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VIEWPOINT

Turning the tide on bronchiectasis in adult Aboriginal Australians: from neglect to action

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Abstract

Chronic respiratory disorders are highly prevalent among adult Aboriginal and Torres Strait Islander peoples, with emerging evidence suggesting that there is a significant burden of bronchiectasis contributing to overall higher morbidity and mortality. Despite this, bronchiectasis in adult Aboriginal Australians has attracted little attention in the past few decades, and only recently is published evidence on this topic beginning to emerge. This paper highlights recent insights into the disease profiles of bronchiectasis among adult Aboriginal populations, revealing a particularly high prevalence among rural and remote residing Aboriginal people that is disproportionately higher in comparison to global diverse ethnic cohorts. Studies reveal differences in disease characteristics as well as prevalence, with higher presence of multi-morbidity, impaired lung function (spirometry), multi-lobar involvement on chest radiology and higher bacterial load measured in sputum. In addition, hospital admission rates and all-cause mortality are high, significantly influencing the economic impact. These findings highlight the need for further research into the unique characteristics of bronchiectasis in adult Aboriginal Australian patients and highlight the need for targeted action.

Discussion

Chronic respiratory disorders are highly prevalent among adult Aboriginal and Torres Strait Islander peoples (from here on ‘Indigenous’ is used to refer to global First Nations people/populations, while ‘Aboriginal Australian/population/patients/people’ is used to specifically refer to Australia’s First Nations people) with one in three individuals self-reporting a chronic respiratory condition.[1] Bronchiectasis is a chronic respiratory condition that is reported to be highly prevalent among various Indigenous populations globally.[2] The clinicopathological features of bronchiectasis include chronic cough with mucous retention and production secondary to permanent pathological dilation of the bronchial airway. This condition perpetuates a vicious cycle of recurrent infection and airway inflammation, contributing to increased hospital admission rates and higher mortality.[2] Despite the documented high prevalence of chronic respiratory disease among adult Aboriginal Australians, a comprehensive understanding of the bronchiectasis disease profile and burden within this population remains limited.[2] Existing knowledge on bronchiectasis among Indigenous populations (including the Alaskan Natives, First Nations Canadians, New Zealand Māori’s and Pacific Islanders and Aboriginal Australians) has been largely based on research representing Indigenous children and young adults.[2]

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Emerging evidence indicates that the bronchiectasis disease burden is substantial in the adult Aboriginal Australian population.[3] In the first Aboriginal Australian-specific prevalence survey conducted in the Top End region of the Northern Territory (NT) between 2011 and 2020, the prevalence was staggering – 19.4 per 1000 residents.[4] Moreover, the difference in prevalence between urban and remote communities was stark, with urban region prevalence estimated at five per 1000 and prevalence in remote regions up to 35 per 1000.[4] This is particularly concerning given that the majority of Aboriginal Australians in the NT reside in remote areas, where significant geographic and systemic barriers to healthcare persist.[3] It is likely that these prevalence estimates underestimate the disease burden, as previous studies only included those with chest computed tomography (CT) confirmed bronchiectasis,[4] excluding those without prior CT imaging or only chest X-ray evidence of bronchiectasis. Furthermore, the difference in prevalence between urban and remote locations suggests that, Australia-wide, bronchiectasis prevalence rates among Aboriginal Australians are likely to vary significantly by region. For example, in regional and remote Queensland the prevalence of bronchiectasis among adult Aboriginal Australians presenting to respiratory outreach service was 4%,[5] similar to that reported in central Australia (9.8%) as determined by a community-level survey.[6] In contrast, the prevalence was higher in the Top End of the NT, where 23% of Aboriginal adults undergoing chest CT were affected.[7] A lack of data exists to indicate the prevalence of bronchiectasis among adult Aboriginal peoples Australia-wide.[3] Previous studies showed that Aboriginal children in central Australia displayed the world's highest prevalence of bronchiectasis, at 14.7 per 1000[8]; however, the latest data indicate that the prevalence may be much higher among Aboriginal adults, particularly in the remote Top End, NT communities, with prevalence estimates in certain communities reaching up to 98 per 1000.[4] A recent study demonstrated that the overall bronchiectasis disease burden is substantially higher in Aboriginal Australian adults in comparison to most other global ethnically diverse non-Indigenous populations.[9]

