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Commentary

Management of BAME patients with a history of penicillin allergy: barriers to best practice and strategies to overcome these

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Antimicrobial resistance (AMR) and health inequalities

The Coronavirus disease 2019 (COVID-19) pandemic exposed global health inequalities [1,2]. The risk of severe COVID-19 infection, admission to intensive care and death increased in Black, Asian and minority Ethnic groups (BAME), in patients with existing co-morbidities and in lower socio-economic status [1]. AMR is a global public health concern [3], often described as the 'silent pandemic' which globally has a greater impact on mortality in the lowest income regions of the world [4] and may have a greater impact on mortality in BAME and lower socio-economic groups in the UK and the USA. One retrospective study in the USA found rates of blood stream infections and

urinary tract infections were higher in hospitalised non-Hispanic Blacks and Hispanics, compared to non-Hispanic Whites [5]. An observational study in the UK found extended spectrum beta-lactamase producing *Enterobacteriales* in urine specimens were more likely in patients from an Asian ethnic background compared to white British patients [6]. Global antimicrobial stewardship (AMS) efforts are on-going with high income countries often dictating interventions to help reduce the burden of AMR [2]. Further research is required to understand whether these efforts are equitable from an ethnicity and socio-economic perspective. Health inequalities, the rise in AMR and the use of alternative second-line antibiotics to treat antibiotic resistant infections, further increases the burden of multi-drug resistant infections.

The threat of spurious penicillin allergy labels (PALs)

Another factor contributing to this 'silent pandemic' is a spurious (or false) penicillin allergy label (PAL). Patients with PALs often receive broader-spectrum, second-line antibiotics [7], which increases the risk of healthcare associated infections (HCAs) and AMR bacterial infections e.g. *Clostridioides difficile*, *methicillin resistant Staphylococcus aureus* or *Vancomycin resistant enterococci*. These patients have up to a 50% increased risk of post-operative surgical site infections, delayed antibiotic treatment in sepsis, poorer clinical

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outcomes in bacterial pneumonia, prolonged inpatient stay and overall healthcare costs are increased [7,8].

The burden of a PAL in the BAME community

The prevalence of a PAL is approximately 6% [9] in the UK population and 10% [10] in USA. However, 90–95% [7,9,10] of PALs are found to be spurious after taking a detailed allergy history and allergy testing. The prevalence of PALs in the BAME community are unknown because the small numbers of studies are conflicting. A US study found PALs more common in African Americans than Asians or Caucasians [11] but another US study found White patients were more likely than Black and Asian patients [12] to have a PAL. Determining the prevalence of PALs in the BAME community is difficult because:

- reporting and interpretation of a PALs are not standardised.
- antibiotics may be obtained without prescription [6], therefore allergy records may not be updated.
- increased consumption of alternative non-penicillin antibiotics due to AMR in these patients groups

The prevalence of PALs in different socio-economic groups is also not fully understood. West *et al.* found PALs more common in affluent patients compared to less affluent patients in the UK [9]. Further research is needed to better understand the prevalence of PALs in both BAME groups and different socio-economic groups in the UK and internationally.

Management of a PAL in BAME patients

Several studies have shown that drug allergy documentation is poor (and occasionally missing) in medical records of hospitals and emergency departments [13,14]. Reinhart *et al.* reported that in a BAME populations whom have lower rates of English fluency, allergy status documentation was just 37.5%, compared to 84.6% in the White population ($P < .001$) [15]. Another study found a huge discrepancy rate of 41% in PALs within the Black population, the most common being omissions [16]. Only 18% of the studied BAME population had a complete allergy record [16].

A study in the USA explored disparities in mortality rate for fatal drug anaphylaxis and found Black race and older age significantly increased mortality risk ($P < .001$) [13].

Severe delayed hypersensitivity reactions were disproportionately reported in BAME populations compared to the White population. Although there may be some genetic predisposition explaining the difference, other factors cannot be ignored [13].

AMS strategy: rationalising PALs

Investigation of a PAL is an important AMS strategy. PALs can be categorised into high risk and low risk [17]. Low risk PALs are often in keeping with non-immunological reactions, reported as intolerances or drug side effects [17]. Patients with a low risk PAL can be safely de-labelled (removal of the PAL) by a non-allergy specialist, either directly from history alone or after tolerating a direct oral penicillin challenge [17]. A randomised clinical trial demonstrated the safety of direct oral penicillin challenge testing, but in a predominantly White population and so it is unclear if this research is generalisable to BAME patients [18].

