

Determining the Demographic and Health Characteristics of Patients with Cognitive Impairment Associated with Schizophrenia: A Non-interventional Study of Real-World Data

PS04-3259

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Introduction

1 UNMET NEED

CIAS is common but currently has no standardised diagnostic code or approved pharmacological treatment, hindering routine assessment in clinical practice¹

2 NLP

Mascio et al. developed an NLP method to identify cognitive problems in the EHRs of patients with schizophrenia and demonstrated its application to a large representative patient sample²

As cognition-related observations are often captured in unstructured medical records in clinical practice, NLP models have the potential to identify and characterise patients with CIAS from real-world healthcare datasets

Aim

To use NLP models to identify patients with CIAS and to compare the demographic and clinical characteristics of patients with schizophrenia with and without CIAS

Methods

Study design

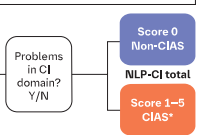
Non-interventional study (1 Jan 2005 to 31 Dec 2023)

Data source

- Akviva Health dataset
- RWD from mental healthcare services in England and Wales
- De-identified and anonymised data from 4.6 million patients



- Attention
- Executive functioning
- Social cognition
- Memory
- Generic cognition



*Higher NLP-CI score denotes impairments in a greater number of CIAS domains. Further details of these methods are described in PS04-3258 'Development of a Natural Language Processing Model to Identify Patients with Cognitive Impairment Associated with Schizophrenia from a Real-World Dataset'

Key inclusion criteria

- ≥18 years of age at schizophrenia diagnosis
- First schizophrenia diagnosis (according to ICD-10 code F20) within the study period
- Clinical notes within the study period

Key exclusion criteria

- Presence of dementia, mild CI or intellectual disability
- First diagnosis of schizophrenia outside the study period
- Non-binary gender or gender missing

Outcomes

- Baseline demographic characteristics
- Mortality (%) and age at death
- Smoking history (during study period)
- Psychiatric comorbidities (between start of study and ≤5 years from schizophrenia diagnosis, or end of study)
- Physical comorbidities (according to ICD-10 codes of Charlson Comorbidity Index; between start of study and ≤5 years from schizophrenia diagnosis, or end of study)
- Use of individual medications and medication classes (between start of study and ≤5 years from schizophrenia diagnosis, or end of study)
- Inpatient admissions (between start of study and ≤2 years from schizophrenia diagnosis, or end of study)

Data analysis

- All outcomes were reported descriptively and stratified by CIAS status and NLP-CI score
- Binary analysis (Mood's median test for continuous variables and Chi-squared test for categorical variables) assessed differences by CIAS status
- Ordinal analysis (Kruskal-Wallis test for continuous variables and Chi-squared test for categorical variables) assessed differences by NLP-CI scores
- Univariate and multivariable logistic regression adjusted for demographic and clinical characteristics to test the associations between CIAS status (binary analysis) and patient characteristics

Abbreviations

CIAS, cognitive impairment associated with schizophrenia; CI, cognitive impairment; COPD, chronic obstructive pulmonary disease; EHR, electronic health records; ICD-10, International Classification of Diseases, 10th Revision; IQR, interquartile range; MDD, major depressive disorder; NLP, natural language processing; OR, odds ratio; RWD, real-world data; SSRI, selective serotonin reuptake inhibitor; SUD, substance use disorder.

Disclosures

AW and SSR are employees of Boehringer Ingelheim International GmbH. TC is an employee of Boehringer Ingelheim Pharmaceuticals, Inc. MF is an employee of Boehringer Ingelheim Ltd. GB and CU are employees of Akviva Health. BP has received grant funding from the National Institute for Health and Care Research (NIHR 201690), the Medical Research Council (MR/R020318/1), the Academy of Medical Sciences (20191020), and Janssen. She has participated in Scientific Advisory Boards for Boehringer Ingelheim and Teva, and received consulting fees from Hologic, Akviva Health, Columbia Data Analytics, Ciplatis, Social Finance, Boehringer Ingelheim, Bristol Myers Squibb, Sunovion, Teva and Otsuka.

