



ISSN Print: 2664-6552  
 ISSN Online: 2664-6560  
 Impact Factor: RJIF 5.5  
 IJCRD 2022; 4(2): 10-15  
<https://www.chemicaljournal.in>  
 Received: 10-07-2022  
 Accepted: 13-08-2022

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## Assessment of lactate dehydrogenase and lipid profile in premenopausal and postmenopausal women in rural regions (Kirkuk government)

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### Abstract

The aim of this study aims to measure the levels of lipid profile in in after menopausal women which is an signal of the rise the probability of heart and blood vessels disease the research included 100 women included 50 after-menopausal women aged between 50-60 years and the second group included 50 premenopausal women aged 33-43 years Samples were collected from December 2021 to march 2022, and estimated whoever LDH, TC, TG and HDL, LDL and VLDL The results showed increase ( $p \leq 0.01$ ) in the level of lactate dehydrogenase enzyme for the after menopausal group ( $317.63 \pm 17.22$ ) U/L compared with the before menopausal group ( $188.5 \pm 15.07$ ) U/L and the outcomes of the research showed that there are significant differences for total cholesterol which showed outcomes rise ( $p \leq 0.05$ ) in after menopausal women when contrasted to before menopausal women in which the outcomes were ( $197.1 \pm 9.52$ ) mg/dl ( $197.105 \pm 9.52$ ) mg / dl respectively and a rise ( $p \leq 0.01$ ) within triglyceride level of within the after menopausal group ( $191.94 \pm 17.62$ ) mg/dl compared with the before menopausal group ( $132.47 \pm 14.37$ ) mg/dl As for high-density lipoprote (HDL) it has appear a decline ( $p \leq 0.05$ ) within after menopausal women ( $43.69 \pm 1.1$ ) mg/dl when compared with before menopausal women ( $56.64 \pm 5.19$ ) mg/dl Regarding low-density protein lipids (LDL) where there was a significant increment ( $p \leq 0.05$ ) with revealed outcomes ( $115.02 \pm 9.11$ ) mg/dl in after menopausal women and ( $88.86 \pm 6.48$ ) mg/dl in women before menopause, and the outcomes appear a rise ( $p \leq 0.01$ ) in the standard of very low-density lipoprotein concentration for the after menopausal group ( $38.38 \pm 3.10$ ) mg/dl compared with the before menopausal group ( $26.49 \pm 3.17$ ) mg/dl and the results showed a significant increase ( $p \leq 0.01$ ) in body mass index in the after menopausal group ( $31.32 \pm 1.17$ ) compared with the before menopausal group ( $27.25 \pm 0.91$ ) kg/m<sup>2</sup>

**Keywords:** Lactate dehydrogenase, lipid profile, premenopausal, postmenopausal

### Introduction

Menopause which marks the end of the reproductive years with the termination of cyclic ovarian functions, is a natural process that occurs as women age [1] According to Walker and Herndon [2] characterize it as a change in females where the finish of fertility is demonstrated by the constant cessation from the menstrual cycle (menstruation) However the expression “perimenopausal” that express “surround the menses” pointing to the menopause transmission year a period both prior and next the history of the last event of menses [3] The menopause transmission and after menopause itself is a normal life-altering, it is not a sickness or problem The transmission itself has a inconstant degree of effects for some women it can be a challenging moment in their lives minimal with regard to others Although menopause perhaps most easily comprehend as the adverse operation of menarcheal the onset of the menstruation According to [4] the woman reach to the menopause when she does not have menstruation for 12 months respectively. Lipid profile is the quantity the total cholesterol (TC) low density lipoprotein (LDL) cholesterol high density lipoprotein (HDL) cholesterol and triglycerides (TG) in the blood The lipid profile assists to determine dyslipidemia and the observe the health levels of these fats is necessary to remain in well [5] The Lactate dehydrogenase (LDH) it is a cytoplasmic enzyme presents in all cells of the body that stimulate the reversible transformation of pyruvate to lactate as a part of the lactic acid cycle [6] LDH regulates cellular metabolism in addition to being a well-known indicator of tissue injury [7] After cellular injury LDH is let out of damaged cells into serum [8] it is believed that the presence of the LDH in extracellular is linked to cell necrosis and tissue breakdown [9, 10].

