

PHYSICAL EXERCISE IS MORE EFFECTIVE THAN HRT IN IMPROVING LIPID PROFILE STATUS IN POSTMENOPAUSAL WOMEN

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ABSTRACT

*Disturbances of lipid profile in postmenopausal women may occur due to hormonal changes and physical inactivity which ultimately increases the risk of atherosclerosis, CHD and MI. Physical exercise may play a significant role in the management of dyslipidemia among postmenopausal women than HRT. The study was carried out to compare and contrast between the effects of physical exercise and HRT in improving lipid profile status among postmenopausal women. This study was carried out in the Department of Physiology, Sir Salimullah Medical College, Dhaka, from 1st January, 2009 to 31st December, 2009. A total number of 90 postmenopausal women having age ranged from 50-60 years were included in the study. Among 90 postmenopausal women, 30 were performing regular physical exercise, 30 were receiving HRT and 30 were sedentary postmenopausal women without receiving HRT. Lipid profile such as TC, HDL-C, LDL-C, TG and fasting blood sugar of all the participants were estimated in Physiology laboratory, SSMC Mitford, Dhaka. The statistical analysis was done by using appropriate test as applicable. Mean serum TC, LDL-C and TG were significantly ($p < 0.001$) higher and mean HDL-C was significantly ($p < 0.001$) lower in sedentary postmenopausal women than those of postmenopausal women with regular physical exercise and postmenopausal women receiving HRT. Again, TC, LDL-C and TG were comparative higher in postmenopausal women receiving HRT than those of postmenopausal women with regular physical exercise and HDL-C were almost similar among these two groups of women. **Conclusion:** Physical exercise could be more effective than HRT in improving lipid profile status in postmenopausal women.*

Key words: Lipid profile, Postmenopausal women, Physical exercise.

(Bangladesh J Physiol Pharmacol 2011;27(1&2):9-12.)

INTRODUCTION

Lipid profile abnormalities in postmenopausal women is a common health hazard all over the world.¹ Due to estrogen deficiency and lack of physical exercise alteration in lipid metabolism occurs among these group of women which ultimately leads to all causes of morbidity & mortality.²

Alteration of lipid metabolism with increase serum levels of total cholesterol (TC), lipoprotein and triglyceride may occur in postmenopausal women which are highly favorable factors for atherogenesis.³ Again increase level of VLDL-C and LDL-C are found among postmenopausal women.^{3, 4}

Physical exercise or HRT may play a significant role in the management of adverse changes in lipid profile among post menopausal women.² Physical exercise improves lipid profile by increasing HDL-C and by it decreasing, TC, LDL-C, VLDL-C and TG among postmenopausal women.^{2,5} Again, HRT have a favorable effect on lipid profile status among postmenopausal women. Moreover, HRT in postmenopausal women can improve serum cholesterol levels by decreasing LDL-C and increasing HDL-C levels thereby reducing CHD risk by 50%.⁶

But the hazards of prolonged use of HRT may results carcinoma in breast and endometriun, genital bleeding, endometrial hyperplasia, thromboembolism, hypertension, gallbladder disease, stroke etc.^{7,8} Moreover, HRT is not suited for all women and it is contraindicated in several conditions. Again, it is also

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difficult to maintain the dose and timing of taking the drug regularly.

It has been observed that, physical exercise may be safe and effective alternative to HRT in improving lipid profile among postmenopausal women, thereby reducing CVD mortality among these group of women.² Again, performing physical exercise is safest, easiest, less expensive and has no such side effect like HRT supplementation.⁹

Postmenopausal syndrome and complications are increasing day by day throughout the world, especially in Bangladeshi women. Most of this complications arising may be due to abnormal lipid profile status. Although Some study has been done on this regard in abroad,^{2,4,9} but no such published data has yet been available on this aspect in our country. Again, the finding of this study may give information to the physicians for proper management of the women with postmenopausal syndrome. Moreover, it is intended to create awareness among healthy adult women to prevent and also to minimize the risk of postmenopausal syndrome. So this study was undertaken.