Acknowledgements

The authors meet the criteria for authorship as recommended by the International Committee of Medical Journal Editors. This study was funded by Boehringer Ingelheim International GmbH. Writing, editorial support, and formatting assistance were provided by Pilar Ferris, MSc, of Akviva Health Global Limited, funded by Boehringer Ingelheim International GmbH.

Key Conclusions

- In this non-interventional study, CIAS was identified in approximately 60.0% of adults with schizophrenia using NLP models applied to unstructured EHR data
- The presence vs absence of CIAS in patients with schizophrenia was associated with younger age at schizophrenia diagnosis, female sex, White ethnicity, greater smoking history; greater number of recorded psychiatric comorbidities, physical comorbidities, medications and inpatient admissions (Figure 1)

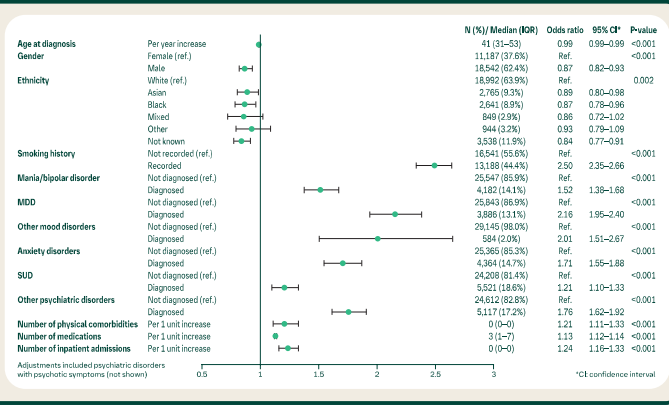


Figure 1. Forest plot displaying adjusted ORs between CIAS and patient characteristics

Results

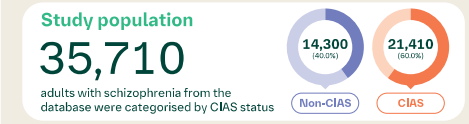
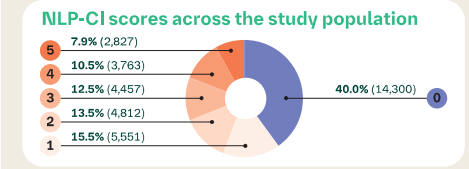


Table 1. Baseline demographics

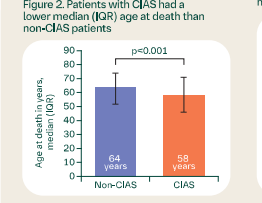
	Non-CIAS (n=14,300)	CIAS (n=21,410)
Age at diagnosis in years, median (IQR)	45.0 (34.0-56.0)	40.0 (30.0-51.0)
Sex, n (%)		
Female	5,066 (35.4)	8,133 (38.0)
Male	9,234 (64.6)	13,277 (62.0)
Ethnicity, n (%)		
White	8,977 (62.8)	14,569 (68.0)
Asian	1,101 (7.7)	1,871 (8.7)
Black	1,079 (7.5)	1,866 (8.3)
Mixed	331 (2.3)	658 (3.1)
Other	401 (2.8)	660 (3.1)
Not known	2,409 (16.8)	1,786 (8.3)



Orange: CIAS, Purple: non-CIAS. Higher NLP-CI score denotes impairments in a greater number of CIAS domains.

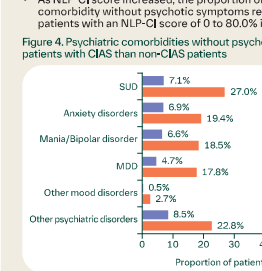
Mortality

- Recorded mortality was lower in CIAS than non-CIAS patients: 6.9% vs 12.2%; p<0.001
- Patients with CIAS were younger at the time of death compared with non-CIAS patients (Figure 2)



