

## Original Research Article

# Study of Clinical Profile and Association of Migraine with Dyslipidemia

### Abstract

**Background:** Headache is common neurological problem experienced by ninety percent of the subjects globally. Prevalence of primary headache, mostly due to migraine, is ten to fifteen percent among the subjects worldwide and is the most disabling amongst the primary headache syndromes. This study intends to find out the clinical profile of migraine and investigate its association with dyslipidemia. Also it will assess the effect of dyslipidemia on migraine's severity, frequency and intensity.

**Methods:** This Observational Cross sectional study will be conducted at AVBRH, Wardha. Routine clinical and biochemical tests, lipid profile, and neuroimaging of the patients will be carried out. Lipid profile parameters will be compared with migraine severity.

**Expected Results:** A positive correlation is expected between the frequency, severity, and intensity in attacks of migraine.

**Conclusion:** A deranged lipid profile have profound effect on migraine attacks. The severity of intensity is aggravated in cases of deranged lipid profile.

**Keywords:** Headache, Migraine, Lipid Profile, Dyslipidemia, Frequency, Severity, Neuroimaging

### Introduction:

Among the various neurological problems, headache is one of them which is characterized by pain that can be sited at the occipital region or behind the upper neck's back or over eyes/ears. It is commonly found among the ninety percent of the subjects globally<sup>(1,2)</sup>. Prevalence of primary headache (mostly due to migraine) is ten to fifteen percent among the subjects worldwide and is the most disabling amongst the primary headache syndromes.<sup>(3,4)</sup> It is of prime importance to diagnose and manage this syndrome accurately and the best method for this is cautious medical method because the only mechanism of this syndrome can be understood.

According to IHS, headache can be classified as primary & secondary. Secondary headache happens due to disorders of exogenous nature while primary problem is mostly due to factors to itself only. Mostly primary headache leads to problems in daily life of the person along with effect in quality of life, but rarely it cause death or other severe disorder.

Studies in India have shown varying prevalence in different parts of the country ranging from 25% in the South to 14% in the East, with a higher prevalence among women and among rural populations.<sup>(5)</sup>

A benign and persistent headache syndrome associated with other signs of neurological disorder is a helpful definition of migraine. It is also possible to distinguish migraine by its

activators, referred to as causes. Migraine is a family condition characterised by frequent headache attacks, greatly varying in severity, frequency and duration; normally unilateral, typically associated with anorexia, nausea and vomiting; and often accompanied or associated with disorders of neurology and behaviour.<sup>(4)</sup>

The activation of the so-called trigeminovascular system (TGVS) induces migraine-an episodic headache: trigeminal afferents contribute to the activation of structures involved in pain transmission and perception and to the release of vasoactive peptides (presumably triggering neurogenic inflammation).<sup>(6)</sup>

Stress, menstruation, visual triggers, environmental changes, nitrates, fasting, wine, sleep disturbances, and aspartame, among others, may be the cause factors for migraine. In order to understand the occurrence of migraine, numerous dynamic hypotheses have been proposed to research the relationships between various coincidental variables like with ecological as well past history of family, hereditary variables, nutritional history etc.<sup>(7)</sup>

Despite recent advances, the precise pathophysiology of migraine remains an enigma, the identification of associated factors may aid in bettering our understanding of this disorder, as well as explore new avenues for management of patients with this disabling condition. One of the less explored factors and its roles and relationship with migraine is dyslipidemia.<sup>(8)</sup>

The massive concern in positive analysis of dyslipidemia is its silent path that inevitably contributes to the emergence of serious & extreme irrevocable heart disorders encompassing immense & critical stroke, myocardial infarctions ultimately lead to mortality.<sup>(9)</sup> Upcoming studies have shown that even occurrence of migraine & its intensity could be associated with serum lipid levels.<sup>(8)</sup>

Association among lipid profile & incidence of migraine outbreaks was evaluated by Janoska M et al<sup>10</sup> in their report. 64 female migraine subjects were recruited, having average age of 40±10.84 years and a mean illness period of 18.52±7.57 years. Both migraine patients were tested for lipid profiles (total cholesterol, TC; low-density lipoprotein cholesterol, LDL-C; high-density lipoprotein cholesterol, HDL-C; triglycerides, TG). Based on the number of migraine incidents in the last 3 months, the incidence of migraine attacks was estimated. The findings showed a statistically important association among TG & TC and the occurrence of migraine outbreaks. The authors concluded that the values of TC and TG could influence the severity of migraines & might lead to an enhanced occurrence of heart problems and more commonly among females. Gokce et al<sup>11</sup> research concluded that acute hypertriglyceridemia is associated with vasodilatation of peripheral arteries and improved blood flow.

