Infections and inflammation are associated with psychiatric disorders and suicidal behavior.

Infections are a risk factor for mood disorders and suicide.

**Mood disorders**: Persons with autoimmune disease and 8 or more hospital contacts for infection have a > 4-fold increased incidence of mood disorders, compared with persons without autoimmune disease and no hospital contacts for infection. [1] See: Autoimmune diseases and severe infections as risk factors for mood disorders: a nationwide study

**Schizophrenia**: Persons with autoimmune disease and 3 or more hospitalizations for infection have a >3-fold increased incidence of schizophrenia, compared with persons without autoimmune disease and no hospitalization for infection. [2] See: Autoimmune diseases and severe infections as risk factors for schizophrenia: a 30-year population-based register study

Inflammation is also associated with suicidality

**Suicidality**: Levels of interleukin (IL)-1β and IL-6 were significantly increased in blood and postmortem brain samples of patients with suicidality compared with both patients without suicidality and healthy controls. [3] See: Meta-analysis of cytokines and chemokines in suicidality: distinguishing suicidal versus nonsuicidal patients

What is the effect of agents such as influenza B virus and *Toxoplasma gondii*?

Agents such as the influenza B virus and the parasite *Toxoplasma gondii* can infect the brain and may also increase inflammation in the blood and brain

Schizophrenia is associated with an increased prevalence of inflammation, infection with *Toxoplasma gondii*, and suicide.

Lund-Sørensen and colleagues explored the association between infections and risk of suicide mortality in a large Danish cohort study [4]. See: A nationwide cohort study of the association between hospitalization with infection and risk of death by suicide
Study methods

- All people age 15 or older living in Denmark between 1980 and 2011 were included
- This cohort of 7,221,578 people was followed up until death, emigration from Denmark, or the end of 2011
- Data from national registries on all residents living in Denmark were used, including the:
  - National Hospital Register
    - Inpatient hospitalizations since 1977
    - Outpatient/Emergency visits since 1995
  - Psychiatric Central Research Register
    - Psychiatric inpatient hospitalizations since 1968
    - Psychiatric outpatient/emergency visits since 1995
  - Cause of Death Register
    - ICD-8 and ICD-10 codes for suicide
- The risk of suicide among people with a diagnosed infection relative to those without infection was calculated
- Data were analyzed using logistic regression to calculate incidence rate ratios (IRRs) and 95% confidence intervals (CIs)

Study results

- Of the 7.2 million people in the cohort:
  - 11% had a hospitalization with infection
  - 32,683 died by suicide
    - 24% of these people (7892) had a hospitalization with infection
- There was a 1.4-fold increased risk of suicide in people with hospitalization with infection (IRR = 1.42; 95% CI, 1.38-1.46)
All types of infections, except for pregnancy-related infections and ear infections, were linked to an increased risk of suicide.

The population attributable risk for hospitalization with infection was 10%.

- Implies that 1 in 10 suicides could be prevented if infections were eliminated (assuming a causal association).

The risk of suicide increased in a dose-dependent fashion with the number of hospitalizations for different infections.

- Persons with 7 or more hospitalizations for infection had an almost 3-fold increased incidence of suicide compared to persons with no hospitalizations for infection.

There was a 1.4-fold increased risk of suicide in people with hospitalization with infection with NO diagnosis of schizophrenia or affective disorder (IRR = 1.40; 95% CI, 1.36-1.44).

Infections occurring before, but not after, a psychiatric diagnosis were associated with a significant increased risk of suicide.

**Discussion**

- This is the largest study to date of infections and suicide mortality.
- The association remained significant after controlling for age, sex, calendar period, marital status, socioeconomic status, and an index of comorbidity.
- Associations between infections and suicide in patients with schizophrenia (and related psychotic disorders) were not considered, but warrant further study.
- Although there are potential causal links between infections and suicide, the mechanisms of this association remain unclear.

**The bottom line**

- Hospitalization for infection is a risk factor for death by suicide.
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References


