- Smokers unexpectedly exhibited higher folate levels (4.70 ± 2.73 vs. 1.94 ± 1.86; p=0.036).

No significant correlations were found between biomarkers and PANSS or SAS scores.

Conclusion: In addition to global reductions in cortisol and folate in schizophrenia, this study identifies distinct biomarker signatures linked to smoking, thyroid dysfunction, and psychiatric history. These findings underscore the importance of accounting for metabolic and lifestyle factors when interpreting peripheral biomarkers in psychiatric research and clinical practice.

Abstracts were reviewed by the RCPsych Academic Faculty rather than by the standard *BJPsych Open* peer review process and should not be quoted as peer-reviewed by *BJPsych Open* in any subsequent publication.

Fairness-Aware Machine Learning for Predicting Recovery and Dropout in NHS Talking Therapies

Mr Dominic Shipman[1,2] and Dr Anastasia Ushakova[1]

[1]Lancaster Medical School, Lancaster, United Kingdom and [2]Lancashire and South Cumbria NHS Foundation Trust, Preston, United Kingdom

doi: 10.1192/bjo.2026.11126

Aims: Depression represents a leading cause of disability in England, with NHS Talking Therapies providing evidence-based psychological treatments to over 1.8 million people annually. Despite overall effectiveness, persistent disparities in recovery and engagement exist across demographic groups, particularly by age and ethnicity. Predictive modelling offers an opportunity to identify patients at risk of dropout or non-recovery, but few studies have evaluated such models for fairness.

This study aimed to develop and evaluate fairness-aware machine learning models to predict recovery and dropout in NHS Talking Therapies using early-treatment clinical data. In addition to assessing predictive performance, the study quantified algorithmic fairness across demographic groups, focusing on disparities in true positive rates by age and ethnicity. We hypothesised that integrating fairness constraints into model training would reduce demographic disparities while preserving predictive performance, thereby supporting more equitable and targeted service delivery.

Methods: This study analysed routinely collected clinical data from 33,341 patients discharged from an NHS Foundation Trust in North-West England between January 2024 andJuly 2025. Outcomes included dropout after assessment, dropout before session four, and recovery following at least one therapy session. Predictor variables comprised demographic characteristics, referral pathway, and item-level Patient Health Questionnaire-9 (PHQ-9) responses, including early symptom change. Baseline models included L2-regularised logistic regression and Extreme Gradient Boosting (XGBoost). Performance was evaluated using the Area Under the Receiver Operating Characteristic Curve (AUROC), accuracy, and Equal Opportunity (parity in true positive rate (TPR)) across age, gender, and ethnicity. A custom fairness-aware XGBoost model was developed using a dynamic dual-ascent regularisation controller to reduce subgroup disparities during training.

Results: Baseline models showed moderate discrimination (AUROC 0.65 for dropout after assessment; 0.75 for recovery), with logistic regression performing similarly to XGBoost. However, substantial disparities were observed, with TPR gaps exceeding 0.40 across age groups and 0.30 across ethnic groups. The fairness-aware XGBoost model maintained discrimination (AUROC 0.64–0.74) while markedly reducing subgroup disparities, achieving up to an 84% reduction in age-related gaps, approximately 50% in gender, and 40% in ethnicity, with only a minimal reduction in overall accuracy.

Conclusion: These findings demonstrate that fairness-aware optimisation can mitigate demographic disparities in predictive modelling for mental health services while preserving predictive performance. To our knowledge, this represents the first application of fairness-constrained machine learning in NHS Talking Therapies. Such approaches could support more equitable, data-driven care pathways when implemented as clinician decision-support tools with ongoing fairness monitoring.

Abstracts were reviewed by the RCPsych Academic Faculty rather than by the standard *BJPsych Open* peer review process and should not be quoted as peer-reviewed by *BJPsych Open* in any subsequent publication.

Integration of AI in Diagnostic Methods for Dementia -A Scoping Review

Dr Natasha Singh[1] and Miss Alexandra Minseo Kim[2]

[1]Darent Valley Hospital, Dartford, United Kingdom and [2]University of Lancashire, Preston, United Kingdom

doi: 10.1192/bjo.2026.11127

Aims: To discuss the potential role of artificial intelligence (AI) in different diagnostic interventions in dementia.

Methods: A literature search was conducted in PubMed on 6 February 2026 using the terms "*artificial intelligence*" AND "*dementia*". The search identified 5257 records, which were limited to publications from 2021–2026, yielding 3598 records. Filters for free full-text availability and study type (clinical trials, randomized controlled trials, systematic reviews, meta-analyses, and reviews) were applied, resulting in 303 articles.

Inclusion criteria were: (1) studies focused on the application of artificial intelligence in dementia; (2) human studies; (3) peer-reviewed articles; (4) publication within the last five years; and (5) availability of full text in English. Exclusion criteria included: (1) non-dementia populations; (2) non-AI-based methodologies; (3) conference abstracts, editorials, letters, and commentaries; and (4) animal or simulation-only studies.

Titles of the 303 eligible articles were screened for relevance, resulting in 50 studies included for further analysis.

Results: Dementia is a clinical outcome of complex neurological disorders with a multitude of aetiologies and risk factors. Conventional methods in early diagnosis and management of dementia pose several risks and costs. Integrating AI with a sophisticated learning model can provide a comprehensive assessment in the diagnosis of dementia. Early diagnostic efforts can be achieved through a combination of AI-based neuroimaging such as MRI, PET, and CT scans, genetic and metabolic biomarkers supported by a robust pattern recognition algorithm. Incorporation of AI in dementia diagnosis can enable early recognition, leading to a 40% risk modification.

However, a number of methodological constraints should be noted when using AI for diagnosis like lack of algorithm development and standard definitions. Other challenges include difficulties in integrating healthcare systems, as well as data privacy and ethical concerns.

Conclusion: Artificial intelligence has significant potential to enhance the diagnosis and prognosis of dementia by improving early detection and reducing costs. Despite methodological, ethical, and integration challenges, effective collaboration between AI and medical professionals and the development of standardized approaches are essential for successful implementation in clinical practice.

Abstracts were reviewed by the RCPsych Academic Faculty rather than by the standard *BJPsych Open* peer review process and should not be quoted as peer-reviewed by *BJPsych Open* in any subsequent publication.