

5-12-2010

Serum Lipids and Suicidality in Early Psychosis: Is There a Connection? A Preliminary Study

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Citation of this paper:

Srivastava, Amresh; Johnston, Megan; Purde, Lenore; and Campbell, Robbie, "Serum Lipids and Suicidality in Early Psychosis: Is There a Connection? A Preliminary Study" (2010). *Psychiatry Presentations*. 37.

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Serum Lipids and Suicidality in Early Psychosis: Is there a connection? A preliminary study

**Amresh Shrivastava ¹, Megan Johnston²
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Suicide is an international mental health problem

Canada: 3200 per year ¹

10% of all suicide patients - Schizophrenia

**50% of persons who have committed
suicide sought professional help
within 1 month of the act (Lester 1993)**

**>90% people who attempt suicide have a
mental disorder:**

World Health Organization

Schizophrenia

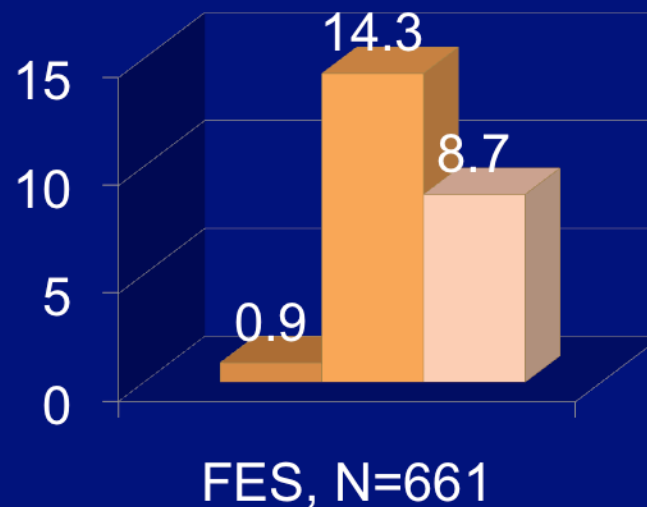
- 10-13% die, in follow up¹
- 4.9% in recent meta-analysis
- Life time risk of 4%
- The annual rate of 0.4% to 0.8%
- Has remained constant ²

1. Meltzer HY. Suicide and schizophrenia: clozapine and the InterSePT study. International Clozaril/Leponex Suicide Prevention Trial. J.Clin.Psychiatry 1999;60 Suppl 12:47-50.

2. Meltzer HY. Treatment of suicidality in schizophrenia. Ann.N.Y.Acad.Sci. 2001 Apr;932:44-58;

First episode or early phase of psychosis: High risk phase

- Died (06)
- Attempted prior to entry (93)
- Attempted during treatment (57)



Robinson J Prevalence and predictors of suicide attempt in an incidence cohort of 661 young people with first-episode psychosis. , Aust N Z J Psychiatry. 2009 Feb;43(2):149-57

Alaraisanen A , Suicide rate in schizophrenia in the Northern Finland 1966 Birth Cohort. Soc.Psychiatry Psychiatr.Epidemiol. 2009 Dec;44(12):1107-1110

Clinical, Psychological, **Biological**

- **Predicting suicidal behavior is a complex and difficult task ¹**
- **Predictive models generally have not proven accurate or sensitive enough to have practical clinical value (Mann, 2001)**
- **Several factors have some predictability**

1. Pompili M, Amador XF, Girardi P, Harkavy-Friedman J, Harrow M, Kaplan K, et al. Suicide risk in schizophrenia: learning from the past to change the future. *Ann.Gen.Psychiatry*. 2007 Mar 16;6:10.

Serotonin – Biology ¹

- Central Serotonin: central modulator.
- Low 5-HT/ 5-HIAA hostile aggression.
- Serotonin transporters ²
- DST: Non suppression
- Prolactin
- PFC and cingulate gyrus
- Both: Attempted and completed suicide

Can we easily measure it?

Can it help in prediction?

1. Meltzer HY, Baldessarini RJ.

Reducing the risk for suicide in schizophrenia and affective disorders. J.Clin.Psychiatry 2003 Sep;64(9):1122-1129.