METHODOLOGY

This cross sectional study was carried out in the department of physiology, Sir Salimullah Medical College, Dhaka between 1st January 2009 to 31st December 2009. A total number of 90 subjects were taken in this study, and all of them belonged to middle socioeconomic status. Among the 90 postmenopausal women, age ranged from 50-60 yrs were included in this study which was further divided into group A consisting of 30 sedentary postmenopausal women without HRT (Control), group B consisting of 30 postmenopausal women with regular physical exercise (Study) and group C consisting 30 postmenopausal women receiving HRT (Study). Protocol of this study was approved by the Institutional Ethics Committee (IEC) of Sir Salimullah Medical College, Dhaka. All the postmenopausal women were selected from known relatives and associates and the postmenopausal

women receiving HRT were collected from Central Hospital, Dhanmondi, Dhaka. Subjects having history of Hypertension, Diabetes Mellitus, Tuberculosis, Heart disease, Renal disease, other acute and chronic diseases, alcohol users, using prescribed medicine were excluded from this study. After selection of the subjects, the objectives and benefits of the study were explained to each subject and written informed consents were taken from the subjects. Detail personal, dietary, medical, family, socioeconomic, occupational and drug history of each subject were recorded in a prefixed questionnaire and thorough physical examinations were also done and documented. Height and weight of the subjects were measured for the calculation of BMI. With all aseptic precautions, 4 ml of venous blood was drawn from medical cubical vein by disposable syringe. It was kept in a clean dry glass test tube and 30 minutes were allowed for clot formation. Then blood was centrifuged at 3000 rpm for 30 minutes. After that supernatant serum was collected in labeled eppendorf tube and preserved in the refrigerator at -20°C. Then estimation of fasting blood sugar and lipid profile were done by auto analyzer in the laboratory of Department of physiology, SSMC. The statistical analysis was done by one way ANOVA (Post Hoc) test, Bonferroni test, Chi-square (X^2) test, Fisher's exact test by using SPSS Programme, Version-15.

RESULTS

All the groups were matched for age. Again, no significant difference of BMI was observed among all the 3 groups of postmenopausal women. (Table I).

The mean TC, LDL-C, VLDL-C and TG was significantly ($p < 0.001$) higher in group A in comparison to those of group B and C. Whereas, all of these value were higher in group C in comparison to group B, but was not statistically significant (Table-II).

The mean serum HDL-C level was significantly (0.001) lower in group A in comparison to those of group B and C. Again, HDL-C levels were almost similar and showed no significant difference between group B and C.

Table I
Mean \pm SD of Age and BMI in different groups (n=90)

Group	n	Age (years)	BMI (kg/m ²)
Group A	30	54.50 \pm 2.22 (51-59)	22.12 \pm 0.60 (20.55-22.89)
Group B	30	54.53 \pm 2.08 (51-59)	22.13 \pm 0.75 (19.92-22.89)
Group C	30	55.60 \pm 2.14 (52-60)	21.86 \pm 1.30 (17.58-22.89)

Statistical analysis

Group	n	Age (p value)	BMI (p value)
Group A vs Group B		0.999 ^{ns}	0.999 ^{ns}
Group A vs Group C		0.999 ^{ns}	0.999 ^{ns}
Group B vs Group C		0.333 ^{ns}	0.999 ^{ns}

Group A = Sedentary postmenopausal women without HRT (control)

Group B = Postmenopausal women with regular physical exercise (study)

Group C = Postmenopausal women receiving HRT (study)

*** = Significant at $p < 0.001$; ns = Not significant; n = total number of the subject

Table II

Mean \pm SD of Serum lipid levels in different groups (n=90)

Group	n	TC(mg/dl)	HDL(mg/dl)	LDL(mg/dl)	TG(mg/dl)
Group A	30	218.33 \pm 57.79 (129-375)	34.33 \pm 3.97 (28-48)	149.81 \pm 63.94 (51.4-309.0)	170.93 \pm 49.40 (100-283)
Group B	30	147.97 \pm 25.02 (100-197)	40.60 \pm 5.61 (31-50)	87.96 \pm 22.23 (50-134)	97.05 \pm 28.48 (60-170)
Group C	30	152.93 \pm 32.01 (109-265)	40.87 \pm 6.08 (30-50)	88.25 \pm 30.86 (50.4-201.6)	119.77 \pm 25.57 (75-155)

