



**International Journal of Biology, Pharmacy
and Allied Sciences (IJBPAS)**

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

**VARIABILITY OF HDL LEVELS AND THEIR ASSOCIATION IN PATIENTS WITH
DEPRESSED SYMPTOMS**

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Received 20th Jan. 2020; Revised 27th Feb. 2020; Accepted 29th March 2020; Available online 1st Sept. 2020

<https://doi.org/10.31032/IJBPAS/2020/9.9.5176>

ABSTRACT

Background and Objective: Deregulated levels of lipid profile are associated with different mental disorders. Even though no clear outcomes have been published to clarify the association. Number of articles does indicate varying outcomes for relation of lipid profile and depression. Yet comparatively there is less number of literatures published in India for the association study of these parameters and those studies which have been published had some limitations and shows contradicting results. With this thought to elucidate more specific results for Indian subpopulation we have done this study. The aim of this study was to correlate HDL levels in healthy and depressed patients.

Methodology: A total of 78 patients coming to Parul Sevashram Hospital, Vadodara. Depression symptoms were diagnosed with Hamilton Depression Scale. The study population was divided into age group of 20-39 and >39. After taking the consent of patients blood was drawn by a nurse and after serum isolation lipid profile was checked.

Result: Higher mean HDL levels were observed in depressed patients compared to healthy controls with 0.001 significance. We further show that higher mean HDL levels in male depressed patients with $p=0.008$ and lower mean levels of HDL in females with 0.04 significant differences.

Interpretation and Conclusion: Higher HDL level was observed among the study groups with significant (<0.05) difference with It can be predicted that females are at more risk for having higher HDL in depressive state. Considering the low study sample additional investigation and replication of study with large sample size is required.

Keywords: Depression, HDL, LDL, Hamilton Depression Scale, Lipoproteins

INTRODUCTION

Lipoproteins play an important role in transport of different lipid molecules. On the basis of different density values they are divided into HDL (High Density Lipoprotein), LDL (Low Density Lipoprotein) and VLDL (Very Low Density Lipoprotein) they carry and bind different percentages of phospholipids, triglycerides, esterified and unesterified cholesterol.

When number of these lipoprotein fluctuate they indicate number of pathologies For example. Lower LDL and HDL was lower in a meta analysis of 65 studies in patients with suicidal tendencies compared to healthy controls [1]. Lower LDL levels also increases the chance of developing type 2 diabetes [2]. Increased chance of cardiovascular disease was associated with increased LDL and non HDL lipoproteins [3, 4], while lower LDL and HDL levels were associated with patients with multiple system atrophy with patients

with MSA - P having higher HDL levels compared to patients with MSA-C [5]. Higher LDL increases the chances of developing coronary heart disease and coronary vascular disease [6]. A lower LDL in type 2 diabetes increases the chances of osteoporosis at lumbar spine [7]. In European Americans, higher LDL in type 2 diabetes increases the chance of developing abdominal aortic aneurism [8]. Higher HDL and LDL level was also observed in acute bipolar maniac patients [9], in schizophrenia [10] in and in Parkinson's disease [11]. Keeping in mind that lipoproteins play a role in mental and physical disorder we have conducted a study to compare lipoproteins levels in patients with depression in Indian subpopulation.

METHODOLOGY

A total of 78 people of age 20-60 were taken into the study. After the approval of Human

Ethics Committee of Parul Sevashram Hospital; patients coming in the OPD of Parul Sevashram Hospital, Limda, Vadodara were first made aware of the study and after taking their consent they were included in the study.

Assessment of depressive symptoms

Ham-D Scale: Depression assessment was made by Ham-D (Hamilton Depression Scale - 17 questions). Ham-D characterizes the patients in (Score 0-7), mild depression (Score 8-14), moderate (Score 15-18) and severe (Score >18). Patients having scored above 10 were advised to take consultancy from the psychiatric ward. Patients scoring between 0-7 were considered as control for this study. A socio demographic form was filled which consisted of age of the patients, medical history of the patients, eating habits i.e. Vegetarian/ Non-vegetarian or mixed; frequent fasting, daily exercise regime, smoker, alcoholic or any drug ingestion.

Exclusion Criteria: Smokers, alcoholics were not taken in the study. Patients with mental disorder other than assessed depression, chronic kidney disease, hypertension, hyperthyroidism, fatty liver, auto immune disorder, familial hyporcholestemia, mental disorder and patients taking anti inflammatory drugs were also excluded in the study.

Lipid Profile: 1 mL Blood from patients were drawn in a plain vial (Xinle Clot Activator) by a nurse and stored in 4°C until further analysis. Lipid profile of samples was analyzed on ERBA EA 360 (Transasia) fully automated biochemistry analyzer after serum separation. (3000 rpm for 10 minutes).