2. Mann JJ, Arango VA, Avenevoli S, Brent DA, Champagne FA, Clayton P, et al.

Candidate endophenotypes for genetic studies of suicidal behavior. Biol.Psychiatry 2009 Apr 1;65(7):556-563.

Cholesterol

- plays an important role in distinguishing suicidal from non-suicidal patients¹
- Lower level of cholesterol is associated with
 - suicide behavior
 - violent suicide
- Studies of postmortem brain of suicide completers in psychosis^{2,3}

1. Atmaca M, Kuloglu M, Tezcan E, Ustundag B. Serum leptin and cholesterol values in violent and non-violent suicide attempters. *Psychiatry Res.* 2008 Feb 28;158(1):87-91.

2. Boscarino JA, Erlich PM, Hoffman SN. Low serum cholesterol and external-cause mortality: potential implications for research and surveillance. *J. Psychiatr. Res.* 2009 Jun;43(9):848-854.

3. Ellison LF, Morrison HI. Low serum cholesterol concentration and risk of suicide. *Epidemiology* 2001 Mar;12(2):168-172.

Serum cholesterol

- Central cholesterol- key player in serotonin metabolism ¹
 - It plays a fundamental role in maintaining the soundness of neuron membranes ²
 - Especially in the transport of serotonin vesicles into the synaptic cleft ³
- The relationships among suicidality, psychosis and cholesterol remain undetermined and complex

(1) Marcinko D, Marcinko V, Karlovic D, Marcinko A, Martinac M, Begic D, et al. Serum lipid levels and suicidality among male patients with schizoaffective disorder. *Prog.Neuropsychopharmacol.Biol.Psychiatry* 2008 Jan 1;32(1):193-196.

(2) Marcinko D, Martinac M, Karlovic D, Filipcic I, Loncar C, Pivac N, et al. Are there differences in serum cholesterol and cortisol concentrations between violent and non-violent schizophrenic male suicide attempters? *Coll.Antropol.* 2005 Jun;29(1):153-157.

(3) Mahadik SP, Mukherjee S, Correnti EE, Kelkar HS, Wakade CG, Costa RM, et al. Plasma membrane phospholipid and cholesterol distribution of skin fibroblasts from drug-naive patients at the onset of psychosis. *Schizophr.Res.* 1994 Oct;13(3):239-247.

