Letter to the Editor

Association of lipid profile with completed suicides: A hospital-based case-control study

1. Introduction

Various studies have been conducted on the association between lipid profile and suicide/suicidal attempts/suicidal ideation with mixed results. Some of the studies done on total serum cholesterol showed that high serum cholesterol level is associated with less suicide/suicidal ideation (Messaoud et al., 2017; Olié et al., 2011; Perez-Rodriguez et al., 2008) while other studies showed that high cholesterol level is associated with more suicide/suicidal ideation (de Leon et al., 2011; Verma et al., 1999).

Only a few studies were done among the completed suicide (who committed suicide) cases (Park et al., 2013; Tanskanen et al., 2000). One of the studies done on complete suicide cases found that high total cholesterol level was associated with high violent suicide but did not find any relation with non-violent suicide (Tanskanen et al., 2000) while the other study failed to find any association at all (Park et al., 2013). Keeping in mind the mixed result of various studies worldwide, this preliminary study was conducted among the Indian population to know the relationship between the serum lipid profile and completed suicide.

2. Materials and methods

It was a hospital-based case-control study for 2 years from July 2015 to June 2017 at All India Institute of Medical Sciences, New Delhi. Forty cases of completed suicides and 38 non-suicidal deaths as controls were included in the study with consent from the next of kin of the deceased.

Serum lipid profiling (total cholesterol, triglycerides, HDL, LDL, and VLDL level) of the subjects was done using "ROCHE P800" chemical analyzer of making Hitachi. The interview of the near relatives for demographic and psychosocial profile was conducted simultaneously.

Statistical analysis was done for BMI and lipid profile excluding outliers for whole samples, and males and females' samples separately, with a comparison between suicide and non-suicide groups. Both groups are checked for normality (Shapiro-Wilk normality test) for selection of parametric test (t-test) or non-parametric test (Mann-Whitney test). F-test was also applied to check variance of the data and for selection of standard two-sample t-test or Welch two-sample t-test. A p-value of less than 0.05 has been considered as statistically significant. This study was approved by the Institute Ethics Committee.

3. Results

Mean BMI for the whole samples, i.e. males and females, was 24.64 among the suicides and it was 24.90 among the non-suicides (p = 0.696). Mean total serum cholesterol level was 136.1 mg/dl among the suicides and it was 162.6 mg/dl among the non-suicides, the difference was statistically significant (p = 0.001). Mean serum HDL level was 42.89 mg/dl among the suicides and it was 39.65 mg/dl

among the non-suicides (p = 0.186). Mean serum LDL level was 95.99 mg/dl among the suicides and it was 122.1 mg/dl among the non-suicides, the difference was statistically significant (p = 0.007). Mean serum VLDL level was 35.97 mg/dl among the suicides and it was 37.36 mg/dl among the non-suicides (p = 0.301). Mean serum triglyceride level was 179.9 mg/dl among the suicides and it was 186.8 mg/dl among the non-suicides (p = 0.301). The statistical analysis done for males separately showed statistically significant difference in the same parameters between the two groups as the whole samples. For females, however, none of the parameters was found significantly different between the two groups (Table 1).

4. Discussion

This study found that suicide group had significantly lower serum total cholesterol and LDL levels compared to non-suicidal group for the whole samples as well as for males. On the other hand, female subjects did not show any significant difference in cholesterol levels.

A case-control study was conducted by Diaz-Sastre et al. (2007) found that serum cholesterol levels were significantly lower in suicide attempters than in non-suicides. After gender stratification, the difference remained significant in men, but not in women. Atmaca et al. (2003) conducted a study with an objective to measure total serum cholesterol and leptin levels in 16 medication-free schizophrenic patients with and without suicide attempts and in 16 healthy non-suicides. They observed that the significantly lower total cholesterol and leptin levels were observed in patients who had attempted suicide compared with those who had not. The finding of the present study on the association of low serum cholesterol level with a high risk of suicide concurs with the above studies.

There are other studies too on the association of suicide ideation/attempts with the level of different types of cholesterol. A meta-analysis was done by Wu et al. (2016) to see the relation between serum lipid levels and suicidal patients. Compared with the non-suicidal patients, suicidal patients had significantly lower serum total cholesterol, LDL-C and triglyceride levels. The present study concurs with discussed study for low total serum cholesterol level and LDL cholesterol level, however, failed to find any relation of suicide with triglyceride level.

Contribution of authors

Ramesh Pratap Anuragi: Enrolled the subjects, collected the samples, analysed the samples, collected the data, interpret the data, prepared the manuscript, revised the manuscript and approved the manuscript.

R Lakshmy: Analysed the samples, collected the data, interpret the data, prepared the manuscript, revised the manuscript and approved the manuscript.

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Table 1

Comparison of BMI and serum lipid profiles between suicide and non-suicide group.