Statistical analysis for done by Chi-Square test and unpaired Student's T test in Microsoft Excel.

RESULTS

Lipid Profile of male patients (n = 56)

Total of 78 patients were taken into this study (**Figure 1**). The study population was divided into different gender and age groups. Those patients who scored >7 in HamD were considered as depressed, while those scoring below were considered as control or healthy (**Figure 2**).

Lipid Profile

The mean cholesterol level in depressed patients was 205.79 ± 36.58 mg/dl while it was 186.52 ± 92.61 . The mean HDL level in depressed patients was 52.61 ± 12.60 mg/dl while it was 43.61 ± 10.51 in healthy controls. The mean LDL level was 81.74 ± 16.77 in depressed patients while it was 70.1 ± 30.76 in healthy controls. The mean LDL level in depressed patients was 81.74 ± 16.52 while it was 70.1 ± 13.60 in healthy controls. The mean triglyceride level was $148.23 \pm$

66.88 in depressed patients while it was 132.43 ± 60.45 in healthy controls. Thus, higher lipid profile level was observed in depressed patients as compared to healthy controls. However chi square data suggest there is a significant difference between cholesterol level in both depressed and control subjects ($p = 0.000$), however T test revealed no significance ($p = 0.26$). Chi square and T test both suggest no significance for triglyceride levels; 0.44 and 0.28, respectively. For HDL both the test suggest significant difference ($p = 0.001$) in depressed and control subjects. In LDL only t test showed significant result ($p = 0.001$).

Further we tried to compare HDL levels in both the genders and between the age groups.

Significant difference in Chi Test was observed for $p < 0.05$ in depressed male patients of two age groups, similar significant difference for $p < 0.05$ was found in females patients of two age groups. When healthy and depressed females were compared the difference in HDL levels in both the groups were significantly different with $p = 0.04$ for Chi Square and 0.00 for unpaired T test. No difference was found in HDL levels of depressed and healthy males. From data obtained from our study it can be predicted that female population are at more risk of having co morbidity of higher lipid in depressed state (Table 1-3, Figure 3, 4).

