

# Study of Electrocardiography and Its Correlation with Lipid Profile in Postmenopausal Women

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## ABSTRACT

Menopause is a physiological event in every woman's life which is characterized by hormonal changes. Menopause occurs between late 40's and early 50's. Menopause is defined as the time of cessation of ovarian function resulting in permanent amenorrhoea. It takes twelve months of amenorrhea to confirm that menopause has set in; therefore it is a retrospective diagnosis. . During menopause there is fall in serum levels of estrogen and progesterone. After menopause there is increase in fat mass and change in lipid storage in central part of body. Menopause increases the risk of ischemic heart disease. There is increased risk for cardiovascular diseases in postmenopausal women compared with premenopausal women. This can be attributed to significant plasma cholesterol lowering action of Estrogen. Postmenopausal women are particularly at risk due to loss of protective effect of estrogen on cardiovascular disease. By adapting healthy life style and with help of exercise there may be reduction in cardiovascular risk in postmenopausal women. This study intends for early diagnosis and primary prevention from cardiovascular diseases in postmenopausal women.

**Key Words:** - Postmenopause, Premenopause, Estrogen, Lipid Profile, Electrocardiography

## INTRODUCTION

Menopause is an important physiological event in every woman's life which is characterized by hormonal changes. All women undergo the same basic hormonal changes during menopause i.e there is fall in estrogen and progesterone levels. The tendency to gain weight after menopause is a major predisposing factor for cardiovascular disease, hypertension etc. [1] After menopause there is increase in fat mass accompanied by a change in fat storage distribution. There is a tendency of fat deposition in central part of body that is abdominal location. [2] The body weight has influence on blood pressure & lipid profile & is a good predictor of hyper tension & hyperlipidemia. [3]

As perimenopausal women are deprived of the protective effects of

estrogen, they are highly predisposed to cardiovascular risk. There is an increased need for an awareness of the significance of cardiovascular disease and its prevention. Risk of cardiovascular disease is commendable in postmenopausal women. By inculcating simple measures like changing the life style and regular exercise there can be reduced cardiovascular risk in postmenopausal women. [4] This study may also useful for early diagnosis and primary prevention from cardiovascular disease in postmenopausal women.

Increasing incidence of cardiovascular disease is related to many risk factors such as increase in body weight, ageing process, dyslipidemia, physical inactivity, mental stress, smoking and alcohol intake. As the incidence of coronary artery disease increases in women after

menopause, in the present study we tried to correlate some of the risk factors associated with coronary artery disease. [5] Our aim is to educate women about the transition of her phase of health so that she can adopt a healthy and active life style thus smoothening the transition.

## MATERIALS AND METHODS

This is a Cross sectional study of correlation of lipid profile and electrocardiography changes in 100 postmenopausal women. All apparently healthy post menopausal women who have attained menopause between 0 -5 and more than 5 years ago were selected for the study. Women who were known cases of Hypertension, diabetes mellitus, cardiovascular diseases, primary & secondary amenorrhea and those who had undergone hysterectomy were excluded from our study.

The study was conducted in D.Y. Patil Hospital, Kadamwadi & D.Y. Patil Medical College, Kasaba- Bawda, Kolhapur after obtaining ethical committee clearance from the institute. The study group was selected as per inclusion and exclusion criteria. Written and informed consent was taken for the study after explaining its significance in their vernacular language. A pre tested structured proforma was used collect the relevant information. Personal history was taken and a clinical examination of all the systems was done to exclude medical problems and to prevent confounding of results. Study was carried out during 8:00 AM to 11:00 AM. In this study parameters studied are

1. Pulse rate / min.:- Pulse was examined by standard clinical method of examination.
2. Blood pressure recording:- In supine position with mercury sphygmomanometer, systolic and diastolic blood pressure recorded under resting condition.

**ECG:-** ECG recording with ECG 12 lead machine during morning hours in (10.00am to 1.00 pm)

Before recording the electrocardiogram, the procedure was explained to the subject. The subject was asked to relax in supine position. The relaxed physical and mental state of the subject was confirmed. Then, a resting 12-lead ECG was recorded in supine position, in accordance with classical recommendations on the BPL 108T –DIGI machine.