Lactate dehydrogenase increase in serum in a variety of clinical conditions such as myocardial infarction, haemolysis, and disorders of the liver Kidney lungs brain damage and Muscle, which serves as markers for the state of tissue or organ [11] Indicated that hazard factors for heart and blood vessels disease that are mainly associated with coronary artery disease are high concentration of total cholesterol triglycerides and low-density lipoprotein (LDL) and low levels of high-density lipoprotein (HDL) It diminish the fat disturbance and promote the health status and diminish the causes of death from coronary artery disease as indicated by [12] The low-density lipoprotein LDL is an paramount risk and has an active role in the formation of atherosclerosis, while the high-density lipoprotein has an opposite role to HDL, Also [13] indicated that the level of very low-density lipoprotein (VLDL) was elevated in heart patients It goal from the current study is to measure the levels of serum lipids in postmenopausal women in rural Kirkuk City and compare them to premenopausal women as well as to examine the impact of promenopause on markers of coronary heart disease by measuring the activity of plasma lactate dehydrogenase (LDH) enzymes.

### Materials and Methods

This study included 2 study groups, the first group enclosed 50 post-menopausal women aged between 50-60 years, and also the second group included 50 pre-menopausal women aged 33-43 years this study included was conducted on women in the rural Kirkuk Governorate The samples are collected from December 2021 to March 2022 during this study we tried to exclude the co start variables and results obtained are taken because the commonplace normal in our environment

### Samples collection

Blood samples have been collected after blood become drawn from the vein. Blood was drawn by use of a syringe of a quantity of (10 ml) after which placed in a new clean and dry plan tube made from polystyrene after which put in a water bath at (37 C0) for 10 minutes Then after that it was placed in the centrifuge with a speed of (4000g) for 10

minutes and after that the serum was pulled with a micropipette and keeping the serum at a temperature of (-20 C0) until it is used Estimated each Lactate dehydrogenase enzyme total cholesterol triglycerides and high-density lipoprotein by using a kit (Biolabs) France company low-density lipoprotein and very low-density lipoprotein estimated by equations  $LDL-C (mg/dl) = Total\ cholesterol - (HDL-C + TG/5)$  and  $VLDL-C = TG/5$  [14].

### Statistical analysis

Statistical analysis of the data was carried out using the ready-made statistical package SPSS 20 to determine the mean and the standard error of the mean The results were statistically analyzed using the t-test to find significant differences between study groups (Pearson's moment correlation) to determine the existence of an effective correlation between the studied parameters.

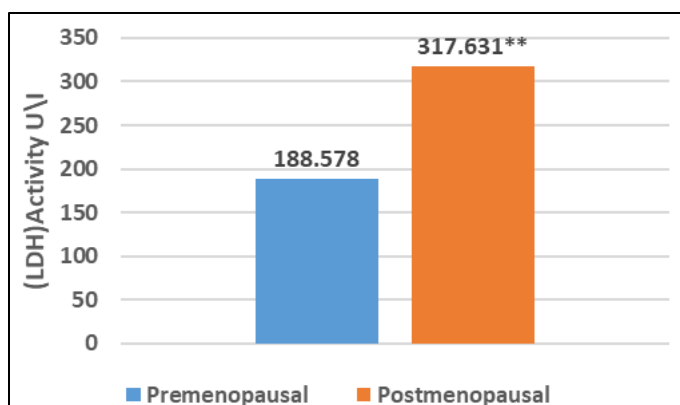
### Results

The results show in table (1) a significant increase in the level of lactate dehydrogenase enzyme for the postmenopausal group contrasted to premenopausal group ( $p \leq 0.01$ ) Figure (1) the research appears elevate in the total cholesterol level of the postmenopausal contrasted to premenopausal ( $p \leq 0.05$ ) Figure (2).