Food Internal Phosphates etc

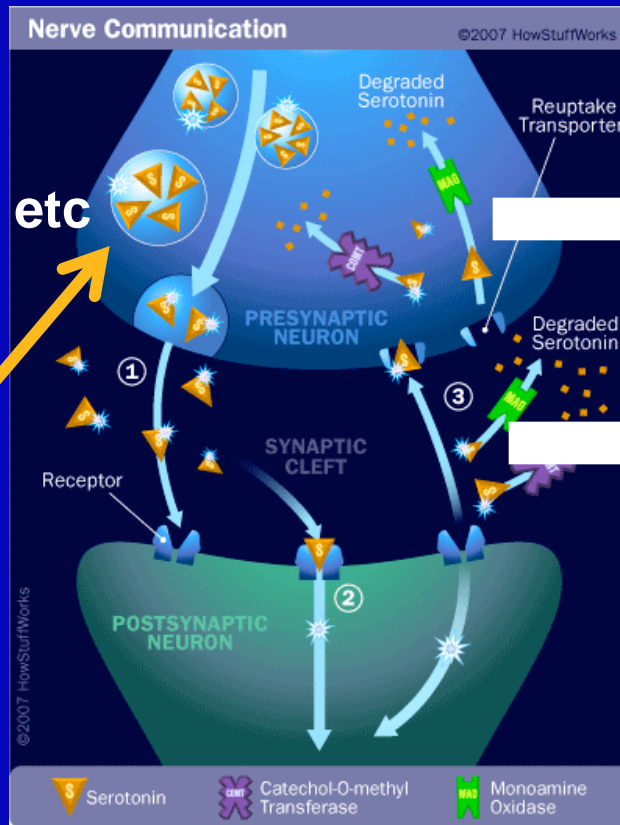
Synthesis

Cholesterol

Metabolism

TGL

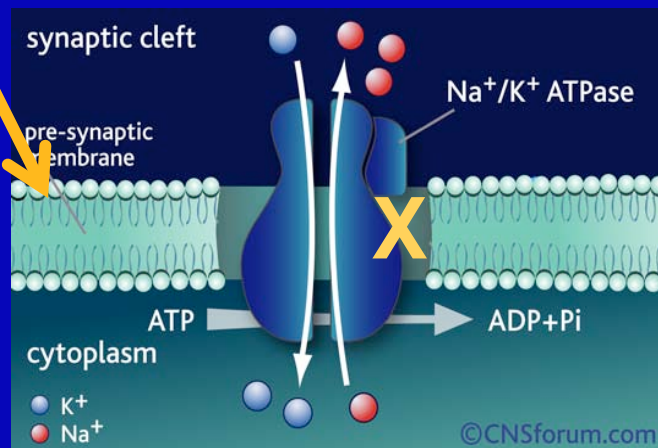
Lipoproteins



Slow movement of vesicles

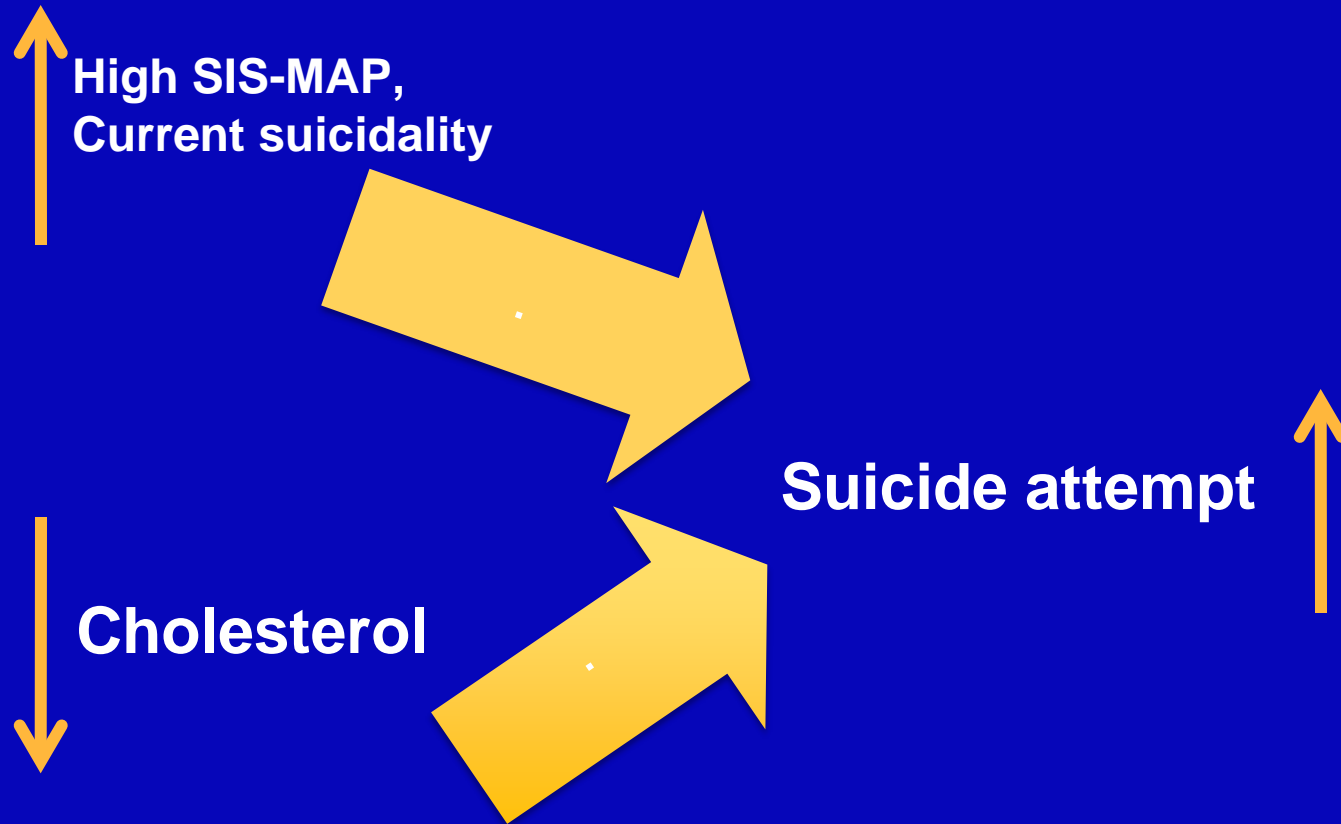
Low serotonin in synaptic cleft

- Depression
- Impulse dyscontrol
- Violence
- Aggression
- Suicide



Hypothesis

Study



Objective

(a) To determine relationship of cholesterol with clinical parameters and level of suicidality

(b) correlation of suicide potential of SIS-MAP scale

