Original Article

# Evaluation of Lipid Profile in Patients with Anemia in Mirpur AJK

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## ABSTRACT

**Objective:** The objective of this study to evaluate saliva biochemical composition of pregnant women and non-pregnant women in Mirpur AJK.

**Study Design:** Cross-sectional study

**Place and Duration of Study:** This study was conducted at the department Physiology and Biochemistry Department of Mohtarma Benazir Bhutto Shaheed Medical College Mirpur AJK from March 2018 to August 2019.

**Materials and Methods:** Total 200 anemic patients were selected male and female and 100 control healthy people were selected for the study. Lipid profile (Total cholesterol, HDL, VLDL and triglycerides) was estimated in both groups in anemic patient and control healthy people. Blood samples were collected from both groups anemic and healthy people. Samples were analyzed by Micro lab 300 for lipid profile for both groups anemic and control .Merck kits were used for analysis of lipid profile in both groups. Hematology study was conduct by used hematology analyzer. Kits of Merk Company were used for analysis.

**Results:** The total mean cholesterol (mg\dl) in anemic patients was $182.6 \pm 29.5$ while in healthy control was $193.6 \pm 30.5$.The mean LDL (mg\dl) in anemic patients was $105.8 \pm 15.5$ while in healthy control was $118.7 \pm 19.3$. The mean HDL (mg\dl) in anemic patients was $42.77 \pm 8.4$ while in healthy control was $59.3 \pm 8.1$. The mean Triglycerides (mg\dl) in anemic patients was $120.2 \pm 29$. while in healthy control was $133.3 \pm 31.2$. Result showed that lipid profile is lower in anemic patient as compare to healthy control subjects .The mean Hb (g/dl) in anemic patients was $8.88 \pm 1.32$ while in healthy control subjects was $12.79 \pm 1.43$. The mean Serum iron (μg/dl) in anemic patients was $38.32 \pm 6.35$ while in healthy control subjects was $96.15 \pm 18.68$. The mean TIBC (μg/dl) in anemic patients was $399.03 \pm 41.48$ while in healthy control subjects was $282.72 \pm 27.04$. The mean Serum ferritin (μg/dl) in anemic patients was $9.93 \pm 3.8$ while in healthy control subjects was $49.4 \pm 31.00$.

**Conclusion:** The result showed that in anemia and lipoprotein relationship exist but the type of anemia is not affect the relationship. The lipoprotein level is decreased in anemic patient as compare to control.

**Key Words:** Lipid profile, Anemic patients

## INTRODUCTION

Iron Deficiency (ID) is widespread nutritional disorder developing countries regardless of age, gender and socioeconomic status. Due to its complications, iron deficiency anemia becomes a big public health problem.

One of the risk factor of coronary artery disease (CAD) is Dyslipidemia and another public health issue is anemia.

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Anemia is more common in low socioeconomic status.[1] Anemia have role as protective on lipid profile and reduced the risk of CAD. In upper socioeconomic class more prevalence of CAD as compare to lower socioeconomic class. Nutritional Anemia is high prevalence in lower socioeconomic class.[2] some studies showed contradictory result regarding lipid profile and anemia relationship. [3]In some studies observed that VLDL levels and triglycerides are high in anemia due to iron deficiency as compare to non-anemic patients.[4] lipoprotein (LDL) cholesterol were found lower in anemic patients. Where in other study found that high-density lipoprotein (HDL), LDL, VLDL, and triglyceride levels are decreased in anemic patients as compare to control and health people. [5] Different study studies showed that deficiency of iron in animal caused alteration in the lipid profile.[6,7] That when the concentration of the iron is low in animal IDA iron deficiency anemia it changed the high-density lipoprotein (HDL), LDL, VLDL, and triglyceride levels in animal. In other study of human, Iron deficiency anemia lipid profile is lower with respect iron deficiency .[8,9] In severe IDA, Low levels of triglycerides and total cholesterol (TC), in young

Korean girls are decreased and returned normal after therapy of iron.[11]These results and observations showed that there is variation in both findings.  So we conducted this study to evaluate  the lipid profile (high-density lipoprotein (HDL), LDL, VLDL, and triglyceride) in anemic patients and non anemic control healthy people.

