Monitoring for abnormal movements associated with tardive dyskinesia in routine care: a retrospective analysis of electronic health records

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BACKGROUND

- Tardive dyskinesia is a severe involuntary movement disorder most frequently associated with long-term antipsychotic treatment. Timely recognition of TD can facilitate appropriate diagnosis and treatment.
- Current clinical guidance recommends structured assessment using the Abnormal Involuntary Movement Scale (AIMS) at intervals ranging from 3 to 12 months, while broader expert consensus supports brief motor evaluations at each clinical encounter.[1,2]
- There is evidence that TD is underdiagnosed in clinical practice,[3,4] which may in part driven by low systematic and regular usage of monitoring tools in antipsychotic-treated populations.

Objective

- This study investigated and described real-world longitudinal usage of AIMS as a tool for monitoring abnormal movements during routine clinical care.

METHODS

Study design and data source

- A retrospective descriptive analysis of de-identified EHRs, collected as part of provision of routine mental healthcare across the U.S. throughout years 1999 – 2025 (NeuroBlu Data V25R1).

Population

- The population of interest was adult patients eligible for AIMS monitoring.
- Eligible for AIMS monitoring was defined as those with a: i) psychiatric diagnosis requiring long-term antipsychotic treatment (schizophrenia spectrum disorder, major depressive disorder with features of psychosis, bipolar disorder with features of psychosis), ii) exposure to an antipsychotic of any formulation for any duration, iii) no prior evidence of tardive dyskinesia or another movement disorder (**Figure 1**).
- All diagnoses were identified via presence of International Classification of Disease (ICD) version 9 or 10 codes. Evidence of tardive dyskinesia was defined as ICD code G24.01 or a prescription of an indicated VMAT-2 inhibitor.
- Patients with at least one complete AIMS record were include, defined as AIMS items 1-7.

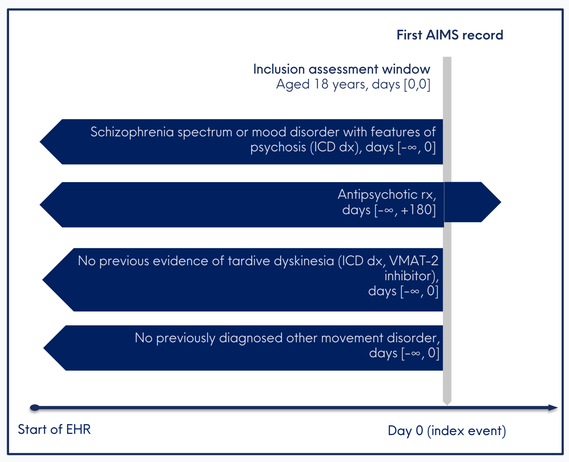


Figure 1. Temporality for inclusion into the study cohort. No previously diagnosed movement disorders related to ICD codes for Huntington's, Parkinson's, Wilson's, tic disorders, or dystonias). EHR – electronic health record, dx – diagnosis, rx - prescription

Time-related definitions

- Given the exploratory and descriptive nature of the analysis, no cap was applied to the maximum pre or post index follow-up period (**Figure 2**).

Figure 2. Schematic of individual-level follow-up.

Analysis

- Descriptive statistics were utilised to characterise the population at first recorded AIMS assessment and investigate the nature of AIMS monitoring. Description included:
  - At the first recorded AIMS assessment (index event)
    - Demographic characteristics at the index event
    - Distribution of total AIMS scores
  - Across the pre-index period
    - Antipsychotic treatment characteristics
    - Total length of available clinical follow-up
  - Across the post-index period
    - Number of AIMS assessments per person
    - Number of days between consecutive assessments
    - Total length of available clinical follow-up
- Heatmaps were used to visualise consecutive scores related to severity of movements across distinct bodily locations.

RESULTS

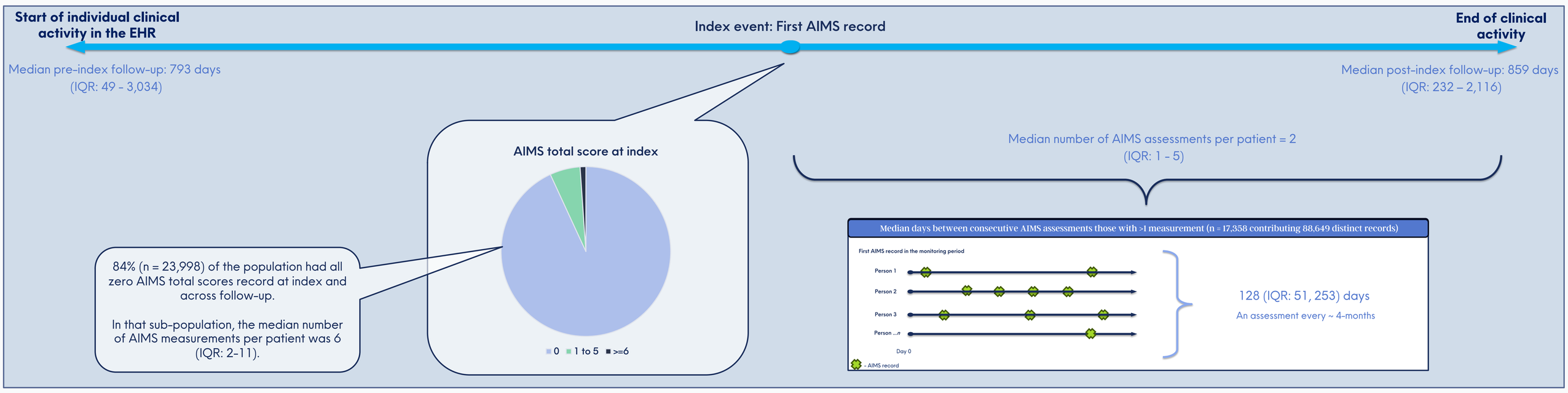
Demographic characteristics

- A total of 28,555 patients met the eligibility criteria (mean age = 38.8, SD: 13.0 years, 61.2% male).
- 38.1% of the population had a schizophrenia diagnosis recorded prior to first AIMS assessment, 32.2% had a schizoaffective disorder diagnosis, 22.5% had a diagnosis of major depressive disorder with features of psychosis, and 18.9% had a diagnosis of bipolar disorder with psychosis. Of note, diagnostic groups are not mutually exclusive and therefore a single patient may have more than one diagnostic record.

