

# Original Article

## Estimation of Serum Cholesterol level in Patients with Obsessive–Compulsive Disorder

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### ABSTRACT:

**Background:** Obsessive–compulsive disorder (OCD) is a mental disorder where people feel the need to check things repeatedly, perform certain routines repeatedly, or have certain thoughts repeatedly. The present study was conducted to determine the role of cholesterol in OCD. **Materials & Methods:** It consisted of 25 subjects with OCD. Equal number of subjects was selected as control. Serum cholesterol level was measured in all subjects as cholesterol concentration (mg/dL) = (Absorbance of sample/Absorbance of standard) x 200. Normal Range of cholesterol was 140 – 200 mg/ dL. **Results:** Group I (control) had 25 subjects and group II (OCD) had 25 subjects. The difference was non- significant (P=1). The mean age in group I was 35.48 years and in group II was 36.12 years. The difference was non- significant (P>0.05). Mean cholesterol level in group I (167.4 mg/dL) and group II (150.3 mg/dL). The difference was significant (P<0.05). **Conclusion:** The reason and pathophysiology of OCD is still doubtful. Cholesterol forming the vital component of neurons regulates neurochemical activity. Reduced serum cholesterol level causes hyperactivity of serotonin reuptake receptor activity precipitating symptoms of OCD.

**Key words:** Absorbance, Cholesterol, Obsessive–compulsive disorder.

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## INTRODUCTION

Obsessions are recurrent, persistent, thoughts, images or impulses that are experienced as intrusive & inappropriate. Compulsions are repetitive behaviors or mental acts that the person feels driven to perform in response to an obsession or according to rigid rules.<sup>1</sup>

Obsessive–compulsive disorder (OCD) is a mental disorder where people feel the need to check things repeatedly, perform certain routines repeatedly (called "rituals"), or have certain thoughts repeatedly. People are unable to control either the thoughts or the activities for more than a short period of time.<sup>2</sup> Common activities include hand washing, counting of things, and checking to see if a door is locked. Some may have difficulty throwing things out. These activities occur to such a degree that the person's daily life is negatively affected. Often they take up more than an hour a day.<sup>[2]</sup> Most adults realize that the behaviors do not make sense. The

condition is associated with tics, anxiety disorder, and an increased risk of suicide.<sup>3</sup>

The cause is unknown. The recently reported role of cholesterol in the function and organization of the neuronal serotonin 1A receptor, a representative of the GPCR family which is present endogenously in the hippocampal region of the brain, is highlighted. The neurotransmitter release at the synapses underlies fundamental brain activities such as cognition, emotion, and memory. It is therefore natural to speculate that the neurotransmitter release depends on the cholesterol level in the brain. A low cholesterol level may alter the pattern of the release, which in turn perturbs the brain activities to the extent that it could lead to behavioral dysfunction, depression, suicide, and memory loss.<sup>4</sup>

Obsessive –compulsive disorder is the fourth commonest psychiatric disorder with disability in severe cases often comparable to the disability associated with mental illness such as schizophrenia

and bipolar disorder. 2% of adults suffer from this disorder.<sup>5</sup>

The OCD usually presents at the age of 20-30 yr. If it presents in older age (in 4th decade) it usually comes after a stressful situation in life. OCD usually begins in adolescence or early adulthood although it can begin in childhood. Nearly 65% of the patients have the onset before 25 years of age and <15% have onset after 35 years of age.<sup>6</sup> The present study was conducted to determine the role of cholesterol in OCD.

**MATERIALS & METHODS**

This study was conducted in the department of biochemistry. It consisted of 25 subjects with OCD. Equal number of subjects was selected as control. All were informed regarding the study and written consent was obtained. Ethical clearance was taken from institutional ethical committee.