Identifiable barriers to the management of PALs in BAME patients

Globally there are multiple barriers to the management of PALs in BAME patients, these may include (Figure 1):

1. Lack of awareness and education: Some BAME communities may have limited knowledge about penicillin allergies, including the symptoms, risks, and appropriate management which may prevent individuals from identifying and reporting their allergies to healthcare providers.
2. Language and communication: Language barriers prevent effective communication. If healthcare professionals and patients cannot effectively communicate it may lead to misdiagnosis or inadequate management of PALs.
3. Cultural and traditional beliefs: Cultural beliefs/practices within BAME communities can influence perceptions of PALs. These beliefs may discourage individuals from seeking appropriate medical care or adhering to prescribed

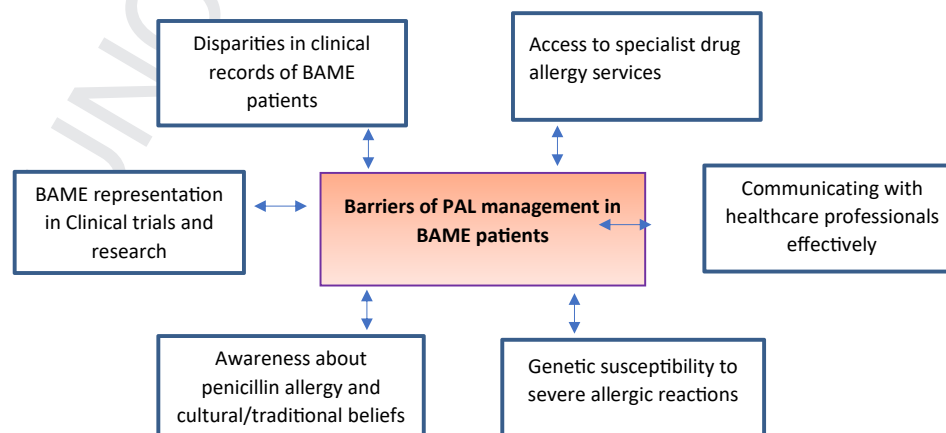


Figure 1. Barriers of PAL management in BAME patients.

treatments, potentially exacerbating the consequences of an allergic reaction.

4. Healthcare access disparities: BAME patients may experience healthcare access disparities which delay or prevent evaluation and diagnosis of PALs, leading to unnecessary avoidance of penicillin antibiotics.
5. Implicit Bias and stereotyping: Unconscious biases and stereotypes among healthcare providers may affect their perceptions and treatment of individuals from BAME communities. This can result in inadequate recognition and management of PALs.
6. Lack of diversity in clinical trials: BAME groups are under-represented in clinical trials, including studies on PALs, limiting generalizability, resulting in knowledge gaps around PALs in BAME communities.
7. Genetic factors: Genetic variations can contribute to differences in drug metabolism and immune responses, including allergic reactions. Certain BAME groups may have a higher prevalence of specific genetic variations associated with penicillin allergy.

Penicillin allergy de-labelling (PADL): addressing health inequalities

Nationally and globally, we need to improve patient education of the adverse impact of a spurious PALs on AMS and AMR. Education should be equitable from an ethnicity and socio-economic point of view. Better understanding of attitudes and behaviours of BAME patients and of patients from different socio-economic backgrounds will help to develop resources for an effective education campaign, to raise awareness and empower patients to question their allergy status rather than simply accepting a potentially spurious allergy label. Digitalisation of healthcare databases doesn't always offer the advantage of automated transfer of patient specific data, increasing the risk of re-labelling if a PAL has

been removed. Digitalisation of the UK's NHS is complex and inconsistent in terms of the accurate transfer of patient specific information across different interfaces e.g., from secondary care to primary care or vice versa. Advantages of empowering patients are that patients are ultimately best placed to inform healthcare professionals about their health across healthcare interfaces, including changes in allergy status. Figure 2 shows a strategic global approach to empowering BAME patients with a PAL to question their allergy status and to prompt a better understanding of their PALs. The successful implementation of PADL services depends on clinician engagement. Healthcare professionals are ethnically and socio-economically diverse and so a better understanding of healthcare professional's attitudes and behaviours, the prevention of inappropriate re-labelling, antimicrobial prescribing and AMR, is also important for PADL. This will help to implement and embed a successful PADL service for BAME communities in the UK's NHS.