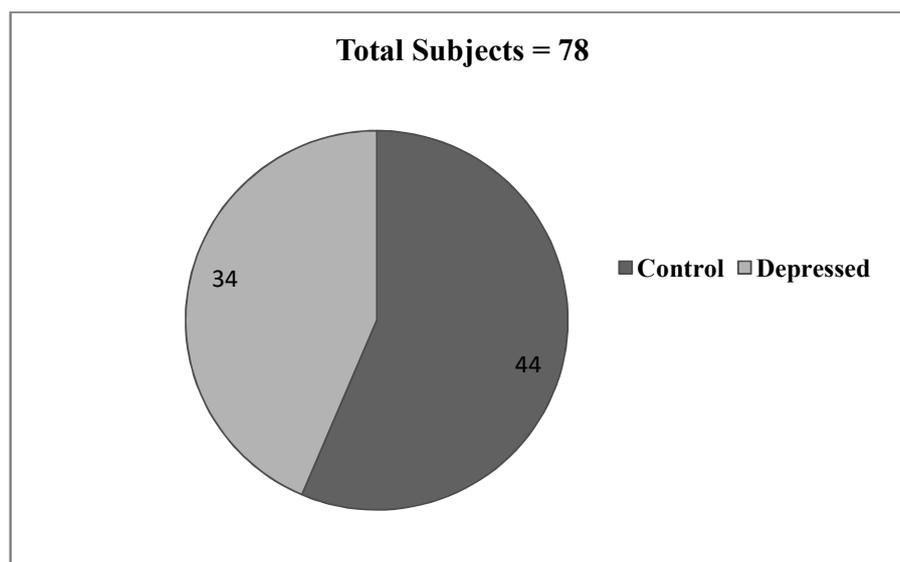


Figure 1: Number of Control and Test subjects involved in the study

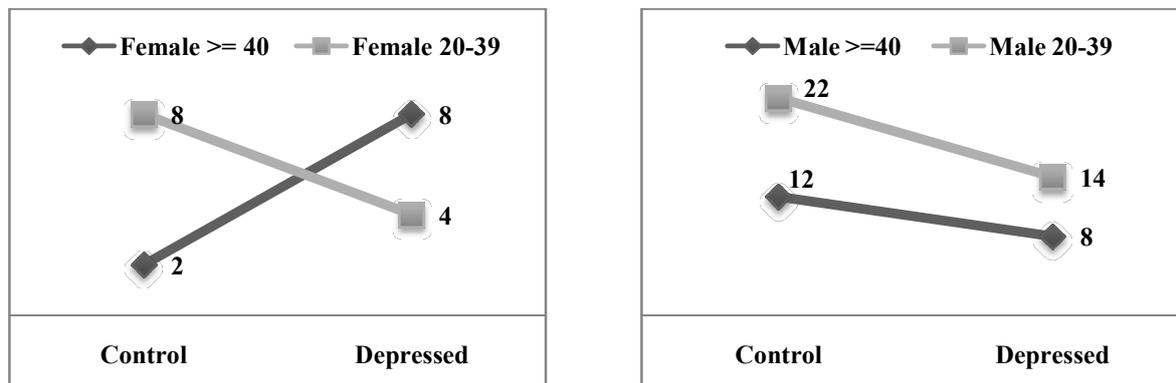


Figure 2: Gender and Age wise distribution of control and depressed female and male subject

Table 1: Mean± SD of lipid profile of total study population, Chi square and un paired T test for <0.05 significance

Parameters	Control (n = 44)	Depressed (n = 34)	Chi Square	T test
Cholesterol	186.52 ± 92.61	205.79 ± 36.58	4.0865E-10	0.261472229
Triglyceride	132.43 ± 60.45	148.23 ± 66.88	0.446577953	0.284174239
HDL	43.61 ± 10.51	52.61 ± 12.60	0.002542	0.001101508
LDL	70.1 ± 13.60	81.74 ± 16.52	0.235429753	0.001196468

Table 2: Age Wise Distribution of HDL levels in healthy and depressed patients

Gender	Age Group	Subject	Mean(SD) mg/dL	Chi Square
Males	20-39 vs. ≥ 40	Healthy (n= 24 vs. 10)	48.68(11.2) Vs. 47.33(12.19)	0.06842215
Males	20-39 vs. ≥ 40	Depressed (n = 14 vs. 8)	53.5(8.2) vs. 40(13.76)	0.008014278
Females	20-39 vs. ≥ 40	Healthy (n = 8 vs. 2)	41.34(12.9) vs. 42.5 (1.5)	0.153354967
Females	20-39 vs. ≥ 40	Depressed (n = 4 vs. 8)	57(10.63) vs. 61.5(7.87)	0.049787068

Table 3: Gender Wise distribution of HDL Levels in healthy and depressed patients

Gender	Subject	Mean (SD) mg/dL	Chi Square	T Test
Females	Healthy Vs Depressed (n = 10 vs 12)	41.6(11.5) vs 60(9.13)	0.043499754	0.000750191
Males	Healthy Vs Depressed (n = 34 vs 22)	44.2(10.11)vs 48.59(12.4)	0.113576094	0.160896745

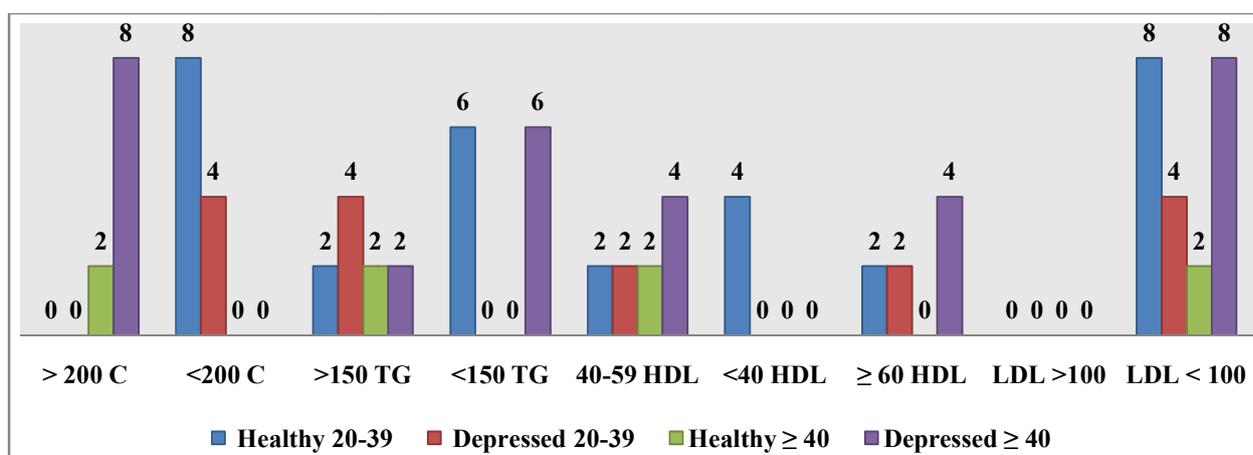


Figure 3: Lipid profile of females subjects (n=22)

