Symptom Disconnect and Variable Treatment Response in Network Analysis of Violent Schizophrenia Patients

Michael Rondinaro (MS candidate in BME)

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Abstract: The risk for increased aggression and violence in schizophrenia patients has been substantiated across the literature. At the same time, the risk of violence at the population level is essentially unaffected due to the low percentage of individuals with schizophrenia. The stigma of violence in schizophrenia exaggerates the population-level risk and affects the perception of all schizophrenia sufferers, the majority of whom are non-violent. The history of identifying key causal factors in psychopathology is tenuous. Recent research suggests that the approach to treating schizophrenia may benefit more immediately from a network science approach, in which symptoms can be represented as nodes and their relationships as edges. In this manner, a descriptive and predictive symptom environment can be constructed and observed under key conditions. Our objective was to construct symptom networks and test for differences based on two parameters related to schizophrenia: violence and antipsychotic treatment. Our study aimed firstly to clarify the differences between symptom networks of violent and non-violent schizophrenia patients, and secondly to assess differences in the response of violent and non-violent symptom networks to antipsychotic treatment. From the Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE), published by the National Institute of Mental Health (NIMH) in 2005, we obtained a large sample size of chronic schizophrenia patients across different backgrounds and the accompanying extensive data records. Using data from the Positive and Negative Syndrome Scale, MacArthur Abbreviated Community Violence Instrument, and antipsychotic treatment, we constructed symptom networks for four groups of patients: pre-treatment non-violent, post-treatment non-violent, pre-treatment violent, and post-treatment violent. We found that violent and untreated patients have lower centrality, clustering, and node strength, and higher shortest path length – i.e. less connected symptom networks. Moreover, we found that violent patients show less predictable changes in network properties in response to antipsychotic treatment. The results have clinical implications in identifying patients at risk to become violent and exerting effective symptom management through subgroup-specific network perspective. Future studies will be required to verify results using different data sets and clinical efficacy of implementing symptom network identifiers for violence risk.