## MATERIALS AND METHODS

This study was conducted in the department Physiology and Biochemistry Department of Mohtarma Benazir Bhutto Shaheed Medical College Mirpur AJK from March 2018 to   August 2019. It was cross section – control study. Total 200 anemic patients were selected male and female and 100 control health people are selected for the study. Lipid profile (Total cholesterol, HDL, VLDL and triglycerides) was estimated in both groups in anemic patient and control healthy people. Blood samples were collected from both groups anemic and health people. Samples were analyzed by Micro lab 300 for lipid profile for both groups anemic and control .Merck kits were used for analysis of lipid profile in both groups.  Hematology study was conduct by used hematology analyzer. Kits of Merk Company are used for analysis.

**Statistical Analysis:** SPSS for Windows version 20 (SPSS, Inc., Chicago, IL, USA) was employed for all statistical analyses.

## RESULTS

The total mean cholesterol (mg\dl) in anemic patients was182.6 ± 29.5 while in healthy control was 193.6 ± 30.5.The mean LDL (mg\dl) in anemic patients was 105.8 ± 15.5 while in healthy control was 118.7± 19.3. The mean HDL (mg\dl) in anemic patients was 42.77± 8.4while in healthy control was 59.3 ± 8.1. The mean Triglycerides (mg\dl) in anemic patients was120.2 ± 29.while in healthy control was 133.3 ± 31.2. Result showed that lipid profile is lower in anemic patient as compare to healthy control subjects .The mean Hb (g/dl) in anemic patients was8.88 ± 1.32    while in healthy control subjects   was12.79 ± 1.43.

**Table No.1:  Participant Characteristics**

| | (n=200) Anemic Patients | Control (n=100) |
|---|---|---|
| Age (years) | 51.4 ± 10.2 | 49.7 ± 10.3 |
| Male /Female (%) | 100/100 | 50/50 |
| Body weight (Kg) | 68.9 ± 10.8 | 69.3 ± 11.2 |
| BMI (kg/m2) | 24.7 ± 2.6 | 24.5 ± 2.5 |

The mean Serum iron (µg/dl) in anemic patients was38.32 ± 6.35while in healthy control subjects was 96.15 ± 18.68. The mean TIBC (µg/dl) in anemic patients was 399.03 ± 41.48 while in healthy control subjects   was 282.72 ± 27.04.The mean Serum ferritin (µg/dl) in anemic patients was9.93 ± 3.8 while in healthy control subjects was 49.4 ± 31.00.

**Table No.2: Lipid Profile of Anemic Patients and Control Health People**

| Anemic patients (n=200) | Control (n=100) |
|---|---|
| Fasting Blood Glucose(mg/dl) | |
| 97.8 ± 4.3 | 99.4 ± 4.6 |
| Total Cholesterol (mg/dl) | |
| 182.6 ± 29.5 | 193.6 ± 30.5 |
| LDL  (mg\dl) | |
| 105.8 ±  15.5 | 118.7± 19.3 |
| HDL  (mg\dl) | |
| 42.77± 8.4 | 59.3 ± 8.1 |
| Triglycerides (mg\dl) | |
| 120.2 ± 29.5 | 133.3 ± 31.2 |

**Table No.3:Hematological profile of anemic Patients and Control Health People**

| Anemic patients   (n=200) | Control (n=100) |
|---|---|
| Hb  (g/dl) | |
| 8.88 ± 1.32 | 12.79 ± 1.43 |
| Serum iron (µg/dl) | |
| 38.32 ± 6.35 | 96.15 ± 18.68 |
| TIBC (µg/dl) | |
| 399.03 ± 41.48 | 282.72 ± 27.04 |
| Serum ferritin (µg/dl) | |
| 9.93 ± 3.8 | 49.4 ± 31.00 |

## DISCUSSION

Iron Deficiency (ID) is widespread nutritional disorder developing countries regardless of age, gender and socioeconomic status. Due to its complications, big public health problem is IDA iron deficiency anemia[.12] The major risk factor in the development of CAD is Dyslipidemia.[13.14]This study was conducted in the department Physiology and Biochemistry Department of Mohtarma Benazir Bhutto Shaheed Medical College Mirpur AJK from March 2018 to   August 2019. It was cross section –control study. Total 200 anemic patients were selected male and female and 100 control health people are selected for the study. Lipid profile (Total cholesterol, HDL, VLDL and triglycerides) was estimated in both groups in anemic patient and control healthy people. Blood samples were collected from both groups anemic and health people. Samples were analyzed by Micro lab 300 for lipid profile for both groups anemic and control .Merck kits were used for analysis of lipid profile in both groups.  Hematology study was conduct by used hematology analyzer. Kits of Merk Company are used for analysis. Iron and cholesterol are important for human body any deficiency of both caused serious effect on humen body. The level of iron and cholesterol are important.

