Headaches and Migraines in the Birmingham Pakistani Population

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Introduction

Headaches and migraines are among the most common neurological disorders globally, yet there remain significant disparities in how these conditions are diagnosed, managed, and treated across different ethnic groups. This project focuses on the Pakistani community in Birmingham, a population that comprises a substantial proportion of the city's residents. We aimed to understand ethnic variations in migraine prevalence, medication prescribing rates, and hospitalisation outcomes within Birmingham. These insights can help inform targeted interventions and support more equitable service delivery across Birmingham's GP practices. Financial support was provided as a Quality Improvement Grant from Pfizer Limited.

Methods

GP data across a 12 month period from February 2023 to February 2024 was extracted from local TPP and EMIS by the Midlands and Lancashire CSU. The data included the number of patients attending a GP appointment for a headache/migraine, and the number of migraine medication prescriptions in the last 12 months. Differences in ethnicity coding were unified using the following mappings: www.opencodelists.org/codelist/opensafely/ethnicity. From these, the prevalence of headaches/migraines and migraine prescription rates could be estimated. Pseudonymised inpatient data, provided by the BSol ICB, was also used to calculate age-standardised migraine hospitalisation rates.

While the target of our investigation is the Pakistani population in Birmingham, we have included all ethnicity groups throughout our investigation. Our points of comparison were the prevalence of headaches / migraines, migraine prescription rates, and age-standardised migraine hospitalisation rates.

We also implemented funnel plots to identify potential intervention targets at a GP level. These funnel plots allow for visualisation of significant differences in hospitalisation compared to the number of migraine-related appointments, while also accounting for the different GP population sizes.

Analysis

Figure. 1 shows significant variation in the prevalence of headache and migraine patients across ethnicity. For migraines, the Birmingham average prevalence sits at 1%, with 7 ethnicities' prevalence being significantly higher. The prevalence for the Pakistani population is statistically similar to the Birmingham average for migraines, but is significantly higher for headaches.

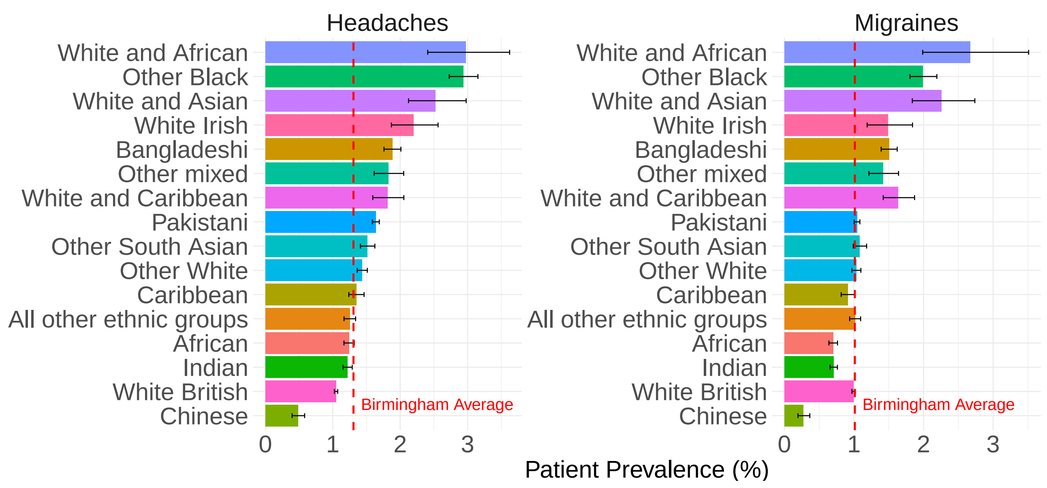

Figure 1. Graph showing the estimated prevalence of patients with migraine and headache across ethnicity. Confidence intervals were calculated using the Byar's method.

Figure. 2 shows further variation in prescription rates across ethnicity. Many ethnicities have significantly lower prescription rates for migraine medication than the Birmingham average, with only White British being significantly higher. The Pakistani cohort has a prescription rate statistically similar to that of the Birmingham average. In some cases, the prescription rate is greater than 1, meaning there have been more prescriptions than patients in the last 12 months.

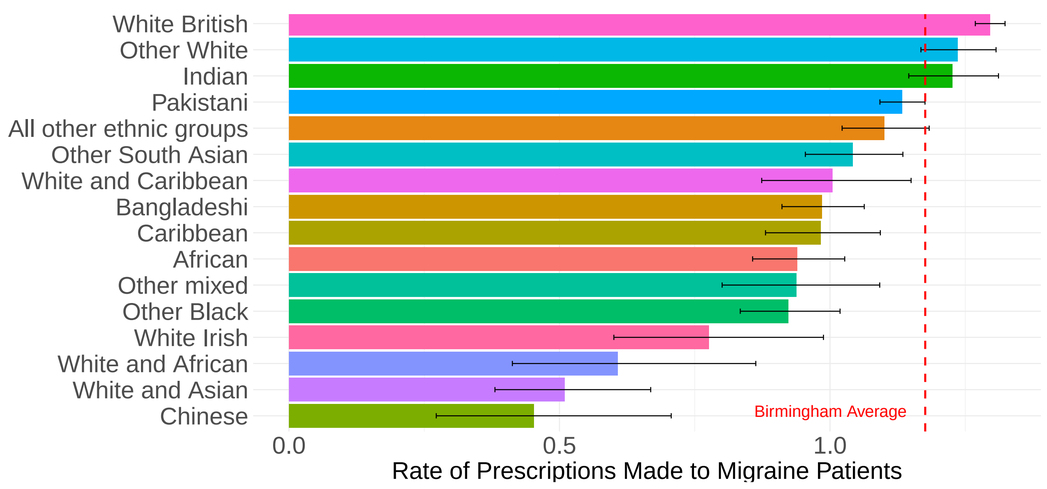

Figure 2. Graph showing the rate of prescription (Prescriptions made/ migraine patients) across ethnicities.