### Lipid Profile:-

**In Lipid Profile** – For the estimation of Lipid Profile, 5ml venous blood sample was collected after 12 hours overnight fasting from each subject and lipid profile was done by semi-automated analyzer using enzymatic method. Lipids analyzed were -

- a) Total serum cholesterol
- b) Triglycerides
- c) HDL cholesterol
- d) LDL cholesterol

**Statistical Analysis:** Data collected was statistically analyzed by unpaired t test & correlation coefficient was used to determine correlation.

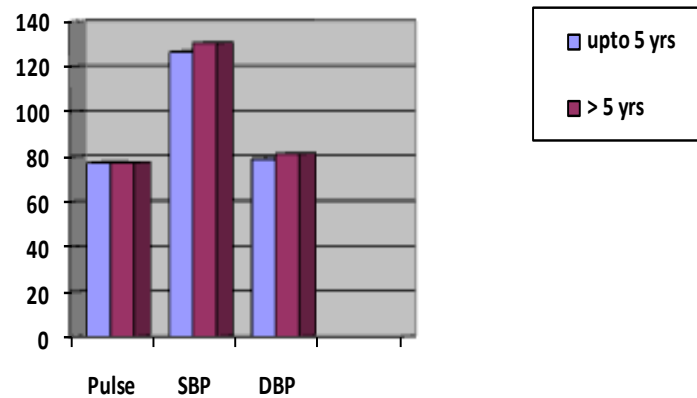
## RESULTS

### Mean Value of Systolic & Diastolic Blood Pressure

Menopause		Pulse/min	SBP in mm Hg	DBP in mm Hg
0-5 Yrs (50 subjects)	Mean	77.26	126.52	79
	Std Deviation	6.39	14.34	8.37
>5 Yrs (50 subjects)	Mean	77.20	130.40	81.24
	Std Deviation	8.16	13.21	9.04
Unpaired Test	t value	0.041	1.408	1.285
	p value	0.967	0.162	0.202

Mean Pulse, SBP, DBP of women with menopause period more than 5 yrs was not significant with women of menopause period upto 5 yrs.

PULSE, SBP, DBP



Mean values of T. Cholesterol, Triglycerides, HDL, LDL

Menopause		T.Cholesterol	Triglycerides	HDL	LDL
< 5 years >5years	Mean	198.00	137.16	49.37	121.20
	Std. Deviation	39.55	56.46	11.66	37.93
	Mean	190.03	162.92	44.55	112.89
	Std. Deviation	47.46	76.94	8.28	42.84
Unpaired t test	t value	0.912	1.909	2.382	1.026
	p value	0.364	0.059	0.019	0.307

Mean Total cholesterol, mean LDL of women with menopause period > 5 years was not significant with women of menopause period upto 5 years.

Mean Triglyceride, of women with menopause period > 5 years was moderately high with women of menopause period upto 5 years (triglyceride t=1.909, P=0.059) VLDL (t=1.909, P=0.059).

Mean HDL of women with menopause period > 5 years was significantly low with women of menopause period upto 5 years (t=2.382, P= 0.019).

Group 1-The women who have attained menopause in last 5 years.

Group 2- The women who have attained menopause more than 5 years ago.

Lipid profile - In our study there is significant change in Serum triglycerides (t=1.909, P=0.059), HDL (High Density Lipoprotein) (t=2.382,P=0.019) and VLDL (Very low Density Lipoprotein) (t=1.909,P=0.059).

Sushil Kumar et al (2012)- Concluded that in lipid profile Serum triglyceride, total cholesterol, Serum LDL and Serum VLDL was increased and Serum HDL was low except triglyceride (P < 0.01) all changes in lipid profile were very significant (P < 0.001) in menopausal women. [6]

Walulkar et al (2012)- studied cardiovascular risk factors in postmenopausal women , they concluded that menopause is associated with potentially adverse changes in lipids and lipoproteins independent of any effects of ageing. The Serum lipids and lipoproteins were increased after menopause resulting in a more atherogenic risk. [7]