Two phase study:

- 1. Pilot, cross-sectional cohort design to test the correlations of two parameters**
- 2. Longitudinal follow up study, to test the predictability**

Methods: *Preliminary, Naturalistic, cohort*

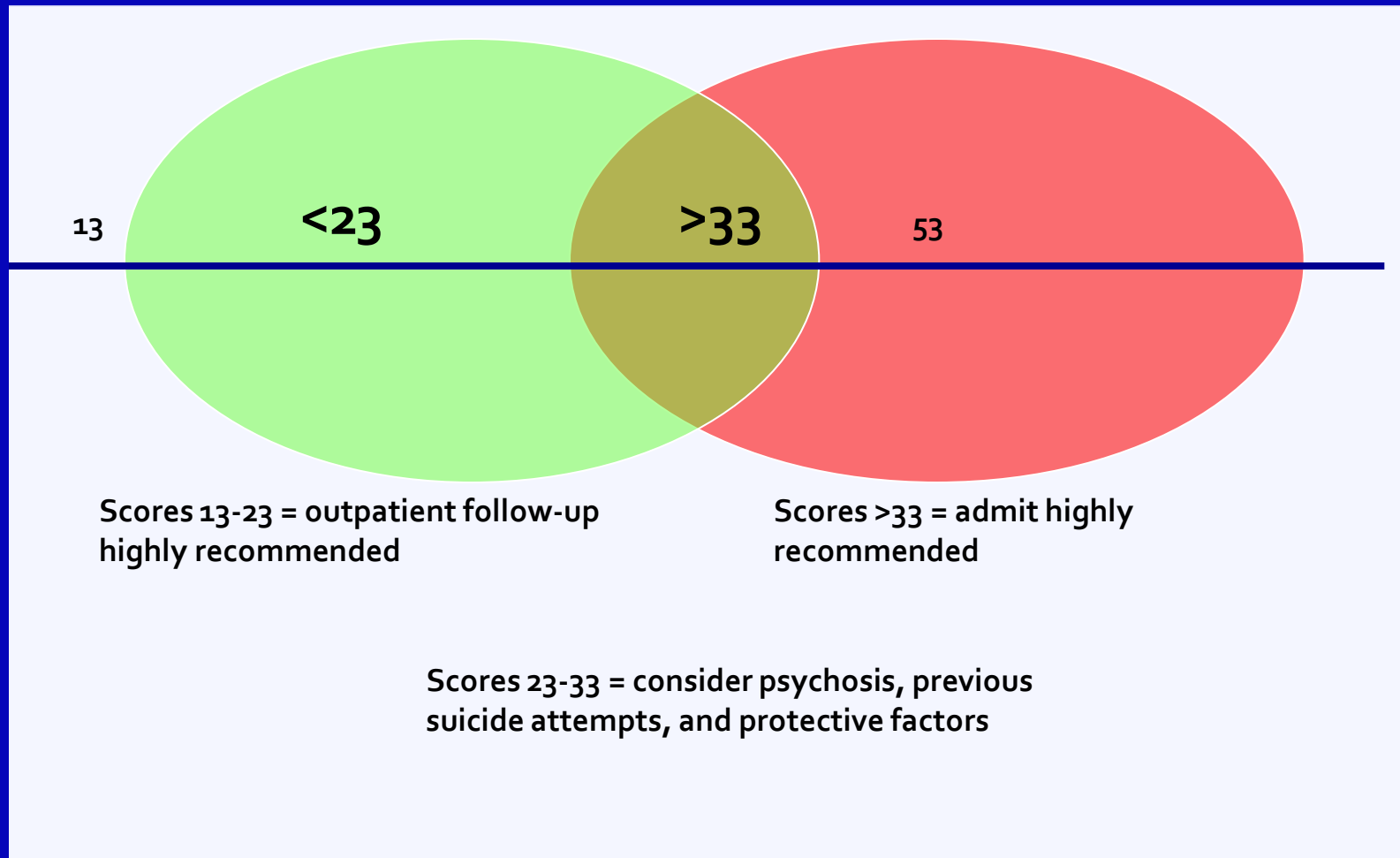
- Subjects (patients) must be 18+ years of age.
- DSM IV criterion of 'Non-affective schizophrenia spectrum'
- First episode psychosis can be continuous or exacerbating
- *Excluded:* OMD, Withdrawal states, Physical illness, chronic pain with opiates

