

SERUM LIPID PROFILE IN SUICIDE ATTEMPTERS

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ABSTRACT

Practical difficulties associated with assessment of central parameters necessitates the development of peripheral markers of suicidal risk. Recent research suggest that serum lipid profile may be a useful indicator of suicidal behaviour. Serum lipid profiles of forty suicide attempters were compared with forty age, sex and BMI matched controls.

Total serum cholesterol, serum Triglyceride, LDL levels and HDL levels were found to be lower in suicide attempters but were not statistically significant. Statistically significant negative correlation was seen between risk-rescue score and above mentioned parameters. No statistically significant difference was observed when various diagnostic break-up groups of patients were compared.

Key words : Suicide, serum lipids, total serum cholesterol, serum triglyceride, HDL, LDL, risk-rescue score

In today's society suicide is a major public health problem. It is a highly undesirable event and urgently requires development of preventive approaches. The first step naturally is the identification of people liable to commit such an act. Psychosocial factors and clinical variable which have been identified as risk factors for suicide need to be supplemented by relevant biological markers. Feature of temperament like irritability and impulsivity relate biological markers. Feature of temperament like irritability and impulsivity relate more closely to biological variables than diagnostic categories. Recently central serotonergic system has been linked to both inward and outward aggression. Earlier works focussed on CSF 5-HIAA levels and their relationship to attempted suicide, but practical difficulty encountered in assessment of central parameters necessitate development of a peripheral markers of suicidal risk.

There has been some debate as to whether lowering serum total cholesterol is associated with an increased risk of suicide. Randomised controlled trials using cholesterol reducing

treatments have found no evidence of excessive risk (Scandinavian Simvastatin Survival Study group, 1994). In contrast, the relationship between serum cholesterol and mortality either from accidents or suicide has been discovered in community cohorts (Zureik et al., 1996).

In two large randomized double blind trials the lipid research clinic coronary primary prevention trial (1984) and Helsinki Heart Study (Frich et al., 1987), the benefits of a decrease in CHD mortality were offset by increase in deaths from accident and violence. At first this was interpreted as a chance finding. Virkkunen (1985) later suggested that the increased mortality due to accident and violence in the treatment group of cholesterol lowering trials may be associated with low serotonin turnover in the brain, which could lower the serum cholesterol level through enhanced insulin secretion (Virkkunen, 1993). Similarly in a review of six randomized controlled, primary prevention trials. Muldoon et al. (1992) found that lowering of raised serum cholesterol in middle aged subjects by diet, drugs or both was associated with a significant decrease in the number of deaths from

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CHD but not in total deaths. There was significant increases in mortality due to suicide or violence compared to control group. Maes et al. (1997) found HDL/cholesterol ratio to be significantly lower in subjects with major depression and in patients with depressed mood who had at some time made a medically serious suicide attempt. They were however unable to detect any significant association between suicidal behaviour and total cholesterol. There are studies which have particularly looked at suicidal ideation. Collectively including over 2000 patients five of the six studies showed an association between low cholesterol and suicidal ideation or attempt (Muldoon et al., 1990 & 1992; Dayton et al., 1969; Lipid Research Clinics Prog., 1984; Frick et al., 1987). But there have been studies which do not support the association between low cholesterol and suicidal behaviour (Markovitz et al., 1979; Smith et al., 1990; Law et al., 1994). Thus this area still remains controversial. The present study was undertaken with an aim of studying serum lipid profile of suicide attempters and to find out the correlation, if any between the serum lipid level and suicidal risk.

MATERIAL AND METHOD

Sample of the study comprised of two group :

(a) Suicide Attempters : All suicide attempters admitted on specified beds in department of Medicine and Surgery, King George's Medical College, Lucknow.

(b) Control Group : Comprised of normal healthy volunteers matched one to one for sex and group matched for age (in group of 10 years with suicide attempters). Controls were evaluated for medical and psychiatric illness clinically and on CMI (MR Section).

Inclusion Criteria were age between 17 to 55 years and informed consent. Exclusion Criteria were as follows : (a) Presence of major medical-illness (CHD, diabetes, hypothyroidism, nephrotic syndrome, liver disorder and familial hyperlipidemia). (b) Use of following drugs oral contraceptive pills, hypolipidemic drugs, antihypertensive and anticonvulsant drugs.