Figure. 3 shows the age standardised hospitalisation rate for migraines across ethnicity (2023/24). The Pakistani hospitalisation rates were 59% higher than the Birmingham average, with all other ethnic groups having rates that were statistically similar or lower.

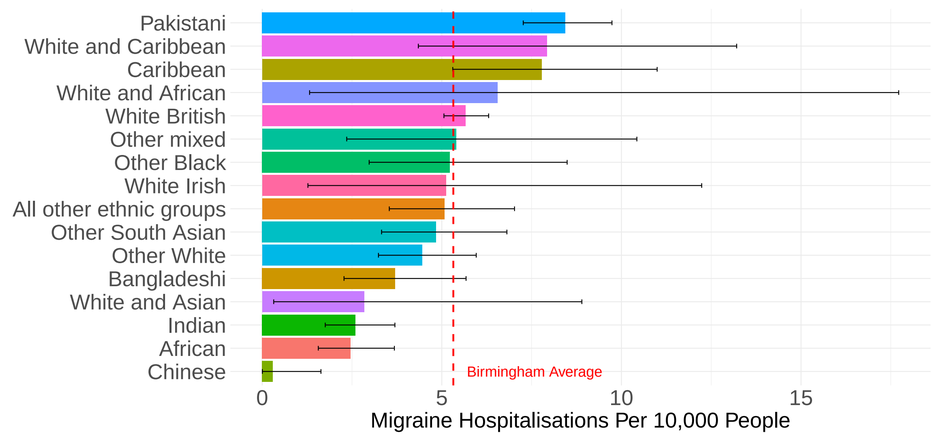

Figure 3. Age standardised Hospital admission rates (2023/24). Extracted first admissions with ICD 10 code "G43*" (Migraines)

Figure. 4 shows the proportion of migraine hospitalisations relative to the number of migraine patients for each GP in Birmingham. In total there are 12 GP's with significantly higher hospitalisations in relation to their number of migraine patients.

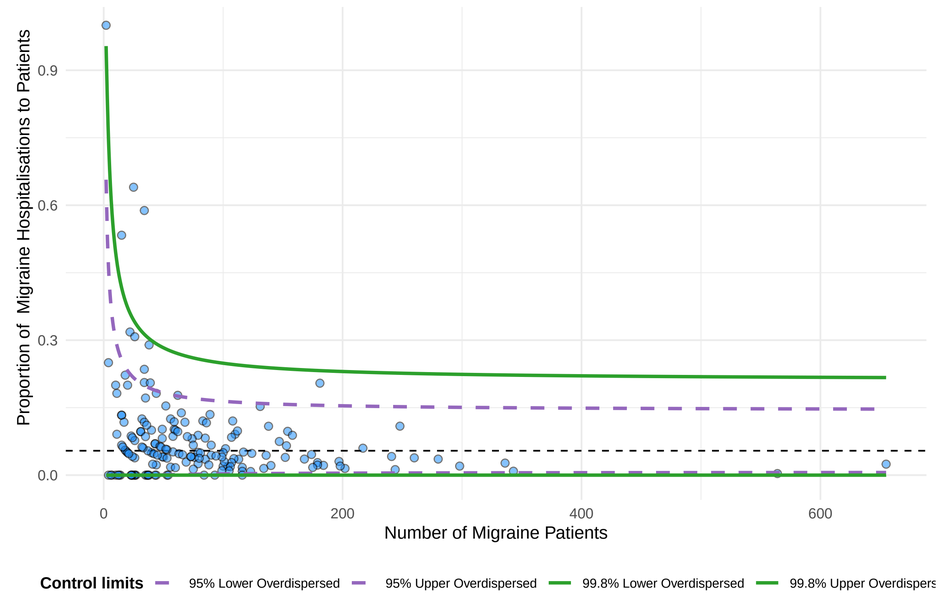

Figure 4. Proportion of Migraine Hospitalisations to the number of Migraine related GP appointments. 95 and 99 % confidence intervals calculated using the FunnelPlotR package (GitHub). GP codes have been concealed for anonymity.

Limitations

The GP data did not differentiate patients by age or gender, making it impossible to standardise for either of these factors. This however was not an issue for hospitalisation rates. There was also no indication of how many prescriptions each individual person received, since all patient/prescription data was pre-aggregated by ethnicity and GP practice. Additionally, since non-migraine specific medication was not included, migraine medication prescription rates may be underestimated.

It is important to note that the prevalences stated here may indicate how frequently migraines are documented rather than how often they actually occur. A low prevalence in a particular group, therefore, does not necessarily mean those individuals are less prone to migraines; it could simply mean their symptoms are not being reported to or recorded by GPs as often.

Conclusions

Our analysis reveals notable ethnic disparities in the recording, treatment, and outcomes of headaches and migraines across Birmingham. While the Pakistani population exhibits a migraine prevalence and prescription rate broadly in line with the citywide average, their age-standardised hospitalisation rate is markedly higher—59% above the Birmingham average. This discrepancy suggests potential gaps in early intervention or access to appropriate care pathways for this community.

Through the use of funnel plots, we identified a subset of GP practices where migraine-related hospitalisations are significantly elevated relative to patient numbers. These practices present key opportunities for targeted intervention, service improvement, and further qualitative investigation.

This project lays the foundation for exploring how ethnicity intersects with healthcare recording practices, patient engagement, and access to care. Our findings support the need for more nuanced, equity-focused approaches to migraine management in Birmingham, and reinforce the value of combining population-level analytics with local healthcare intelligence.

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