Assessment

- Clinical data
- Psychopathology: PANSS & HDRS
- Suicidality by SIS-MAP scale
- Serum cholesterol: From database
- All assessment with 7 days of admission or consult
- Semi-structured
- Analyzed : SPSS

SIS-MAP

Clinical Cut-Offs for Level of Care Needed



Results

- **Sample**

- 41 males (68.3%), 19 females (31.7%)
- age mean (years) = 26.5 (*SD* = 4.61); range = 17 – 38
- duration of illness mean (months) = 14.6 (*SD* = 9.71); range = 3 – 38

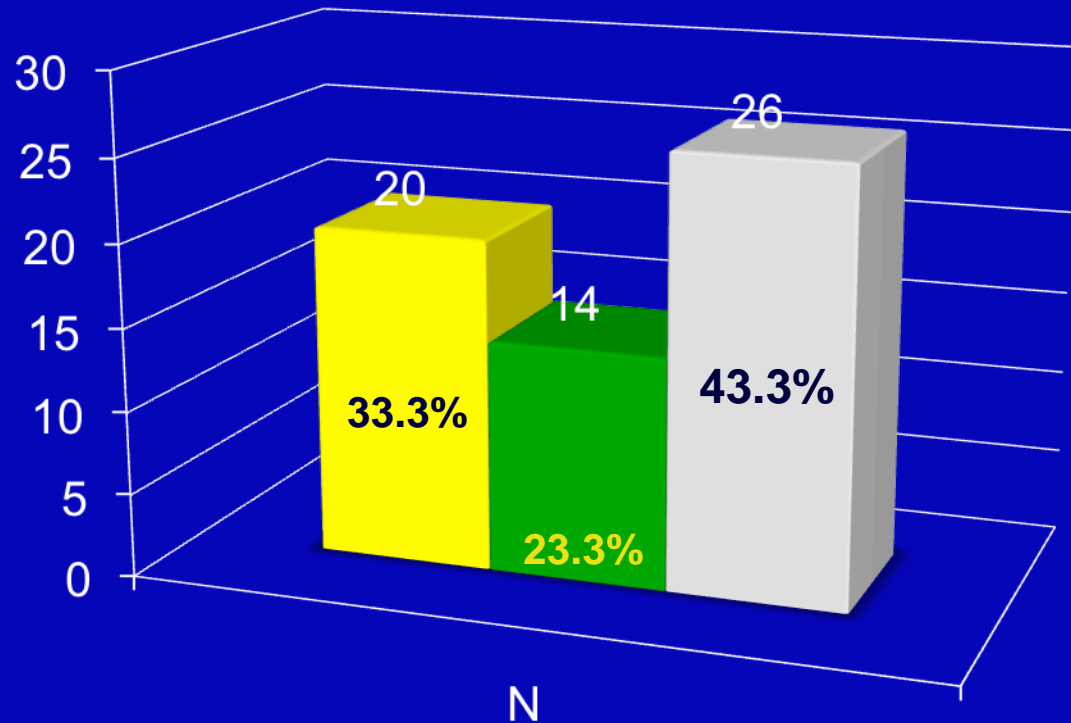
Range of Suicidality

SIS-MAP scores (frequency/percent of participants in each category of Suicidality)