Healthcare providers should receive cultural competency training to understand the unique cultural and linguistic needs of BAME patients. This will help improve communication, build trust, and ensure that patients receive appropriate care. It is also essential to promote diversity within the healthcare workforce to better serve diverse patient populations.

Addressing barriers to penicillin allergy requires collaboration among healthcare providers, community organizations, policymakers, and researchers. Partnerships with community leaders and organizations can help tailor interventions to the specific needs of BAME populations and ensure their engagement and participation in allergy management initiatives.

A PADL service needs to consider how the outcome of a de-labelling intervention can be communicated to patients effectively without the confounders of health inequalities. Patient empowerment will enable accurate transfer of information to healthcare professionals thereby preventing re-labelling.

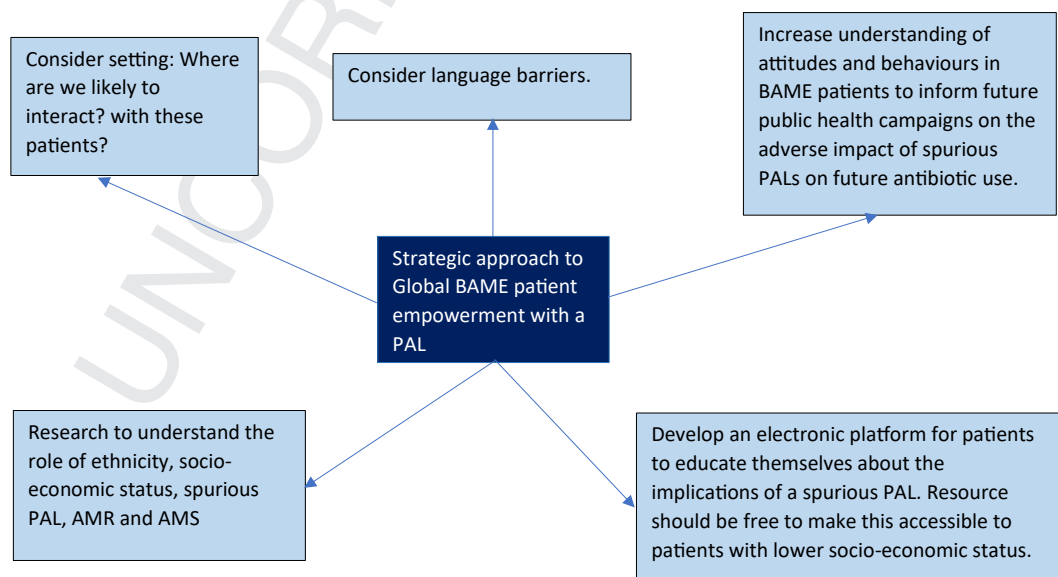


Figure 2. 'An approach to global PAL patient empowerment.

Conclusion

The prevalence of a PAL is not known in BAME communities or different socio-economic groups. Health inequalities in BAME and lower socio-economic groups contribute to AMR, as do spurious PALs.

There is a global need to understand the impact of patient specific factors such as ethnicity, socio-economic status and language barriers to facilitate appropriate and effective communication strategies for raising awareness about spurious PALs but also for communicating the outcome of de-labelling interventions so that patients can behave as vectors for preventing re-labelling and reducing further rise in multi-drug resistant infections.

Competing interests

The authors declared the following competing financial interests or personal relationships that could have appeared to influence the work reported in this paper: RB was the lead research pharmacist for the NIHR funded study 'SPACE' study that looked at non allergy specialist led penicillin allergy de-labelling. SE declared no competing interests. NP is holder of an NIHR/HEE CDRF exploring penicillin allergy de-labelling, lead educator on the BSAC MOOC education module on non-allergist penicillin allergy de-labelling, a member of the ESCMID non-allergist penicillin allergy de-labelling guideline committee., co-investigator on the NIHR SPACE penA de-label study and a PI on ALABAMA study.

Author contribution

Rashmeet Bhogal: Conceptualization, methodology, validation, resources, writing original draft, writing review and editing, visualization, supervision, project administration.

Neil Powell: validation, resources, writing original draft, writing review and editing.

Shuayb Elkhalfifa: Conceptualization, methodology, validation, resources, writing original draft, writing review and editing, visualization.

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