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Review of the use of electronic health records for advancing schizophrenia research in the UK

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Introduction and objectives

Schizophrenia is a severe and complex mental health disorder with considerable clinical heterogeinty.[1] There remains an unmet need for tailoring current antipsychotic treatments and supporting the development of new personalized therapeutic strategies that maintain remission[2] and improve functional outcomes.[3]

Electronic health records (EHRs) are digital versions of patients' medical history stored as structured (diagnostic and demographic information) and unstructured (ward/clinic notes, admissions, referral or discharge letters, test results) data. EHRs are emerging as a promising real-world data (RWD) source to advance the use of mental health treatments based on individual patient characteristics, in part by better characterizing predictors of treatment response and patterns.[4,5]

Analyzing mental health EHRs, however, is more challenging than physical health EHRs. One key issue is that most psychiatric assessments in routine clinical practice are stored as unstructured free text that require recoding into structured data before being analyzed.

EHR data from the UK's National Health Service (NHS) is considered to be a rich RWD source.[6] Given this, the purpose of this study is to identify the current state of EHR use in schizophrenia research in the UK.

Methods

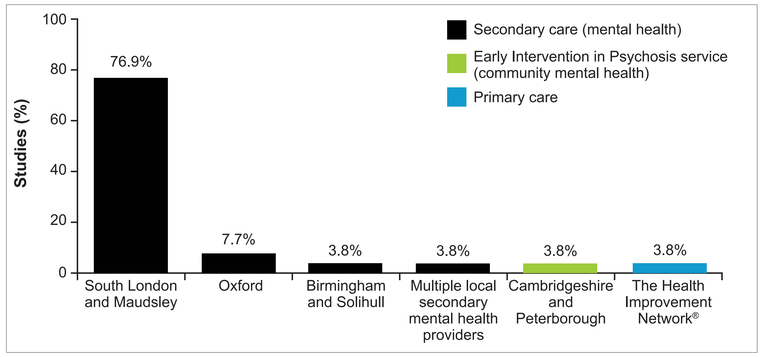
A literature review was conducted by searching electronic databases (PubMed and Google Scholar) for research articles reporting any use of EHR for schizophrenia research in the UK, between January 1, 2019, and December 31, 2023. The number of hits from Google Scholar was limited to the first 100 hits. Studies were included if the patient population examined were adults (aged 18 years and above) diagnosed with a schizophrenia-spectrum disorder. Publications were reviewed for their data source, links to other datasets, the main study objectives, and the use of natural language processing (NLP) to extract unstructured clinical text data. Of the 192 articles screened, 26 eligible articles were included for analysis.

Results

Studies were most frequently sourced from local secondary mental health NHS foundation trusts (84.6%, 22/26), of which the South London and Maudsley NHS Foundation Trust was the most common source (81.8%, 18/22) (Figure 1). Only one study reported sourcing EHRs using a local Early Intervention in Psychosis service, and another study used a national primary care database (The Health Improvement Network®).

Just over one-fifth of all EHR studies identified (23.1%, 6/26) were linked to other electronic databases. These databases included the Zaponex Treatment Access System (n = 2), national mortality database (n = 2), a local pharmacy database (n = 2), the Hospital Episode Statistics database (n = 1), and the UK Biobank (n = 1).

Figure 1: Proportion of UK EHR studies (2019-2023) in schizophrenia by source of EHR (N = 26)

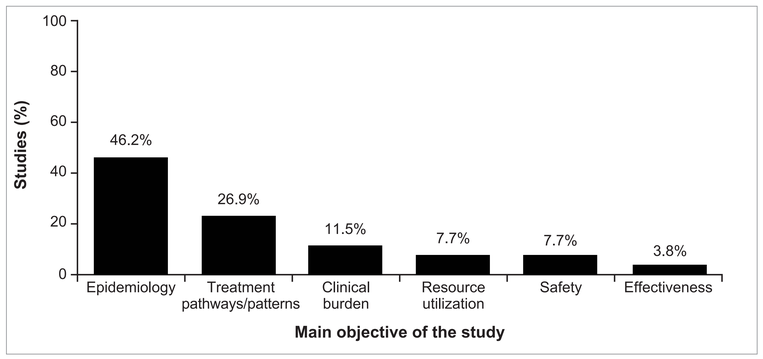


The most frequent main study objective among all eligible studies was epidemiology (46.2%, 12/26). Within these epidemiology studies, objectives were distributed fairly evenly across subcategories such as etiology, prediction, occurrence of cardiovascular risk factors, physical comorbidities, or mental health comorbidities, and validation of the linkage to another database.

Just under two-thirds of all studies (65.4%, 17/26) used NLP to extract unstructured clinical text data. Among these studies, which included substance misuse variables (cannabis, nicotine, alcohol, opiates) in their analysis, all were extracted by NLP. For the studies that examined antipsychotic prescribing as either an outcome or predictor variable, two-thirds (66.7%,4/6) reported using NLP to obtain the variable.

Among the studies assessing treatment response to antipsychotics (n = 3), all utilized a clinician-rated outcome measure, specifically either the Clinical Global Impression-Improvement or Clinical Global Impression-Severity scales. These measures were manually coded by researchers using unstructured data from the EHRs.

Figure 2: Proportion of UK EHR studies (2019-2023) in schizophrenia by the main study objective (N = 26)



Conclusions

EHR publications in schizophrenia research should draw data from a wider geographic range of NHS mental health trusts, given that there are 54 mental health trusts in England.[7] Additionally, there should be a greater emphasis on incorporating data from primary care EHRs.

Cannabis is one of the most frequently used illicit drugs in patients with schizophrenia and it is associated with a higher proportion of adverse outcomes compared with non-users.[8] Information on cannabis use would be more readily accessible if it was incorporated in structured EHR data fields rather than solely relying on NLP to extract insights from unstructured data.

Increasing the number of integrated EHR studies that link secondary mental health service datasets to primary care and other national databases will enhance our ability to ensure more complete data for schizophrenia research. But more importantly, integrated EHR studies will support bridging the gap towards "precision psychiatry", where schizophrenia care is individualized for each patient.

References

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