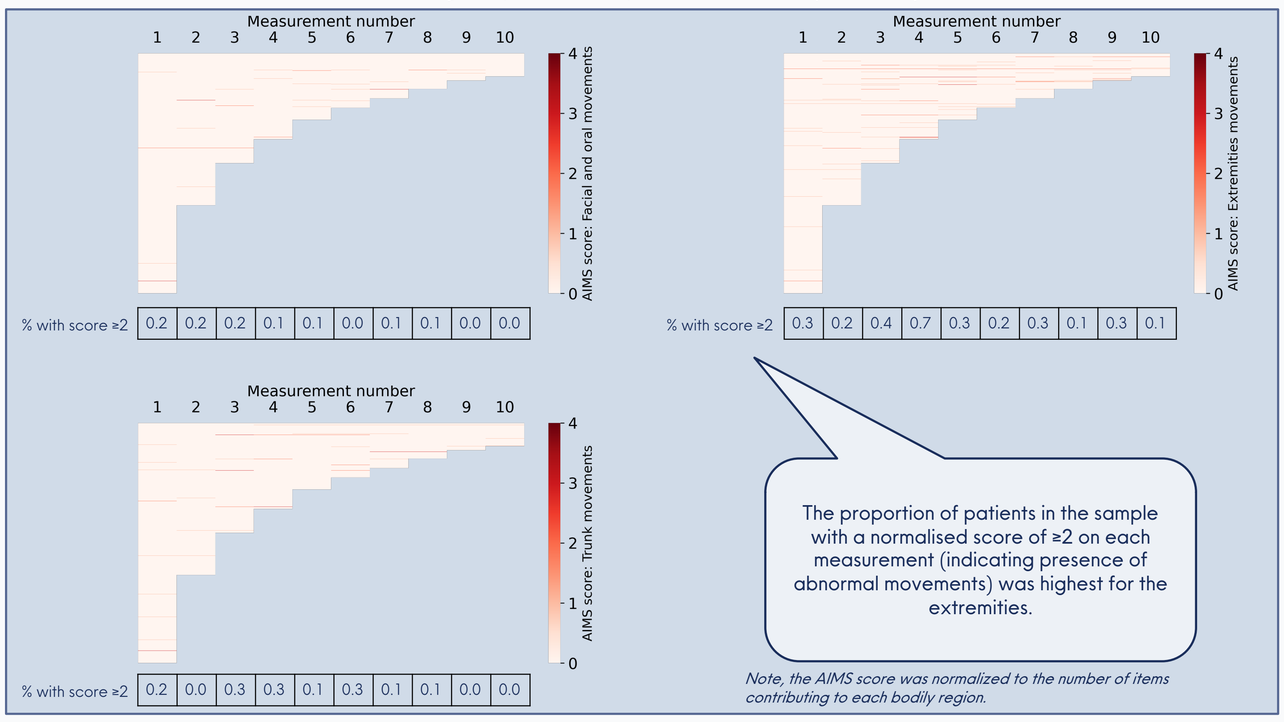
Treatment characteristics

- 87% (n = 21,912) of the population had evidence of antipsychotic treatment before the initial AIMS assessment. The remaining 13% of the population were first exposed to an antipsychotic within the first 6-months following the index event.
- In those with antipsychotic exposure during the pre-index period (n = 21,912), the median proportion of days covered with any antipsychotic treatment was 0.5 (IQR: 0.1– 1.0).
- 71.4% of the population were prescribed at least one second-generation antipsychotic, and 26.5% were prescribed at least one first-generation antipsychotic in the month surrounding first AIMS record.

Evidence of AIMS monitoring



Severity of abnormal movements over consecutive measurements in a random sample (n = 1,000), stratified by bodily location



Note, the AIMS score was normalized to the number of items contributing to each bodily region.

CONCLUSION & LIMITATIONS

- This descriptive study of EHR data finds evidence of AIMS monitoring in routine clinical care. Monitoring was initiated in patients both with and without evidence of abnormal involuntary movements as indicated by AIMS total scores.
- Almost three-quarters of the population were exposed to a second-generation antipsychotic, which is consistent with clinical understanding of tardive dyskinesia as a risk factor following treatment with both first and second-generation compounds.
- Repeat AIMS assessments in those with all zero total AIMS provides evidence of continued monitoring in this population and is consistent with usage of AIMS as a tool to screen at-risk populations.
- Population-level descriptives indicate the frequency of consecutive assessments broadly aligns with clinical guidelines, such as those provided by the American Psychiatric Association[1]. Future analyses are required to better understand the role of known risk factors for TD and other clinical characteristics in the frequency of AIMS assessments.

Limitations

Real-world data are not collected with the goal of conducting research and, therefore, have limitations in clinical research. There is a possibility for the data to be incomplete and to represent some populations better than others (selection bias). In addition, the clinical decision-making context cannot be assessed, nor care received in settings not captured by NeuroBlu Data.

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