(c) Burns, (d) Pregnancy, (e) Alcohol/tobacco/drug abuse or dependence within past 6 months {above mentioned conditions alter lipid profile of the body (Edwin et al., 1988)}. (f) Ten or more yes responses in CMI (MR Section) for control only (Broadman et al., 1949).

PROCEDURE

Informed consent of all the subjects and controls who met selection criteria was obtained, routine blood investigations were done in all subjects while other investigations like blood sugar, urea, creatinine, bilirubin and EKG were done and indicated. Subjects with abnormal investigations were excluded. Psychiatric diagnosis if any was made after evaluation according to ICD-10 DCR. Severity of suicidal attempt was assessed on risk-rescue rating scales (Wiessman & Warden et al., 1972). Controls were screened on CMI (MR section). BMI of all subjects was calculated and an attempt was made to match the BMI of suicide attempters and controls. All subjects were kept fasting overnight for 12 hours and 5 ml blood was drawn from cubital vein next morning using disposable syringe.

Blood was collected in non-oxalate tube and sent immediately (within 2 hrs.) to CDRI, Lucknow for serum lipid profile. Sample was immediately centrifuged there and analyzed on same day for serum lipid using merckotest kit.

RESULT

A total of 113 suicide attempters were screened during the period of study and out of them 41 who fulfilled the selection criteria were included in the study. One suicide attempter was dropped out of the study due to hyperlipidemia and 40 completed the study (Table-1). Forty controls group matched for age and sex who fulfilled the criteria (Table-1) were selected for the study.

Maximum number of suicide attempters were in the age group of 17-20 years and males outnumbered females by a small margin. The mean age, sex and BMI were comparable in both

TABLE 1
SAMPLE SELECTION

1. Total number of suicide attempters screened (admitted in Deptt. of Surgery or Deptt. of Medicine on specified days).	113
2. Number of suicide attempters excluded from the study	72
3. Total number of suicide attempters included in the study.	41
4. Number of suicide attempters dropped out from the study (due to hyperlipidemia).	1
5. Number of cases who completed the study	40
6. Number of controls taken for the study	40

TABLE 2
SELECTION OF CONTROLS

1. Total number of controls screened	68
2. Number of controls excluded from the study	27
3. Number of controls included in the study	41
4. Number of controls dropped out from the study (due to hyperlipidemia).	1
5. Number of controls who completed the study	40

the group i.e. suicide attempters and controls (Table-2).

Majority of subjects were Hindu, married, illiterate, housewives from rural background. Majority of patients (65%) attempted suicide by ingesting pesticides and unspecified (rat poison, phenyl, glass powder). Only 15% patients attempted suicide by violent methods, 77.5% of the patient had a psychiatric illness (40% has depression) and 37.5% patients were not having any psychiatric illness.

Total-4 shows the comparison of total serum cholesterol of 40 suicide attempters and 40 controls. Total serum cholesterol was lower

TABLE 3
AGE, SEX AND BODY MASS INDEX DISTRIBUTION OF SUICIDE ATTEMPTERS AND CONTROLS

	Suicide Attempters (N=40)		Controls (N=40)	
	No.	%	No.	%
1. Age (in years)				
Upto 20	19	47.5	19	47.5
21-30	14	35	15	37.5
31-40	7	17.5	6	15
Mean Age	23.48±6.0		23.25±5.23	
2. Sex				
Male	22	55	22	55
Female	18	45	18	45
Mean body mass index*	20.34±2.51		20.03±2.32	

TABLE 4
TOTAL SERUM CHOLESTEROL LEVELS IN MG/DL IN SUICIDE ATTEMPTERS AND CONTROLS

	Mean	S.D.
Suicide Attempters (N=40)	127.97	28.43
Controls (N=40)	139.1	23.77

t=0.85, d.f.=78, NS

TABLE 5
SERUM TRIGLYCERIDE LEVEL IN MG/DL IN SUICIDE ATTEMPTERS AND CONTROLS

	Mean	S.D.
Suicide Attempters (N=40)	116.72	29.75
Controls (N=40)	122.52	32.01

t=0.85, d.f.=78, NS

in suicide attempters as compared to controls, but it was not statistically significant, mean total serum cholesterol level was 127.97±28.48 mg/dL in suicide attempters and 139.1±23.77 mg/dL in controls.