■ Low suicidality,
SISMAP (0-18)

■ Moderate
Suicidality, SISMAP
(19-29)

■ High Suicidality
(>30)



Cholesterol: Comparison across suicidality

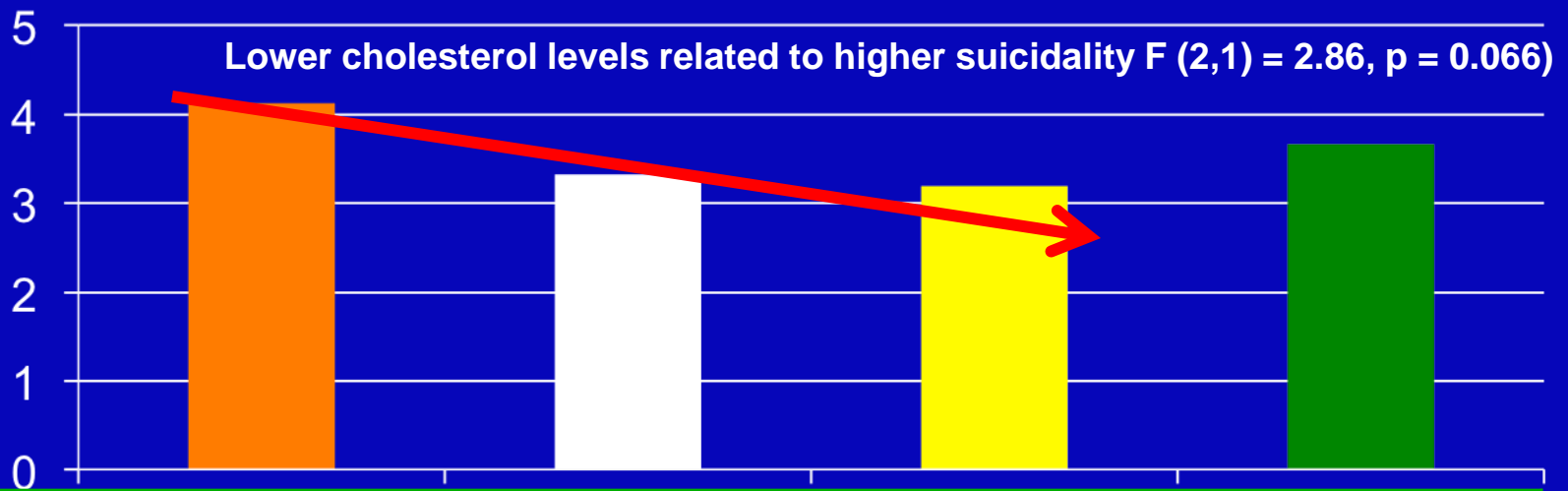
Tendency for lower cholesterol levels to be associated with higher suicidality $F(2,1) = 2.86, p = 0.066$

SISMAP	Cholesterol Mean	N	Std. Deviation
low	4.120	20	1.3217
moderate	3.319	14	1.6396
high	3.488	26	1.3860
Total	3.660	60	1.4426

Results: Cholesterol

- range = 0.3 to 6.7; mean = 3.66 ($SD = 1.44$)
- Cholesterol means value for each category of suicidality