There was no important correlation between TC, LDL-C and HDL-C levels and the occurrence of migraine attacks found by Kurth et al<sup>12</sup>. The other research concentrated more on elevated lipid levels and migraine odds. In their GEM population-based analysis, Scher et al<sup>13</sup> concluded that aura migraineurs were more likely to have an elevated cholesterol profile. The research party consisted 620 migraineurs (31 percent with aura and 64 percent without aura). Without any experience of migraine, the sensors were 5135 probes. For those with migraine with aura, the chances of getting a high Framingham risk score for coronary heart disease is nearly doubled. Similarly, Rist et al<sup>14</sup> reported that there was a greater risk of cardiovascular disease associated with aura migraine.

Due to conflicting literature, this research project is conducted with the aim to find out the clinical profile of migraine & its association with dyslipidemia.

**Objectives:**

- To find out the migraine associated clinical profile.
- To study prevalence of Dyslipidemia in migraine.
- To assess the effect of dyslipidemia on migraine's severity, frequency & intensity.

**METHODS:** The study is designed as an observational, cross-sectional study conducted on 50 migraine patients reporting to the Medicine and Neurology OPD at AVBRH after taking written informed consent.

**STUDY DESIGN:** Cross sectional study, Observational.

The study is designed as an observational, cross-sectional study conducted on 50 migraine patients reporting to the Medicine and Neurology OPD at AVBRH after taking written informed consent.

Diagnosis of migraine will be done of the criteria of International Headache Society Diagnostic Criteria 3rd edition, and severity will be measured by MIDAS score, and frequency will be recorded based on the no. of migraine attacks recalled in the past three months.

Subjects included will be subjected to routine clinical and biochemical tests, lipid profile, and neuroimaging. Migraine severity will be compared to lipid profile parameters to look for any correlation.

**EXCLUSION CRITERIA:**

- Age >50 years.
- Other primary headache syndromes.
- Patients with medical illness including metabolic disorders, CVA, CAD.
- Patients on cholesterol lowering drugs.
- Evidence of significant active psychiatric disorders including but not limited to mood disorders, schizophrenia, anxiety problems, drugs abuse as well psychiatry related problems.

**Investigations:****BIOCHEMICAL PARAMETER ESTIMATION:**

- Complete blood count
- Random blood sugar
- ESR
- TSH
- Lipid Profile

## NEUROIMAGING:

- CT Head
- MRI Brain

### Sample size

A sample is a group of individuals, objects or items for assessment taken from a larger community in research terms. The sample should be reflective of the population to ensure that we can generalise the conclusions from the research analysis to the population as a whole.

According to the formula i.e.  $n = z^2 pq/d^2$ ,

P= Prevalence of migraine (3%, according to Kulkarni GB et al<sup>15</sup>)

So minimum sample size required will 184 patients

In this study we will recruit two hundred subjects.

So the minimum sample size required will be 41.39 patients according to the above formula. However considering the error and attrition, the subjects recruitment will be increased to fifty.

**Statistical analysis:** Data so collected was tabulated in an excel sheet, under the guidance of statistician. In statistical analysis, the means and standard deviations of the measures per category were used (SPSS 22.00 for windows; SPSS inc, Chicago, USA). Mean data between groups is calculated by t test. The discrepancy amid the groups is assessed with chi square test and p was set at <.05.

**Expected Results:** The results of this study are expected to show a positive correlation between the frequency, severity, and intensity in attacks of migraineurs. Previous studies have shown those patients with a deranged lipid profile have migraine attacks that are more severe in intensity. This can be a lifesaving clinical correlation as the after effects of migraine are disastrous.