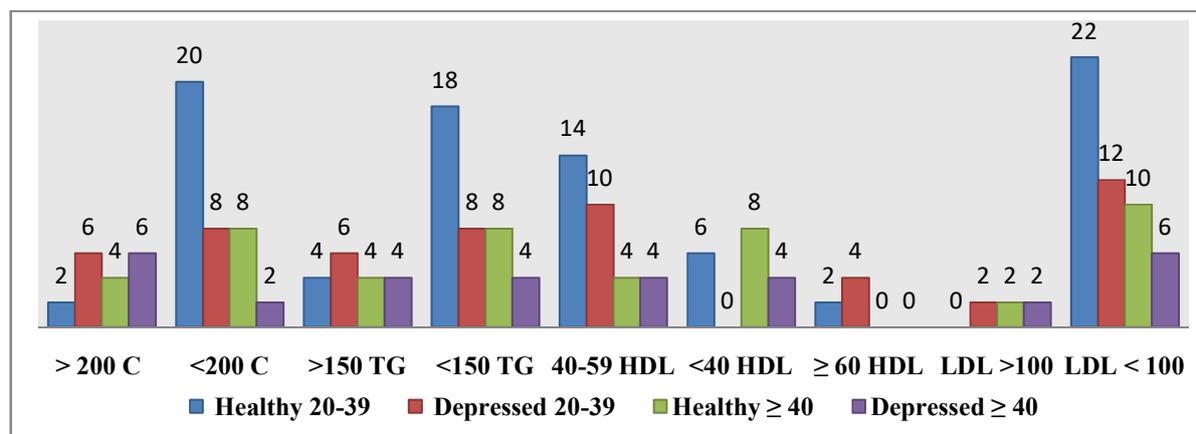


Figure 4: Lipid profile of males subjects (n=22)

DISCUSSION

Associated higher lipid profile in patients with depression in our studies suggest resemblance between other studies.

Total of 8207 subjects of age between 40-64 years showed higher HDL levels in depressed patients [12]. Higher HDL was also found in major depressive disorder patients with recent suicide attempts compared to depressed patients with no suicide attempts with mean of 68.8 ± 16.9 mg/dl vs. 58.6 ± 15.4 mg/dl [13]. 195 patients with unipolar disorder showed higher HDL compared to 89 control patients with mean of 1.21 ± 0.30 mmol/L vs. 1.17 ± 0.28 mmol/L [14].

In 120 women with postpartum depression higher HDL was observed in early postpartum period [12]. While lower HDL was observed in 130 patients with current major depressive symptoms compared to 61 healthy controls with mean of 56.0 mg/dl

versus 58.0 mg/dl and decreased LDL levels of observed in patients with major depressive episode taking anti psychotropic drugs after 3 week of follow up [15, 16]. HDL-C levels were found to be negatively correlated with HamD score in 114 patients with post stroke depression compared to 259 non post stroke depression with mean of 1.04 ± 0.24 vs. 1.15 ± 0.27 [17]. 77 patients with major depressive disorder showed lower HDL levels compared to 863 healthy control with mean±SD of 35.88 ± 10.63 mg/dl vs. 45.65 ± 15.98 mg/dl [18]. 94 patients with depression had lower HDL levels compared to 134 healthy controls [19]. Patients with depressive symptoms of more than 3 years showed lower HDL compared to those with depression symptoms of less than 3 years [20]. However some authors reported no change in depression and healthy control [21-24]. Checking the lipid profile in fasting stage was based upon study published in recent years suggesting non

fasting lipid profile for assessment [25-29]. It can be observed that regardless of fasting or non fasting stage lipoproteins do fluctuate in patients with depression. One thing to be noted is that the questionnaire based depression assessment may lead to biasness, as observed during our study. As this study involved non fasting lipid profile with such complex results, we suggest that patients coming to the psychiatric department should be checked for lipid profile for fasting and non fasting state, of course having considered whether or not the patient have any metabolic disease. This would give much promising result and might be more helpful in correlating lipid profile with depression. Our study should be interpreted in the light of its limitations. As the time limit of our study was less equal number of males and females and the number of people in each age group were not found. And also follow up of the patients could not be done.

In conclusion, it can be interpreted that even though the complex data is obtained, it can be concluded HDL levels do fluctuate in depressed condition with age and gender playing an important role. But as the time period was less we suggest that more controlled and long term follow up study and further investigation in HDL levels and depression may clarify the outcomes.

Acknowledgments

The authors would like to thank OPD staff and Central Laboratory Staff of Parul Sevashram for their cooperation during the study.

Financial Support and Sponsorship

No financial support was taken during the study.

Conflict of Interest: The authors show no conflict of interest

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