Mean Cholesterol



SISMAP	Low	Moderate	High	Total
N	20	14	26	60

Associations of Suicidality and Gender with Cholesterol Levels

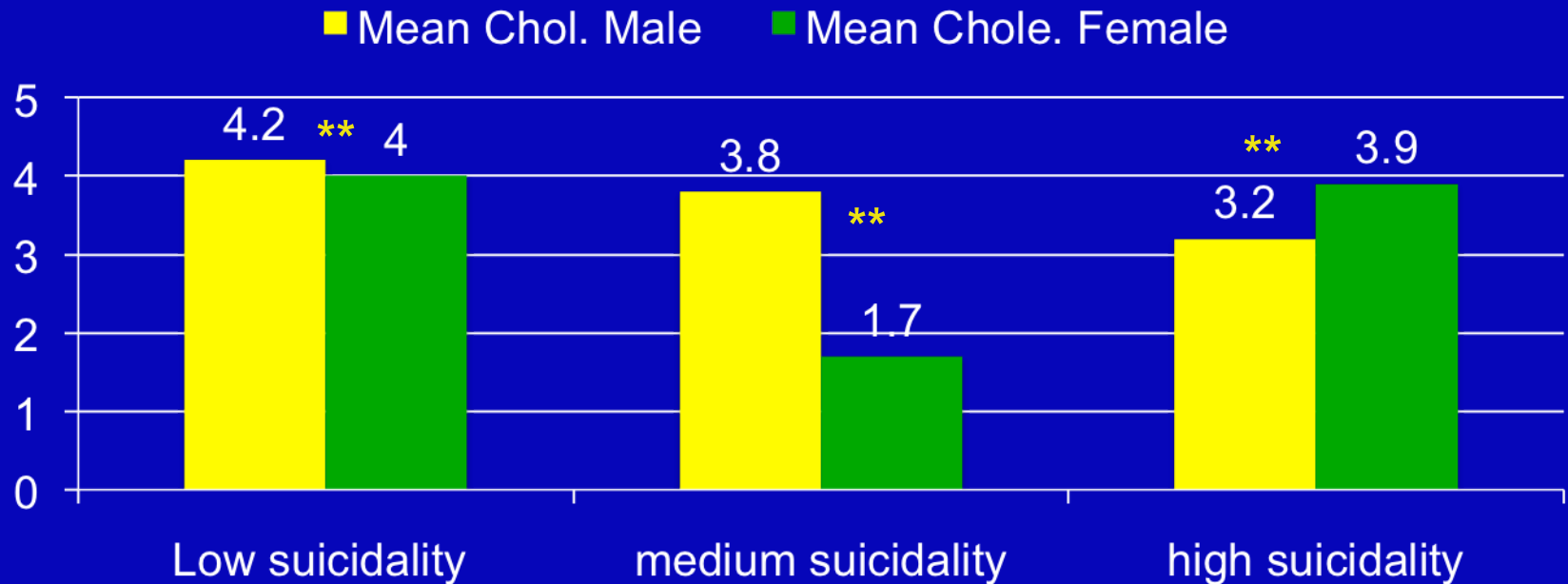
Analysis of Variance (ANOVA) with cholesterol scores as outcome

Suicidality approaches significance in the prediction of cholesterol scores

Also, there is a significant gender difference by suicidality interaction

Source	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	19.223 ^a	5	3.845	2.005	.093
Intercept	523.535	1	523.535	272.981	.000
Sex	2.852	1	2.852	1.487	.228
SISMAP	10.970	2	5.485	2.860	<u>.066</u>
Sex * SISMAP	12.448	2	6.224	3.245	<u>.047</u>
Error	103.563	54	1.918		
Total	926.303	60			
Corrected Total	122.786	59			

Gender Difference in Suicidality and Cholesterol



Higher suicidality in males related to lower cholesterol, whereas moderate suicidality in females is related to the lowest cholesterol levels

(F (2,1) = 3.245, p = 0.047)

Conclusion:

- **The study shows that serum cholesterol does not show any abnormality in early psychosis admitted patients as a group**
- **However, lower levels are observed in patients of psychosis with severe suicidality**
- **More research is required in this field to determine the neurochemistry of suicide behavior in psychosis**



Thank you

**‘Care needs to reach where people
live, where problems arise’**