; T Kikuchi ; VD Martinez ; L Jonasson ; T Yao ; D Burr ; S Mayoral ; W Roubsanthisuk ; V Ricchiuti ; GK Adler . *Kidney Int*., **2006** , 70 , 1759-1768
[9] P Hadji ; O Hars ; K Bock ; G Sturm ; T Bauer ; G Emons ; KD Schulz . *European Journal of Endocrinology*., **2000**, 143 , 55-60
[10] SR Kilim ; SR Chandala . *Journal of Clinical and Diagnostic Research*., **2013**, 7(8) , 1596-1598
[11] G Kanwar ; S Kirad ; L Chawala ; N Jain . *International Journal of Research in Applied, Natural and Social Sciences*., **2014**, 2 (8) , 61-66
[12] Z Hussain ; S Masood ; MH Ur Rehman . *Ann. Pak. Inst. Med. Sci*., **2010** , 6(1) , 4-6