2 ml of venous sample is collected from the patient in a plain vacutainer and allowed to clot. After one hour, the vacutainer is centrifuged at 2500 rpm for 5 min and serum is extracted and stored. Dissolve contents of reagent 2 (R2) with the amount of reagent 1 (R1) indicated on the vial label. The working reagent is stable for 90 days at 2-8°C. Wavelength for estimation was 505-630 nm and linearity was 500 mg/dL. Reagents were mixed and incubated for 5 min. at 37°C. We measured the absorbance of sample and standard against reagent blank. Cholesterol concentration (mg/dL) = (Absorbance of sample/Absorbance of standard) x 200. Normal Range of cholesterol was 140 – 200 mg/ dL. Results were tabulated and subjected to statistical analysis. P value<0.05 was considered significant.

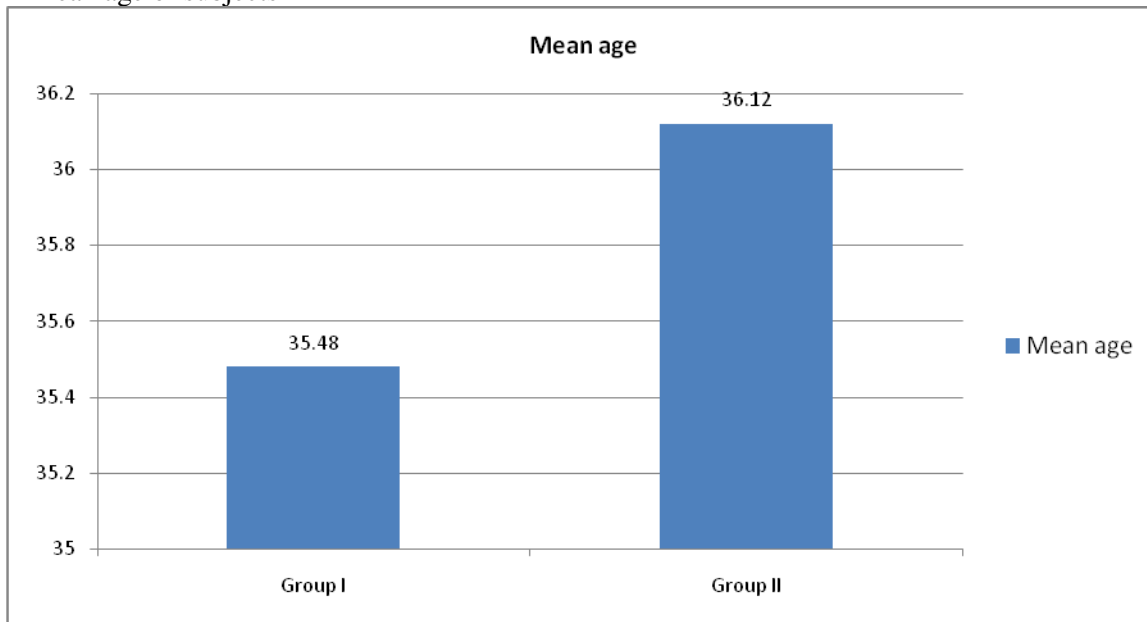
**RESULTS**

**Table I** Distribution of subjects

| Total- 50         |                |         |
|-------------------|----------------|---------|
| Group I (control) | Group II (OCD) | P value |
| 25                | 25             | 1       |