Parameter	Suicide[a] Mean ± SD	Non-suicide[a] Mean ± SD	p-value[b]
All Subjects			
BMI (kg/m^2)	24.56 ± 1.96	24.27 ± 1.49	0.522
Total Cholesterol (mg/dl)	136.10 ± 38.47	162.60 ± 30.87	0.001[c]
HDL (mg/dl)	42.89 ± 12.48	39.65 ± 7.59	0.186
LDL (mg/dl)	95.99 ± 42.82	122.10 ± 38.35	0.007[c]
VLDL (mg/dl)	35.97 ± 7.26	37.36 ± 3.98	0.301
Triglyceride (mg/dl)	179.90 ± 36.31	186.80 ± 19.88	0.301
Males			
BMI (kg/m^2)	24.37 ± 1.91	25.54 ± 2.86	0.067
Total Cholesterol (mg/dl)	133.40 ± 40.81	166.70 ± 31.89	< 0.001[c]
HDL (mg/dl)	42.89 ± 12.85	40.15 ± 7.75	0.310
LDL (mg/dl)	94.57 ± 46.04	123.93 ± 35.73	0.006[c]
VLDL (mg/dl)	36.02 ± 7.44	37.12 ± 3.86	0.461
Triglyceride (mg/dl)	180.10 ± 37.21	185.60 ± 19.29	0.461
Females			
BMI (kg/m^2)	25.39 ± 2.22	23.85 ± 2.15	0.233
Total Cholesterol (mg/dl)	148.8 ± 23.26	140.3 ± 6.43	0.388
HDL (mg/dl)	46.70 ± 11.16	39.93 ± 9.86	0.275
LDL (mg/dl)	102.30 ± 25.58	112.18 ± 53.16	0.670
VLDL (mg/dl)	38.01 ± 3.93	38.66 ± 4.72	0.801
Triglyceride (mg/dl)	190.0 ± 19.77	193.3 ± 23.63	0.801

[a] Values are approximated to two decimal points.
[b] Values are approximated to three decimal points.
[c] Values are statistically significant.

collected the data, interpret the data, prepared the manuscript, revised the manuscript and approved the manuscript.

Deepak Ramkumar Bharti: Collected the data, interpret the data, statistically analysed the data, prepared the manuscript, revised the manuscript and approved the manuscript.

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All authors have approved the final article.

Declaration of Competing Interest

The Authors declare that there is no conflict of interest.

References

Atmaca, M., Kuloglu, M., Tezcan, E., Ustundag, B., 2003. Serum leptin and cholesterol levels in schizophrenic patients with and without suicide attempts. Acta Psychiatr. Scand. 108 (3), 208–214.

de Leon, J., Mallory, P., Maw, L., Susce, M.T., Perez-Rodriguez, M.M., Baca-Garcia, E., 2011. Lack of replication of the association of low serum cholesterol and attempted suicide in another country raises more questions. Ann. Clin. Psychiatry 23 (3), 163–170.

Diaz-Sastre, C., Baca-Garcia, E., Perez-Rodriguez, M.M., Garcia-Resa, E., Ceverino, A., Saiz-Ruiz, J., Oquendo, M.A., de Leon, J., 2007. Low plasma cholesterol levels in suicidal males: a gender- and body mass index-matched case-control study of suicide attempters and nonattempters. Prog. Neuropsychopharmacol. Biol. Psychiatry 31 (4), 901–905.

Messaoud, A., Mensi, R., Mrad, A., Mhalla, A., Azizi, I., Amemou, B., Trabelsi, I., Grissa, M.H., Salem, N.H., Chadly, A., Douki, W., Najjar, M.F., Gaha, L., 2017. Is low total cholesterol levels associated with suicide attempt in depressive patients? Ann. Gen. Psychiatry 16, 20–27.

Olié, E., Picot, M.C., Guillaume, S., Abbar, M., Courtet, P., 2011. Measurement of total serum cholesterol in the evaluation of suicidal risk. J. Affect. Disord. 133 (1–2), 234–238.

Park, S., Yi, K.K., Na, R., Lim, A., Hong, J.P., 2013. No association between serum cholesterol and death by suicide in patients with schizophrenia, bipolar affective disorder, or major depressive disorder. Behav. Brain Funct. 9, 45–49.

Perez-Rodriguez, M.M., Baca-Garcia, E., Diaz-Sastre, C., Garcia-Resa, E., Ceverino, A., Saiz-Ruiz, J., Oquendo, M.A., de Leon, J., 2008. Low serum cholesterol may be associated with suicide attempt history. J. Clin. Psychiatry 69 (12), 1920–1927.

Tanskanen, A., Vartiainen, E., Tuomilehto, J., Viinamäki, H., Lehtonen, J., Puska, P., 2000. High serum cholesterol and risk of suicide. Am. J. Psychiatry 157 (4), 648–650.

Verma, S., Trivedi, J., Singh, H., Dalal, P., Asthana, O., Srivastava, J., 1999. Serum lipid profile in suicide attempters. Indian J. Psychiatry 41 (4), 300–306.

Wu, S., Ding, Y., Wu, F., Xie, G., Hou, J., Mao, P., 2016. Serum lipid levels and suicidality: a meta-analysis of 65 epidemiological studies. J. Psychiatry Neurosci. 41 (1), 56–69.

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