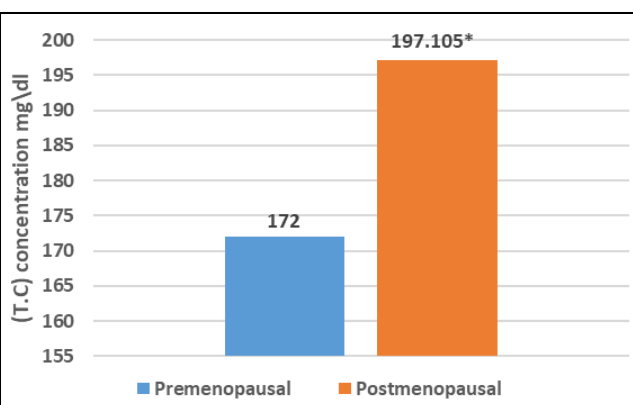
**Table 1:** Compare the premenopausal group with the postmenopausal group

Parameters	Premenopausal group	N	Premenopausal group	N	P-Value
	Mean±SE		Mean±SE		
LDH U\l	188.578±15.074	50	317.631±17.223**	50	0.0001
T.C mg\dl	172.000±6.297	50	197.105±9.527*	50	0.011
T.G mg\dl	132.473±14.376	50	191.947±17.620**	50	0.006
HDL mg\dl	56.646±5.199*	50	43.695±1.101	50	0.023
LDL mg\dl	88.860±6.486	50	115.020±9.115*	50	0.012
VLDL mg\dl	26.494±3.171	50	38.389±3.100**	50	0.001
BMI	27.258±0.910	50	31.322±1.170**	50	0.01

LDH: Lactate dehydrogenase, T.C: Total cholesterol, T.G: Triglyceride, HDL: High-density lipoprotein, LDL: Low-density lipoprotein, VLDL: Very low-density lipoprotein BMI: Body mass index



**Fig 1:** Compare LDH activity



**Fig 2:** Compare T.C concentration

The study showed a significantly elevated level of triglyceride concentration during postmenopausal contrasted to premenopausal ( $p \leq 0.01$ ) Figure (3) There was a

significant decrease in the level of high-density lipoprotein for the control group compared with the studied group ( $p \leq 0.05$ ) Figure (4).

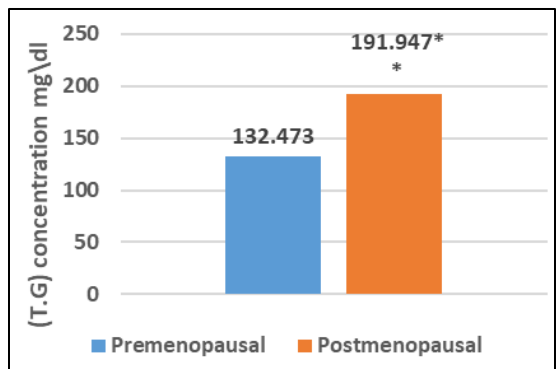


Fig 3: Compare T.G concentration

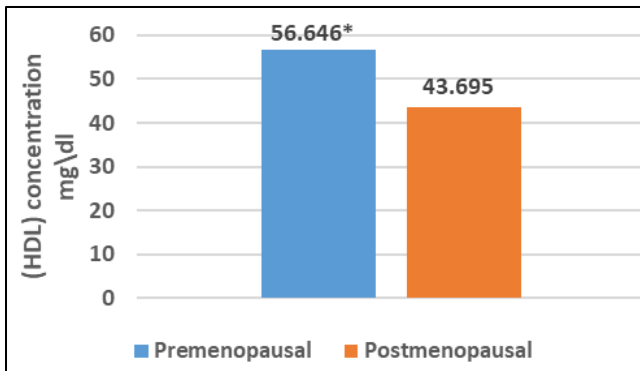


Fig 4: Compare HDL concentration

The results showed a significant increase in the level of low-density protein lipids for the studied group compared with the control group ( $p \leq 0.05$ ) Figure (5) There was a

significant increase in the level of very low-density lipoprotein concentration for the studied group compared with the control group ( $p \leq 0.01$ ) figure (6).