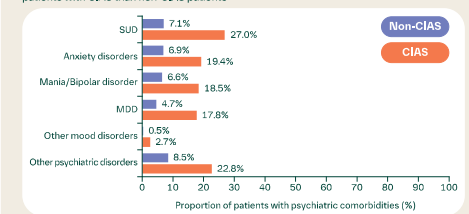
Smoking history

- A greater proportion of patients with CIAS had a recorded smoking history than non-CIAS patients (Figure 3)



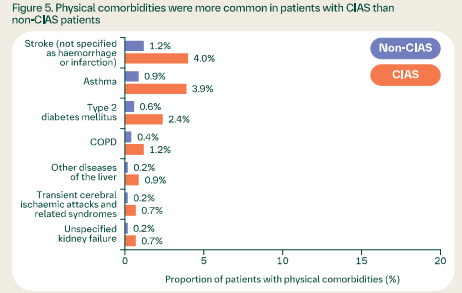
Comorbidities

- Psychiatric comorbidities
 - The most common psychiatric comorbidities without psychotic symptoms were SUD, anxiety disorders, mania/bipolar disorder and MDD (Figure 4)
 - A greater proportion of patients with CIAS had ≥1 psychiatric comorbidity without psychotic symptoms than non-CIAS patients: 60.3% vs 26.0%; p<0.001
- As NLP-CI score increased, the proportion of patients with ≥1 psychiatric comorbidity without psychotic symptoms recorded increased from 20.0% in patients with an NLP-CI score of 0 to 80.0% in those with a score of 5 (p<0.001)



Physical comorbidities

- The most common physical comorbidities were stroke, asthma, type 2 diabetes mellitus and COPD (Figure 5)
- A greater proportion of patients with CIAS had ≥1 physical comorbidity than non-CIAS patients: 15.1% vs 4.6%; p<0.001
- As NLP-CI score increased, the proportion of patients with ≥1 physical comorbidity recorded increased from 4.6% in patients with an NLP-CI score of 0 to 28.2% in those with a score of 5 (p<0.001)



Medication use

- The median (IQR) number of distinct medications recorded was higher for patients with CIAS than non-CIAS patients: 5 (2-10) vs 1 (0-3); p<0.001
- As NLP-CI score increased, the median (IQR) number of recorded medications increased from 1 (0-3) in patients with an NLP-CI score of 0 to 13 (7-24) in those with a score of 5 (p<0.001)
- The top 3 most commonly used psychiatric medications were used by a larger proportion of patients with CIAS than non-CIAS patients:

Medication	Non-CIAS	CIAS
Olanzapine	17.0%	37.6%
Aripiprazole	9.5%	25.6%
Risperidone	9.7%	24.0%

Medication class	Non-CIAS	CIAS
Atypical/second-generation antipsychotics	46.1%	75.8%
Benzodiazepine-derivative sedatives/hypnotics	11.8%	42.4%
Other sedatives/hypnotics	9.6%	36.3%
SSRIs	14.0%	30.3%
Typical/first-generation antipsychotics	11.7%	24.2%
Anticonvulsants	5.6%	17.7%
Other antidepressants	5.6%	15.2%

Inpatient admissions

- The majority of patients with and without CIAS had no inpatient admissions recorded. However, a greater proportion of CIAS patients had ≥1 inpatient admission than non-CIAS patients: 24.4% vs 6.5%; p<0.001

Regression analysis

- All associations between CIAS status and patient characteristics remained following adjustment for demographic and clinical characteristics (Figure 1)

Additional Conclusions

The proportion of adults with schizophrenia determined to have CIAS in this study (50.0%) is comparable to the 55.0% prevalence reported by Mascio et al. who developed the NLP approach². However, the 60.0% CIAS prevalence is lower than that of previous studies, in which the prevalence of CIAS typically exceeds 80.0%.³⁻⁷ This may be attributable to the underreporting of CIAS in EHRs, or differing study methodology in terms of the inclusion criteria, neuropsychological tests, or the NLP data extraction algorithms employed.

The identification of CIAS and associated characteristics in patients with schizophrenia demonstrated the application of NLP to characterise CIAS in clinical practice and may inform tailored treatment strategies for affected patients.