One of the risk factor of coronary artery disease (CAD) is Dyslipidemia and another public health issue is anemia. Anemia is more common in low socioeconomic status. Anemia have role as protective on lipid profile and reduced the risk of CAD. In upper socioeconomic class more prevalence of CAD as compare to lower socioeconomic class. Nutritional Anemia is high prevalence in lower socioeconomic class. Some studies showed contradictory result regarding lipid profile and anemia relationship. In some studies observed that VLDL levels and triglycerides are high in anemia due to iron deficiency as compare to non-anemic patients. lipoprotein (LDL) cholesterol were found lower in anemic patients. Where in other study found that high-density lipoprotein (HDL), LDL, VL DL, and triglyceride levels are decreased in anemic patients as compare to control and health people. Different study studies showed that deficiency of iron in animal caused alteration in the lipid profile. That when the concentration of the iron is low in animal IDA iron deficiency anemia it changed the high-density lipoprotein (HDL), LDL, VLDL, and triglyceride levels in animal. In other study of human, Iron deficiency anemia lipid profile is lower with respect iron deficiency in severe IDA, Low levels of triglycerides and total cholesterol (TC), in young Korean girls are decreased and returned normal after therapy of iron. These results and observations showed that there is variation in both findings Our result showed that amemic and non-anemic both groups plasma cholesterol and lipoprotein are significant lower that in anemic patient the lipoprotein is lower as compare to non-anemic control. The total mean cholesterol (mg\dl) in anemic patients was $182.6 \pm 29.5$ while in healthy control was $193.6 \pm 30.5$.The mean LDL (mg\dl) in anemic patients was $105.8 \pm 15.5$ while in healthy control was $118.7 \pm 19.3$. The mean HDL (mg\dl) in anemic patients was $42.77 \pm 8.4$ while in healthy control was $59.3 \pm 8.1$. The mean Triglycerides (mg\dl) in anemic patients was $120.2 \pm 29$.while in healthy control was $133.3 \pm 31.2$. Result showed that lipid profile is lower in anemic patient as compare to healthy control subjects .The mean Hb (g/dl) in anemic patients was $8.88 \pm 1.32$ while in healthy control subjects was $12.79 \pm 1.43$. The mean Serum iron ($\mu$g/dl) in anemic patients was $38.32 \pm 6.35$ while in healthy control subjects was $96.15 \pm 18.68$. The mean TIBC ($\mu$g/dl) in anemic patients was $399.03 \pm 41.48$ while in healthy control subjects was $282.72 \pm 27.04$. The mean Serum ferritin ($\mu$g/dl) in anemic patients was $9.93 \pm 3.8$ while in healthy control subjects was $49.4 \pm 31.00$.In the study of Choi et al. that there is no significant difference both groups anemic patient and control health people at moderate iron deficiency while in severe iron deficiency anemia patient serum total cholesterol and triglyceride level are significantly reduced .[15]Ece et al. result showed that tat serum hemoglobin have linked with cholesterol and triglyceride concentrations.[16] Higher levels of triglyceride and lower HDL-cholesterol levels were found in anemic patient as compare to control and healthy people.[17] Increased erythropoiesis lead increased demand and ultimately lead hypercholesterolemia in anemic patients.[18] Iron used as cofactor in many biochemical reaction which caused lipid metabolism abnormality in patients.[19] In the study of Graham et al. showed that iron increased in hepatic storage , which caused up regulation of HMG-CoA reeducates of cholesterol biosynthesis, rate-limiting enzyme.[20] The result showed that in anemia and lipoprotein relationship exist but the type of anemia is not affect the relationship.

## CONCLUSION

The result showed that in anemia and lipoprotein relationship exist but the type of anemia is not affect the relationship. The lipoprotein level is decreased in anemic patient as compare to control.

**Author's Contribution:**

| | |
|---|---|
| Concept & Design of Study: | Rashad Mahmood |
| Drafting: | Khuram Shahzad Khan, Zara Shaukat |
| Data Analysis: | Faisal Bashir, Asnad |
| Revisiting Critically: | Rashad Mahmood, Khuram Shahzad Khan |
| Final Approval of version: | Rashad Mahmood |

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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