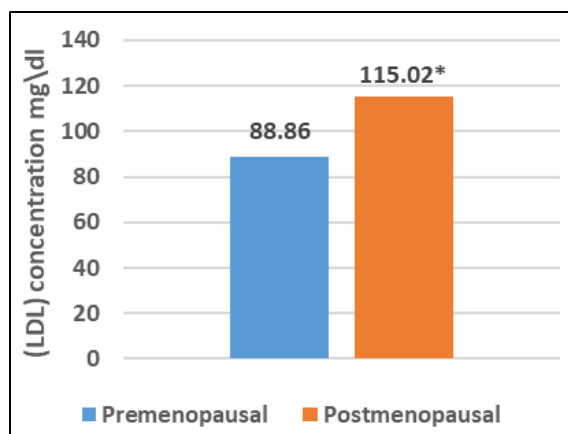


Fig 5: Compare LDL concentration

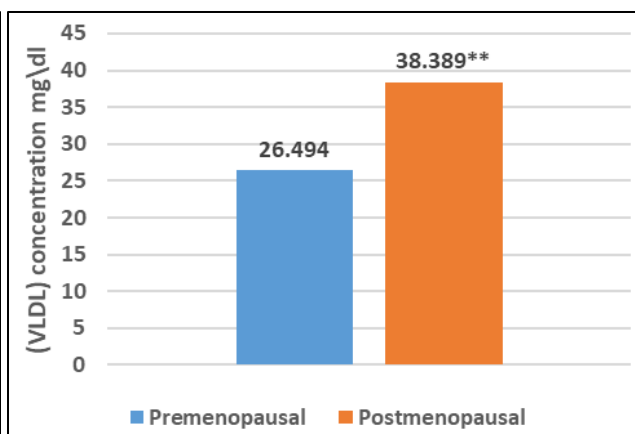


Fig 6: Compare VLDL concentration

There is a significant increase in body mass index for the studied group compared with the control group ( $p \leq 0.01$ ) figure (7).

mass index very low-density lipoprotein and triglycerides And a significant negative association between high-density lipoprotein and low-density lipoprotein in the premenopausal group.

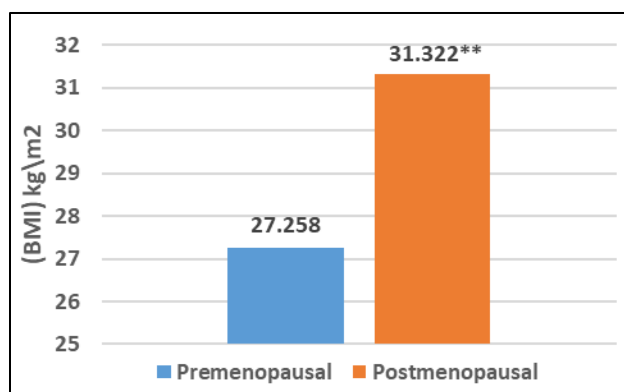


Fig 7: Compare BMI values

Table 2 indicates the statistical correlations between the studied variables, where the results indicated that there was a significant positive correlation between total cholesterol and low-density lipoprotein and a positive significant correlation between triglycerides and very low-density lipoprotein in the case of the postmenopausal group. While the results showed a significant positive correlation between lactate dehydrogenase and cholesterol low-density lipoprotein and very low-density lipoprotein cholesterol and low-density lipoprotein high-density lipoprotein and body

Table 2: Correlation coefficient(r) between groups

Correlations	LDH	T.C	HDL	LDL	VLDL	T.G	BMI
LDH	1	0.087	0.067	0.093	-0.154	-0.154	-0.033
T.C	0.746**	1	0.281	0.710**	-0.056	-0.058	-0.043
HDL	-0.146	0.232	1	0.077	-0.247	-0.240	0.023
LDL	.551**	0.609**	-0.530	1	-0.352	-0.352	-0.018
VLDL	.667**	0.375	-0.194	0.084	1	0.640**	-0.064
T.G	0.688**	0.388	-0.174	0.070	0.688**	1	-0.069
BMI	0.048	.1100	.470*	-0.383	.2120	.2270	1

Red color: Parameters, Blue color- Postmenopausal group correlation - Green color: premenopausal group correlation. \*\* . Significant correlation at the 0.01 level, \* . Significant correlation at the 0.05 level