**Discussion:** Reliably diagnosing and treating migraine is of paramount significance and the safest approach for this is careful medical technique so it is important to consider the only function of this syndrome. Despite recent advances, the precise pathophysiology of migraine remains an enigma, the identification of associated factors may aid in bettering our understanding of this disorder, as well as explore new avenues for management of patients with this disabling condition. One of the less explored factors and its roles and relationship with migraine is dyslipidemia

Our results may suggest that migraines may correlate with hypertriglyceridemia and hypercholesterolemia. This inference may only be a clear success or even an interaction of causal results. In one study, the incidence, severity and duration of headache and drug usage are decreased by a low fat regimen. Changes in prefrontal irritability, inflammation of the nervous system and vascular endothelial dysfunction are suggested mechanisms for migraine. Inducing platelet aggregation and causing neurogenic inflammation can be the result of hyperlipidemia. Changes in serum serotonin and platelet serotonin levels occurred after

platelet aggregation and the cascades of prostaglandins (PG) and leukotrienes (LT) were triggered after this occurrence, creating potent PGS (such as PGE2) and potent leukotrienes. These modifications add to the headache of vasodilatation and migraine. With respect to the effect of hyperlipidemia on vasodilatation, the Gokce et al<sup>11</sup> research concluded that acute hypertriglyceridemia is associated with vasodilatation of peripheral arteries and improved blood flow.

There was no important correlation between TC, LDL-C and HDL-C levels and the occurrence of migraine attacks found by Kurth et al<sup>12</sup>. The other research concentrated more on elevated lipid levels and migraine odds. In their GEM population-based analysis, Scher et al<sup>13</sup> concluded that aura migraineurs were more likely to have an elevated cholesterol profile. The research party consisted 620 migraineurs (31 percent with aura and 64 percent without aura). Without any experience of migraine, the sensors were 5135 probes. For those with migraine with aura, the chances of getting a high Framingham risk score for coronary heart disease is nearly doubled. Similarly, Rist et al<sup>14</sup> reported that there was a greater risk of cardiovascular disease associated with aura migraine. Their prospective analysis described 1155 probands, 166 of which were migraine patients aged 45 years or older. Manestro et al<sup>16</sup> found that migraine in general was dramatically associated with an elevated TC level. A total of 1809 patients were examined. 151 of them were migraine sufferers. In elderly males with migraine, the correlation between the TC level and migraine was stronger.

Association among lipid profile & incidence of migraine outbreaks was evaluated by Janoska M et al<sup>10</sup> in their report. 64 female migraine subjects were recruited, having average age of 40±10.84 years and a mean illness period of 18.52±7.57 years. Both migraine patients were tested for lipid profiles (total cholesterol, TC; low-density lipoprotein cholesterol, LDL-C; high-density lipoprotein cholesterol, HDL-C; triglycerides, TG). Based on the number of migraine incidents in the last 3 months, the incidence of migraine attacks was estimated. The findings showed a statistically important association among TG & TC and the occurrence of migraine outbreaks. The authors concluded that the values of TC and TG could influence the severity of migraines & might lead to an enhanced occurrence of heart problems and more commonly among females.

In comparison, serum HDL-C levels were not linked to migraine in both men and women. In subgroup analysis, these findings may be due to the limited sample size. The importance of this relationship in the overall population was undoubtedly not as high as two other causes, namely TG and total Chol, and low HDL-C had a substantial relationship with migraine in females, but not in males, as was said. It is important to remember that low HDL-C had a negative predictive value for migraine, so that low HDL-C patients had a 5-fold lower risk of migraine. In other words, contrary to its detrimental role in cardio vascular and cerebrovascular conditions, low HDL-C has a beneficial role in migraine. Accordingly, we will be able to use lipid balancing medicine in prophylaxis of migraine.

A number of articles from GBD Study reflect on this problem<sup>(17-19)</sup>. Related studies were reported by few researchers<sup>(20-25)</sup>. Some research on the impact of niacin (vitamin B3) on migraine control may be noticeable in this respect. Increases in serum levels of HDL-C and decreases in triglycerides and LDL-C were shown to be successful. Niacin was used for migraine therapy in one case-report; this result may have been due to its role in homeostasis of lipids.<sup>26</sup>

**Conclusion:** Hypertriglyceridemia & hypercholesterolemia could be mostly found in migraineurs. Conversely, low HDL-C could be least found among the migraineurs subjects as compared to non-migraineurs. Hence migraine as the second most common causes of primary headaches if treated well in time by lifestyle modification and regular prophylactic treatment can significantly reduce the morbidity associated with the disease.

#### COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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