Statistical analysis

Groups	TC(mg/dl) (p value)	HDL(mg/dl) (p value)	LDL(mg/dl) (p value)	TG(mg/dl) (p value)
Group A vs Group B	0.001***	0.001***	0.001***	0.001***
Group A vs Group C	0.001***	0.001***	0.001***	0.001***
Group B vs Group C	0.999 ^{ns}	0.999 ^{ns}	0.999 ^{ns}	0.079 ^{ns}

Group A = Sedentary postmenopausal women without HRT (control)

Group B = Postmenopausal women with regular physical exercise (Study)

Group C = Postmenopausal women receiving HRT (Study)

*** = Significant at $p < 0.001$; ns = Not significant; n = total number of the subject

DISCUSSION

In this study, serum TC, LDL-C, and TG were significantly higher and HDL-C was significantly lower among sedentary postmenopausal women in comparison to postmenopausal women with regular physical exercise and postmenopausal women with HRT. But all these parameters were comparatively improved among postmenopausal women with regular physical exercise in comparison to postmenopausal women with HRT, but was not statistically significant. This finding is in consistent with that of some other researchers.^{3,10} On the contrary, some other groups of investigators observed no significant difference of HDL-

C level among postmenopausal women and premenopausal women.¹¹ This discrepancy might be due to the postmenopausal study population was of higher age group (65 ± 6 years), but in the present study, the age of the postmenopausal study population was from 50-60 years.

Some researchers suggested, physical activity is a lipid lowering factor.¹² It has been reported that, regular physical exercise increases serum HDL-C and decreases serum TC, LDL-C and TG level among postmenopausal women.^{13,14} Again, HDL-C transport excess cholesterol from peripheral tissues to the liver for excretion, a process known as reverse cholesterol transport¹.

Moreover, exercise increases fat utilization for energy, thereby create a physiologic state that is beneficial to lipid metabolism.^{5,15} Furthermore, regular physical exercise may improve insulin sensitivity independent of total weight loss.¹⁶ In the light of present accepted views, insulin sensitive tissues also contain GLUT-4 vesicles that move into cell membrane in response to exercise and are independent of the action of insulin. This is why exercise lowers blood glucose level.^{15,16}

Again, different researchers considered HRT as a cardio protective for postmenopausal women.¹⁷ Moreover, it has been observed that HRT in postmenopausal women can improve cholesterol by increasing HDL-C and by decreasing LDL-C levels. They also suggested that, this increase in HDL-C levels might be due to estrogen induced inhibition of hepatic lipase, the enzyme which destroy HDL-C.¹⁸ Furthermore, HRT decreases cholesterol levels by increasing the number of LDL-C receptors in the liver resulting in increased hepatic removal of cholesterol from blood.¹⁹

However, many hazards and complications may arise from prolong use of HRT such as endometrial carcinoma, breast carcinoma, genital bleeding, endometrial hyperplasia, hypertension, thromboembolism, gall bladder disease, stroke etc.^{18,19} Moreover, HRT is not suited for all women and it is contraindicated several conditions such as undiagnosed abnormal vaginal bleeding, breast lump, myocardial infarction (MI), Thrombo embolism etc.²⁰ Again, it is also difficult to maintain the dose and timing of taking the drug regularly.

In the present study, improvement of dyslipidemia were more pronounced in postmenopausal women with Regular Physical exercise group in comparison to those of postmenopausal women with HRT group. Furthermore, it was observed that Physical exercise was more effective than that of HRT in improving lipid profile status as supported by comparing these parameters between postmenopausal women performing physical exercise & postmenopausal women receiving HRT.

CONCLUSION

From this study, it can be concluded that, physical exercise was more effective than that of HRT in lowering lipid levels among postmenopausal women. Again, physical exercise is the safest, easiest, less expensive and without having any complication for lipid lowering factor in postmenopausal women. So, regular optimal physical exercise can be used as effective alternative to HRT and thereby reduces CVD risk and improve daily life style.

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