**Discussion**

Previous studies have found medical conditions associated with menopause such as associated with high fevers, head pain, muscle pain, depression, and physiological hormonal, and physical changes [15] Reduced estrogen levels cause abnormal lipid and lipoprotein profiles throughout the postmenopausal period according to Bales [16] Estrogens contain a number of cardio protective pathways however they are lost when menopause occurs [17] In our study, postmenopausal women had elevated levels of LDH TC TG LDL-C and VLDL and reduced levels of HDL-C These

results make its owner more vulnerable to cardiovascular disease and this supports conclusions [18, 19, 20, 21, 22] a similar note was also made by [23, 24] in post-menopausal Caucasian women According to the current study's findings, post-menopausal women showed that the plasma LDH activity was significantly higher compared to the pre-menopausal (Table 1) This results is consistent with other research that indicated older women have higher levels of lactate dehydrogenase [25] Given that aging is a degenerative process linked to tissue breakdown and necrosis, an increase in LDH levels with age and after menopause may be caused by the release of the intracellular enzyme from dead cells into circulation [26, 27] Other research has indicated that the cause increase in LDH levels Because of the hormonal effect (estrogen) on the Cardiovascular system, which plays a vital role in lipids Metabolism mediated by estrogen receptor alpha and beta (28) The findings agreement with of earlier research [29, 46, 31, 32] where the TC is shown to increase in post-menopausal women's compared to pre-menopausal women due to estrogen insufficiency In contrast Poonam *et al.* [33] study observed no difference in TC levels between women of pre- menopausal and post-menopausal ages In our study, post-menopausal women shown elevated triglyceride levels and had statistically significant ( $P < 0.05$ ) The results we got are consistent to the [34, 35] In the post-menopausal women there is an increase in the accumulation of fat and the increase in the release of free fatty acid in the blood circulation and excessive free fatty acids provide substrate for hepatic triglyceride (TG) synthesis [36] In this study we found that In comparison to pre-menopausal women, post-menopausal women had significantly reduced levels of HDL ( $p < 0.05$ ) According to certain research [37, 38] In after menopausal women, reduce HDL levels perhaps a serious hazard factor for coronary heart disease (CHD). In contrast to our findings [39] found that post-menopausal women had higher levels of HDL-C according to numerous studies shown that High levels of HDL-C are linked to a decreased incidence of CHD On the other hand, low levels of HDL-C are linked to a higher incidence of CHD [22] When compared to before menopausal women, the findings showed after menopausal women had higher levels of LDL and were statistically significant ( $p < 0.05$ ) These results conform with other studies of [29, 40, 41] According to a study by Kumar and Shah (2012), the fact that estrogen has a direct impact on the metabolism of low-density lipoprotein is the reason for a elevated in LDL levels. Because estrogen promoted the manufacture of LDL receptor and directly contributes to the decline of LDL receptor after menopause, the major reasons for the absolute elevated in low-density lipoprotein perhaps related to a decline in estrogen levels. Very low-density lipoprotein (VLDL) is hydrolyzed by lipoprotein lipase (LPL) to produce median density lipoprotein, which is then converted to LDL. Following menopause, estrogen insufficiency raises plasma LPL and hepatic triglyceride (TG) lipase activity, which causes plasma LDL to build up and also causes LDL receptors to be minimum organize [31, 40] The outcomes showed raised significant ( $p < 0.05$ ) in the VLDL in after menopausal woman when contrasted and before menopausal woman and these outcomes are as congruity with done by [40, 34, 46] Estrogen lack after menopausal woman causes proportional enhancement of little VLDL particles with cholesteryl esters (CE) either reason of the rise catabolism of VLDL with coming about elevated number of extremely VLDL leftover

particles or rise action of cholesterol ester transmit protein or both [43].

The body mass index increasing concur with different studies showing a relationship among BMI and lipids and other studies showed the relationship between the lipid profile and the distribution of fat in the body. Both lipid profile and body fat are significant indicators for metabolic unsettling influences including dyslipidemia hypertension diabetes and cardiovascular diseases [44] The outcome of our research are appropriate with (1) it was shown in a study conducted on post-menopausal women in Calabar Nigeria where a mean BMI of 23.31 and 25.97 kg/m<sup>2</sup> for pre- and post-menopausal women respectively [45] However lipid profile disturbance in after menopausal women is generally perhaps because the alteration in the hormonal status of women these alteration perhaps regarding to the insufficiency of estrogen happening after menopause which shows the significant role of estrogen in lipids metabolism and dissemination leading to increment causes of cardiovascular morbidity and mortality.

### Conclusion

Post- menopause causes lipid profile alteration through increasing the levels of Tc, TGs, LDL, VLDL. Therefore the hazard of cardiovascular disease will be higher. Postmenopausal women are always at highly hazard of heart and blood vessels illness development, because the alteration in their lipid type and absence of estrogen influence in protecting the cardiovascular system.

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