Table-5 shows the comparison of serum triglyceride levels in suicide attempters and controls. It was lower in suicide attempters as

TABLE 6
SERUM HDL CHOLESTEROL LEVEL IN MG/DL IN SUICIDE ATTEMPTERS AND CONTROLS

	Mean	S.D.
Suicide Attempters (N=40)	36.40	7.64
Controls (N=40)	37.02	9.17

t=0.83, d.f.=78, NS

compared to controls but was not statistically significant. Mean serum triglyceride level in suicide attempters was 116.72±29.75 mg/dL and in controls was 122.52±32.01 mg/dL.

Table-6 shows the comparison of mean S. HDL cholesterol level of 40 suicide attempters and 40 controls. Mean S. HDL cholesterol in suicide attempters was 36.40±7.64 mg/dL and in controls was 37.02±9.17. Mean S. HDL cholesterol is lower

TABLE 7
SERUM LDL CHOLESTEROL LEVEL IN MG/DL IN SUICIDE ATTEMPTERS AND CONTROLS

S. LDL Cholesterol (mg/dl)	Mean	S.D.
Suicide Attempters (N=40)	71.31	27.91
Controls (N=40)	78.64	22.05

t=1.33, d.f.=78, NS

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in suicide attempters as compared to controls but it was not statistically significant.

Table-7 shows the comparison of mean S. LDL cholesterol level of 40 suicide attempters and 40 controls, mean S. LDL cholesterol in suicide attempters was 71.31 ± 27.91 mg/dL and in controls was 78.84 ± 22.05 . Mean S. LDL cholesterol is lower in suicide attempters as compared to controls but it was not statistically significant.

Table-8 shows comparison of total serum

TABLE 8
SERUM LIPID PROFILE OF SUICIDE ATTEMPTERS NOT HAVING PSYCHIATRIC ILLNESS AND HAVING PSYCHIATRIC ILLNESS

Lipid Profile mg/dl.	Suicide Attempters not having Psychiatric illness (n=15)	Suicide Attempters having Psychiatric illness (n=25)	t	df	p
Total					
S.Cholesterol	126.73±28.30	128.72±29.07	0.69	38	NS
S.Triglyceride	99.72±36.05	108.11±35.11	1.72	38	NS
S.HDL	38.53± 8.04	35.12± 7.26	1.41	38	NS
S.LDL	66.69±24.08	74.08±24.59	1.76	38	NS

cholesterol, tryglyceride, HDL and LDL cholesterol of suicide attempters not having any psychiatric illness and having psychiatric illness. In both the groups no significant difference was found in all the 4 parameters.

Table-9 shows correlation of Risk-Rescue rating scale score for suicide attempters score and serum lipid profile. Statistically significant negative correlation ($p < 0.05$) was also present between risk-rescue score and total cholesterol. Negative correlation was present between risk rescue score vs. S. Triglyceride HDL & LDL cholesterol but was statistically not significant.

Table-10 shows comparison of serum cholesterol of depressives, nondepressives, psychiatric patients, attempters not having

TABLE 9
CORRELATION OF RISK-RESCUE RATING SCALE SCORE AND SERUM LIPID PROFILE OF SUICIDE ATTEMPTERS

Correlation	r	p
R/R Score vs Total S. Cholesterol	-0.32	$p < 0.05$
R/R Score vs S. Triglyceride	-0.20	NS
R/R Score vs S. HDL	-0.16	NS
R/R Score vs S. LDL	-0.159	NS

TABLE 10
COMPARISON OF TOTAL CHOLESTEROL IN DEPRESSIVES, NONDEPRESSIVES, PSYCHIATRICALY ILL ATTEMPTERS AND ATTEMPTERS NOT HAVING PSYCHIATRIC ILLNESS

