THE RELATIONSHIP OF CHOLESTEROL AND TRIGLYCERIDE WITH DEPRESSION

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Abstract- Despite the fact that most people are worried about having high cholesterol levels, low cholesterol may actually be associated with adverse behavioral effects such as aggression and depression. The aim of this survey was to show whether there was a significant relationship between cholesterol and triglyceride with depression. The level of cholesterol and triglyceride was measured in 80 depressed patients referred or admitted to Sina hospital whose depressive symptoms were assessed by DSM IV criteria. The control group comprised of normal subjects. Cholesterol and triglyceride measurements were done on blood samples of the two groups. There was no significant relationship between age, sex and triglyceride levels with depression ($P>0.05$), but there was a significant relationship between low cholesterol and depression ($P<0.05$). It can be concluded that there is significant relationship between low cholesterol and depression whereas it is not the case for triglyceride.

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INTRODUCTION

Based on studies of pharmacological reduction of serum lipid concentrations, it has been suggested that reduction of serum cholesterol and triglyceride is associated with occurrence of depressive symptoms, suicide and violent deaths (1). The possible association between mental illness and cholesterol and triglyceride has been studied for over seven decades. High serum cholesterol concentration is a well established risk factor for heart disease (2). An analysis of results of cholesterol lowering clinical

trials has suggested that the benefits of reducing heart disease by reducing cholesterol concentration are offset by an increase in deaths from external causes such as suicides, accidents and murder (3-5).This increase in death from causes unrelated to illness occurred regardless of whether the cholesterol lowering regimen was dietary or pharmacological, prompting the authors to suggest that lowering cholesterol concentration might have neurochemical consequences (6). One explanation for this may be that lowering cholesterol concentration causes changes in the cholesterol content of the synaptosomal membrane and a decrease in the number of serotonin receptors. Decreased serotonin receptors may account for the increase in deaths from external causes in the treatment group in cholesterol lowering trials (1,2). As studies of cholesterol and

lipid profiles in mood disorders yielded less clear results, the aim of this survey was to show whether there is a significant relationship between cholesterol and triglyceride with depression.

MATERIALS AND METHODS

The groups studied consisted of 80 patients with major depression (mean age 39.4±11.7) and 120 healthy men and women (mean age 41.5±12.6), who were matched for age and sex. Patients were interviewed based on DSM IV criteria that were clinically structured by a psychiatrist (7). All cases were informed and a consent form was taken according to Helsinki protocol. Serum concentrations of total cholesterol and triglyceride were separately measured after an overnight fasting by specific Man kits in the biochemistry department, school of medicine, Hamadan University.

Statistical analysis

Data were expressed as mean±standard deviation. Independent samples *t* test were used for comparison of blood cholesterol and triglyceride levels in the groups that were studied; *P*<0.05 was considered to indicate statistical significance.

RESULTS

Blood cholesterol levels in the studied groups are presented in table 1. The mean cholesterol level in the depressive group was less than control and the difference in cholesterol levels based on *t* test was statistically significant (*P*< 0.05).

Table 2 shows blood triglyceride levels in the groups studied. The mean triglyceride levels in the two groups were not significantly different (*P*> 0.05).

DISCUSSION

Despite the fact that most people are worried about having cholesterol levels that are too high, some studies have suggested that low cholesterol is actually associated with adverse behavioral effects such as aggression and depression. Association between low cholesterol levels and depressive symptoms was observed in the higher age categories and not in the younger age categories as recently reported by Brown *et al.* (6). Both cross-sectional and longitudinal associations between cholesterol levels and measures of depression, hostility, and anger were assessed in young adults, aged 23 to 35 years, by Markovitz *et al.* (8). The results of this study showed that there were no statistically significant relationship between age and sex in depressed patients with low cholesterol and triglycerides levels. Fowkes *et al.* reported the relationship between serum cholesterol, triglyceride level and aggression in the general population (9). The results of present study showed that there was no significant relationship between triglyceride levels with depression (Table 2).

Table 1. Comparison of blood cholesterol levels in depressed patients and control group

Group studied	N	Cholesterol level Mean±SD	Mean cholesterol difference	S.E	95% confidence interval	t	P value *
Depressed patients	80	182.7±39.3					P=0.000 significant
Control group	120	206±53.1	24.1	6.94	10.4-37.7	3.67	

Abbreviations: SD, standard deviation; SE, Standard error.

* Independent samples *t* test.

Table 2. Comparison of blood triglyceride levels in depressed patients and control group

Group studied	N	Triglyceride level Mean±SD	Mean triglyceride difference	S.E	95% confidence interval	t	P value *
Depressed patients	80	136.6±73.9	17.2	12.1	-6.67-41.1	1.42	P=0.15 Non-significant
Control group	120	153.8±89.9					

Abbreviations: SD, standard deviation; SE, standard error.

* Independent samples *t* test.

In this study the mean cholesterol level in the depressed patients was less than the control group and the difference in cholesterol levels based on *t* test was statistically significant. This may be due to changes in the cholesterol content of the synaptosomal membrane and a decrease in the number of serotonin receptors due to a decrease in cholesterol concentration. Since membrane cholesterol freely exchanges with the cholesterol in the surrounding medium, a lowered cholesterol concentration may contribute to a decrease in brain serotonin, with poorer suppression of aggressive behavior (10, 11). Another possible mechanism may be that interleukin-2 lowers cholesterol and increases triglycerides and also suppresses melatonin secretion, thus causing depression and suicidal tendencies (12). Our findings do not support the relation between triglyceride level and depressive symptoms, but there was a significant relation between cholesterol levels and depression.

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