A real-world data analysis of Clinical Global Impression-Severity (CGI-S) as a transdiagnostic predictor of psychiatric hospitalisation

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BACKGROUND

Admission to psychiatric hospital can be medically [1] and socially [2] challenging for individuals. Psychiatric hospitalisation contributes to high treatment costs and high economic burden [3] of mental disorders. Reducing psychiatric admissions could therefore benefit patients and healthcare systems. Besides a few intuitive predictors (such as the illness severity or previous hospitalisations), there is a lack of transdiagnostic risk factors for hospitalisation that can be identified in clinical practice. The Clinical Global Impression-Severity (CGI-S) scale is a 7-point measurement of symptom severity, independent of diagnosis. Due to its routine use in clinical practice and ease of administration, it may have potential as a transdiagnostic predictor of hospitalisation.

OBJECTIVE: To investigate whether early trajectories of CGI-S scores predict risk of hospitalisation over a 6-month follow-up period.

METHOD

A retrospective cohort study was conducted, analysing Electronic Health Record (EHR) data from the NeuroBlu database [4] (Figure 1). The timeline, variables and primary outcome for the present study are shown in Figure 2.

Inclusion criteria
- An ICD-9 or ICD-10 code of major depressive disorder (MDD), bipolar disorder (BD), generalized anxiety disorder (GAD), post-traumatic stress disorder (PTSD), schizophrenia or schizoaffective disorder (SCZ), attention deficit hyperactivity disorder (ADHD), or personality disorder (PD).
- At least 5 recorded CGI-S scores within a 2-month period, defined as the "index" period.

Exclusion criteria
- Patients who had been hospitalised before or within the index period.

Statistical analysis
- The relationship between early CGI-S trajectories and time to psychiatric hospitalisation was investigated using Cox regression.
- The analysis was adjusted for age, gender, race, number of years in education, and psychiatric diagnosis.

RESULTS

A total of 36,914 patients were included (mean [SD] age: 29.7 [17.5] years; 57.3% female). The median follow-up time was 180 (interquartile range 101-180) days (we only analysed data for 180 days). An increase by one standard deviation in clinical instability (HR: 1.09, 95 CI 1.07,9-1.10, p<0.001) and severity (HR: 1.11, 95 CI 1.09-1.12, p<0.001) were associated with an increased risk of hospitalisation (8.7% and 10.6%, respectively). Associations were consistent across all psychiatric diagnoses (Figure 3). Patients in the top 50% of the population in terms of both severity and instability were at a 45% increased risk of hospitalisation compared to those in the bottom 50% along those two dimensions (Figure 4).

CONCLUSION

Early clinical trajectories (defined as the first 2 months of CGI-S recording) reflecting clinical severity and instability were independently associated with increased risk of hospitalisation across diagnoses. This risk was compounded when instability and severity were present together. We reported only the transdiagnostic risk of clinical severity and instability, these could be integrated into more elaborate predictive models to further increase the ability to predict hospitalisation. These results have translation potential in predicting individuals who are at high risk of hospitalisation and could benefit from preventative strategies to mitigate this risk.

Limitations: 1) no distinction between voluntary and compulsory hospital admission, 2) outcome variable was the first admission, with subsequent readmissions not considered, 3) cohort included only a subset of mental disorders. 4) The observational nature of the study means that causal links cannot be inferred.

Conflicts of interest: MT is a consultant for Holmusk Inc. EOC, JK, SK, SR, RP and CL are employees of Holmusk Inc. MT is a consultant for NeuroBlu, an electronic health record (EHR) trusted research environment (TRE) to support mental healthcare analytics. RPGrant, KG, SNW, SK, RP and CL are employees of Holmusk Inc. MT is a consultant for Holmusk inc. EOCP, KG, SK, SNW, SK, RP and CL are employees of Holmusk Inc.

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