Total Cholesterol (mg/dL)	Depressive patients (N=16) (A)	Non-Depressive Psychiatric Patients (N=9) (B)	Attempters not having Psychiatric Illness (N=15) (C)	Controls (N=40) (D)
Mean	127.00	136.00	126.00	139.10
S.D.	28.42	29.24	27.34	23.77

A vs B : t = 0.97 d.f.=23 NS, A vs C : t = 0.10 d.f.=23 NS

A vs D : t = 1.62 d.f.=54 NS, A vs C : t = 0.82 d.f.=22 NS

B vs D : t = 0.33 d.f.=47 NS, C vs D : t = 1.73 d.f.=53 NS

psychiatric illness and controls. Lower total serum cholesterol was seen in depressives, nondepressives, psychiatric patients and suicide attempters not having any psychiatric illness than in controls but this difference was statistically not significant.

Table-11 shows comparison of S.

TABLE 11
COMPARISON OF SERUM TRIGLYCERIDE IN DEPRESSIVES, NONDEPRESSIVES, PSYCHIATRICALY ILL ATTEMPTERS AND ATTEMPTERS NOT HAVING PSYCHIATRIC ILLNESS

S.Triglyceride (mg/dL)	Depressive patients (N=16) (A)	Non-Depressive Psychiatric patients (N=9) (B)	Attempters not having Psychiatric Illness (N=15) (C)	Controls (N=40) (D)
Mean	111.56	112.11	99.72	122.52
S.D.	24.78	34.25	36.05	32.01

A vs B : t = 0.046 d.f.=21 NS, A vs C : t = 0.271 d.f.=28 NS

A vs D : t = 1.613 d.f.=53 NS, A vs C : t = 0.161 d.f.=21 NS

B vs D : t = 0.417 d.f.=46 NS, C vs D : t = 0.886 d.f.=53 NS

Triglyceride level of depressive, nondepressive, psychiatric patients, suicide attempters not having any psychiatric illness and controls. Lower S. triglyceride was seen in depressives, nondepressive psychiatric patients and suicide attempters not having any psychiatric illness than in controls. But this difference was statistically not significant.

Table-12 shows comparison of S. HDL cholesterol levels of depressives, nondepressives attempters not having any psychiatric illness and controls. It was observed that the subjects having some psychiatric illness

had lower levels of serum HDL cholesterol but difference was not statistically significant.

Table-13 shows comparison of S. LDL

TABLE 12
COMPARISON OF HDL CHOLESTEROL IN DEPRESSIVES, NONDEPRESSIVES, PSYCHIATRICALY ILL ATTEMPTERS AND ATTEMPTERS NOT HAVING PSYCHIATRIC ILLNESS

Serum HDL Cholesterol (mg/dL)	Depressive patients (N=16) (A)	Non-Depressive Psychiatric Patients (N=9) (B)	Attempters not having Psychiatric Illness (N=15) (C)	Controls (N=40) (D)
Mean	35.06	35.22	38.53	37.02
S.D.	7.58	60.57	8.04	9.17

A vs B : t = 0.053 d.f.=21 NS, A vs C : t = 1.35 d.f.=28 NS
A vs D : t = 0.77 d.f.=53 NS, A vs C : t = 1.17 d.f.=21 NS
B vs D : t = 0.62 d.f.=46 NS, C vs D : t = 0.82 d.f.=53 NS

TABLE 13
COMPARISON OF LDL CHOLESTEROL IN DEPRESSIVES, NONDEPRESSIVES, PSYCHIATRICALY ILL ATTEMPTERS AND ATTEMPTERS NOT HAVING PSYCHIATRIC ILLNESS

Serum LDL Cholesterol (mg/dL)	Depressive patients (N=16) (A)	Non-Depressive Psychiatric Patients (N=9) (B)	Attempters not having Psychiatric Illness (N=15) (C)	Controls (N=40) (D)
Mean	70.50	79.00	66.69	78.04
S.D.	23.58	26.85	24.08	22.05

A vs B : t = 0.0.82 d.f.=21 NS, A vs C : t = 0.1.20 d.f.=28 NS
A vs D : t = 1.1.13 d.f.=53 NS, A vs C : t = 0.1.77 d.f.=21 NS
B vs D : t = 0.0.11 d.f.=46 NS, C vs D : t = 0.1.60 d.f.=53 NS

cholesterol level of depressives, nondepressive, attempters not having psychiatric illness and controls. No statistically significant difference was observed.