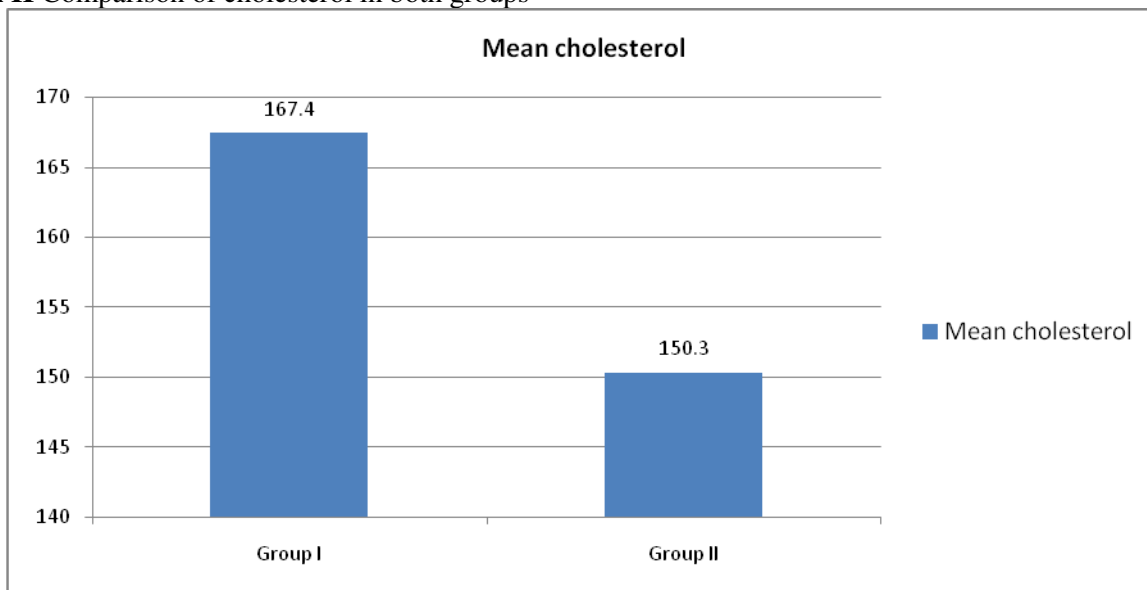
Table I shows that group I (control) had 25 subjects and group II (OCD) had 25 subjects. The difference was non- significant (P=1).

**Graph I** Mean age of subjects



Graph I shows mean age in group I (35.48 years) and group II (36.12 years). The difference was non- significant (P>0.05).

**Graph II** Comparison of cholesterol in both groups



Graph II shows mean cholesterol level in group I (167.4 mg/dL) and group II (150.3 mg/dL). The difference was significant ( $P < 0.05$ ).

## DISCUSSION

The etiology of OCD is unclear. There appear to be some genetic components with both identical twins more often affected than both non-identical twins. Risk factors include a history of child abuse or other stress inducing event. Some cases have been documented to occur following infections. The diagnosis is based on the symptoms and requires ruling out other drug related or medical causes. Rating scales such as the Yale–Brown Obsessive Compulsive Scale can be used to assess the severity.<sup>7</sup> Other disorders with similar symptoms include anxiety disorder, major depressive disorder, eating disorders, tic disorders, and obsessive–compulsive personality disorder. The present study was conducted to determine the role of cholesterol in OCD.

In this study, we included 25 OCD patients and 25 controls. The mean age in group I was 35.48 years and in group II was 36.12 years. The mean cholesterol level in group I was 167.4 mg/dL which is significantly higher than group II (150.3 mg/dL). This is in agreement with Svengsson et al.<sup>8</sup>

Cholesterol is an essential component of eukaryotic membranes and plays a crucial role in membrane organization, dynamics and function. Cholesterol is a multifaceted molecule, which serves as essential membrane component, as cofactor for signaling

molecules and as precursor for steroid hormones. Cholesterol plays a vital role in the activity of membrane transporter e.g SERT (serotonin transporter).<sup>9</sup>

Reduced Serum cholesterol levels in OCD patients also depict low levels of neuronal membrane cholesterol and the increased activity of serotonin transporter (SERT), integral membrane protein which reuptakes serotonin from synapse leading to relative deficiency of serotonin in the synapse that inturn lead to symptoms of OCD. Lowered serum cholesterol levels causes impaired release of neurotransmitter serotonin because of inefficient exocytosis of presynaptic neuronal vesicles. and SERT activity is impaired resulting in faster and exaggerated serotonin uptake. Thus the synapse becomes deficient in serotonin causing neuronal irritability and excessive transmission of impulses resulting in OCD symptoms.<sup>10</sup>

## CONCLUSION

The reason and pathophysiology of OCD is still doubtful. Cholesterol forming the vital component of neurons regulates neurochemical activity. Reduced serum cholesterol level causes hyperactivity of serotonin reuptake receptor activity precipitating symptoms of OCD.

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