Swarnlatha et al (2015)- conducted study of Serum lipid profile between

ECG Changes in Menopause			
ECG changes	Menopause		Total
	Upto 5yrs	> 5yrs	
Normal Sinus Rhythm	43	40	83
	86.0%	80.0%	83.0%
Ischemia	5	3	8
	10.0%	6.0%	8.0%
Sinus Tachycardia	1	2	3
	2.0%	4.0%	3.0%
Mild Bradycardia	0	2	2
	.0%	4.0%	2.0%
LVH	0	1	1
	.0%	2.0%	1.0%
Total	50	50	100
	100.0%	100.0%	100.0%

DISCUSSION

This is a cross sectional comparative study which was carried out in two menopausal women groups.

premenopausal and postmenopausal women. In their study there was no significant difference in cholesterol and LDL. But significant difference was observed in triglycerides, HDL, VLDL. The reduced cardioprotective HDL is an indication that menopause is an independent risk factor for developing cardiovascular disease. [8]

Madhavi Kulkarni et al (2014) carried out study on lipid profile in post menopausal women of Hubli city. There was statistically significant increase in blood pressure, total cholesterol and LDL. No statistically significant change was seen in HDL & VLDL. [9]

Maulik S. Varu et al (2012) - were involved in a comparative study of serum lipid profile between pre menopausal and post menopausal women. According to their study, menopause is associated with altered serum lipid profile which is an independent risk factor for developing cardiovascular diseases. [10]

In spite of age 43 to 60 years (age factor) lipid profile is showing significant high levels i.e. suggesting that in addition to estrogen level faulty diet habit and lifestyle showing additive effects to increase in triglyceride, LDL & VLDL cholesterol and decrease in HDL cholesterol

Shireen Quadri et al (2014) - Study showed correlation of body composition and lipid profile in postmenopausal women. She studied in 2 groups according to menopausal period. The body composition and lipid profile parameters were correlated but statistically was not significant. [11]

ECG- Out of 100 ECGs, 17 ECGs, recording showed abnormalities such as Ischemia, Sinus Tachycardia, Mild Bradycardia, Atrial Ectopics, LVH, Left Bundle Branch Block. The prevalence of ECG changes was more common in group - 2.

Pentti M. Rautaharju, et al (2006) - study depicted the electrocardiographic abnormalities that predict coronary heart disease events and mortality in post menopausal women. Their conclusion was ventricular re-polarization abnormalities in

post menopausal women as important predictors of CHD event and CHD mortality as ECG MI and other QRS abnormalities. [12]

Akerblom M et al. (1998) – studied electrocardiogram pattern in hypercholesterolemic women. Their results revealed that the women with hypercholesterolemia (22%) showed ischemic changes. [13]

Aziz F, Ainy E. et al. (1980) - Coronary heart disease risk factors and menopause: They found increase in coronary heart disease risk after menopause in Tehranian women. [14] Our result also shows 8% ischemic changes in ECG. Brochier ML, et al. (1998) - Coronary heart disease risk factors in women. They concluded that menopause now considered as the marker for the end of natural protection against coronary heart disease. [15]

The estrogens have cardioprotective action. After menopause deficiency of estrogen results in loss of this cardioprotection. The knowledge about the status of cardiovascular system in menopausal women will be useful in the prevention and early detection of cardiovascular diseases with the help of simple and non invasive techniques like study of Lipid profile, BMI, and Electrocardiograph.

8% ECG shows ischemic changes and there BMI value and triglycerides & LDL cholesterol values are raised out of lipid profile. This was our sincere attempt to bring about awareness in women who undergo the stress of menopausal transition. Post menopausal period exposes women to both hypercholesterolemia and in turn coronary events. Every woman ought to be aware of this so that she can experience a healthy transition.

## CONCLUSION

There are significant changes in Lipid Profile and ECG recording in postmenopausal women. The values of BMI and Lipid Profile are raised. In ECG recording there are abnormal changes like

ischemia, sinus tachycardia and sinus bradycardia. These are because of less estrogen in postmenopausal women which have cardio protective role. Because of all these changes there are increased risks of cardiovascular complication. To reduce this complication the postmenopausal women should take preventive majors like change in life style, change in food habits, daily exercise, yoga & meditation. These may reduce the risk of cardiovascular disease in postmenopausal women.

Our findings suggest that women in premenopausal and postmenopausal period should undergo follow up with lipid profile and ECG screening at regular interval for early detection and prevention of cardiovascular disease.

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