DISCUSSION

The present work was aimed to study the serum lipid profile in suicide attempters. Final sample which participated in the study was of 40 subjects who were evaluated for psychiatric illness if any, based on ICD-10 DCR. Out of these, 16 (40%) were found to be suffering from depression 9 (22.5%) subjects were having psychiatric illness other than depression & 15 (37.5%) subjects were not having any psychiatric illness. Severity of suicide attempt was rating

on Risk Rescue Rating Scale (RRRS).

The control group was composed of normal healthy volunteers. Total forty age and sex matched controls were taken after administering inclusion and exclusion criteria. The conditions such as medical illness (coronary artery disease, diabetes mellitus, hypothyroidism, nephrotic syndrome, familial hyperlipidemia), smoking, pregnancy/lactation, alcohol, drug abuse/dependence, use of oral contraceptive pills, hypolipidemic agents, antihypertensive drugs, anticonvulsants drugs and burns were the exclusion criteria for the samples of both groups as these conditions are known to affect the serum lipid profile (Bajwa *et al.*, 1992; Nityanand *et al.*, 1989).

A possibility is that people who alter life long behaviour patterns (i.e. modify their dietary habits) have changes in mood or behaviour sufficient to increase the risk of suicide or they experience alterations in cognitive function in a manner that predisposes to accidental death (Muldoon, 1990). Smith *et al.* (1990) examined that plasma cholesterol is related to death from violent causes including accidents, violence and suicide.

In the present study lowering of raised serum cholesterol in middle aged subjects by diet, drugs or both was associated with increase in suicidal behaviour similar to observation by Muldoon *et al.* (1992) who have shown increased mortality due to suicides and or violence compared to control group.

Lower total serum cholesterol (127.97 ± 28.43 mg/dl) is seen in suicide attempters as compared to controls (139.10±23.77 mg/dl) which shows relevance with the findings of Yates and Wallace (1987) in which bipolar patients had a significantly lower mean level of total serum cholesterol as compared to controls. Low total serum cholesterol level have been associated with the expression of aggressive and antisocial behaviour in criminal population (Virkkunen, 1979, 1983).

Recently in a study done by Partonen *et al.* (1999) a total of 29133 men aged 50-69 years were followed for a 5-8 years and found that low serum total cholesterol was associated with low mood and subsequently a heightend risk of hospital treatment due to major depressive

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disorder and of death from suicide. Thus the association between low cholesterol and death from suicide remains obscure.

Mean serum triglyceride was also lower in suicide attempters (116.72 ± 24.75 mg/dl) as compared to controls (122.52 ± 32.01 mg/dl). There was no significant difference in serum HDL cholesterol between suicide attempters (36.4 ± 7.64 mg/dl) and controls (37.02 ± 9.17).

Serum LDL cholesterol was slightly lower in suicide attempters (71.31 ± 27.91 mg/dl) as compared to controls (78.74 ± 22.05).

The difference observed in total cholesterol, serum triglycerides, serum HDL and serum LDL cholesterol in suicide attempters having psychiatric illness and suicide attempters not having any psychiatric illness, was not significant. The statistically significant negative correlation ($p < 0.05$) was present between risk score and total cholesterol, might be related to increased risk of committing suicide. However causality can not be established by the observation.

In a previously conducted study by Khalid et al. (1995) a strong association has been observed between low lipid levels and depressive with suicidal intent. Present study also shows slight low serum cholesterol, triglyceride and LDL cholesterol level have been observed in suicide attempters as compared to control, though the values are found to be not significant.

It is important to mention that the sample size in our study was a small one. The lipid levels were investigated only once in our study while we now feel that estimation should be done at least twice at least (Nityanand et al., 1989). Another area of attention is that many of the controls were blood relatives of the suicide attempters. Clear picture may emerge if genetically unrelated controls are taken. Future studies must address these problems.

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