Bronchiectasis appears to develop at a significantly younger age among Aboriginal Australians, with mortality following a similar pattern, with death occurring up to 20 years earlier compared to non-Aboriginal Australians living with bronchiectasis.[10,11] The primary underlying cause of bronchiectasis among Aboriginal Australians has been attributed to recurrent childhood respiratory infections.[2] In addition, a complex interplay between socioeconomic disadvantages, such as poverty, inadequate nutrition, housing conditions, overcrowding, exposure to air pollutants, including environmental smoke exposure and tobacco smoking, and the presence of other multi-morbidities that have an association with developing bronchiectasis (chronic obstructive pulmonary disease (COPD), connective tissue disease). These social determinants are compounded by limited access to healthcare, and all may have a role to play in the higher prevalence of bronchiectasis among Indigenous people.[2] Moreover, in certain Indigenous populations, the human T-lymphotropic virus type 1 (HTLV-1) is linked to bronchiectasis.[2] However, the linkage between immunity (immunoglobulin deficiency) and genetic factors influencing the development of bronchiectasis in the adult Indigenous population is less clear.[2] Furthermore, the high prevalence of childhood bronchiectasis, coupled with poor transition of care into adult health services,[8,12] ensures bronchiectasis remains a lifelong disease in this population, thereby giving rise to higher and earlier morbidity and mortality.[2,3,11] Similar to other populations, bronchiectasis among Aboriginal Australians generally exhibits a female predominance and is associated with a lower body mass index (BMI), demonstrating the systemic effects of chronic lung disease.[9]

Comprehensive literature identifying the morphological and radiological chest CT findings of bronchiectasis is limited in Aboriginal Australians. Current radiological insights suggest that bronchiectasis commonly presents as a multi-lobar disease, predominantly affecting the lower lobes with frequent associated parenchymal architectural distortion.[13] Cylindrical bronchiectasis, followed by cystic, are the most common types.[13] However, the degree of multimorbidity is high, as are concurrent chest CT abnormalities including emphysema/COPD,[7] cystic lung disease[14] and lung nodules.[15] Concurrent COPD is recorded in up to 83% of Aboriginal Australians with bronchiectasis.[9] This high co-prevalence may be driven by significant exposure to tobacco smoking and cannabis use, as well as exposure to environmental smoke due to bushfire proximity in remote areas and particular traditional cultural performances and rituals for ceremonial purposes and practical practices such as food preparation and cooking.[16,17] Lung function is significantly and disproportionately impaired among Aboriginal Australians with bronchiectasis, with the median forced expiratory volume in 1 s (FEV_1) being <50% predicted. Not surprisingly, those with concurrent bronchiectasis and COPD have even lower values for FEV_1.[3] Similar to the general bronchiectasis population, specific CT characteristics of bronchiectasis, including lobar location, extent and type, do not show any significant association with lung function parameters.[13] Although sputum microbiology data are sparsely represented in this population, recent studies indicate that *Haemophilus*, *Pseudomonas* and non-*Aspergillus* fungi are commonly present. Notably, the presence of *Pseudomonas* and yeast species have been suggested as poor prognostic indicators for this population.[18,19]

Despite the known fact that respiratory-related hospital admission rates are higher among adult Aboriginal Australians across Australia, including for patients with bronchiectasis, hospital admissions continue to soar in this specific population.[20] All-cause mortality is extraordinarily high, with approximately 30% mortality over a 10-year study period.[19] Recent findings indicate that older age, lower lung function parameters, comorbid COPD, bilateral radiological extent, history of cultured *Pseudomonas* or yeast species and history of prior intensive care unit (ICU) admissions may predict future mortality.[20] Similarly, older age, female sex, lower BMI, concurrent COPD or asthma, lower lung function parameters and history of prior ICU admissions may also predict future hospitalisations.[20] Conversely, a higher BMI, prior cultured *Haemophilus*, better lung function parameters and use of inhaled long-acting beta antagonists or muscarinic agents may predict or support a milder disease course.[19] To add further complexity, adult Aboriginal Australians with bronchiectasis have multiple and concurrent comorbidities, aside from COPD, including heart disease, diabetes, asthma and chronic kidney diseases.[9] Hence, it is difficult to ascertain if bronchiectasis is a primary or a secondary factor driving higher morbidity and mortality in this population. Additionally, the economic cost of managing Aboriginal Australians requiring acute hospital admissions secondary to exacerbations of bronchiectasis is thought to be close to AU$2.3 million per year.[21]

Although the higher prevalence of bronchiectasis among Indigenous/Aboriginal populations has been known for a considerable time, including reports dating back to 1958 in the New Zealand Māoris and Pacific Islanders,[22] there is yet to be developed a bronchiectasis severity and prognostic scale specific to Aboriginal patients with bronchiectasis. In the Australian context, the two well-established tools – the Bronchiectasis Severity Index (BSI) and the FACED scale (FEV_1, Age, Chronic colonisation with *Pseudomonas*, Extension, and Dyspnoea),[9] developed with non-Indigenous cohorts, continue to be utilised for measuring bronchiectasis severity among Aboriginal Australians. However, the validity of the BSI and FACED tools is questionable in Aboriginal adult populations as the much younger age at diagnosis, earlier mortality, significant multimorbidity and generally lower lung function parameters compromise their applicability. Additional factors that need to be considered include cultural appropriateness of Medical Research Council (MRC) dyspnoea scale and geographical isolation, which impairs access to adequate healthcare. In this context, a recent study explored the utility and validity the BSI and FACED tools in an adult Aboriginal Australian bronchiectasis cohort in the Top End NT.[23] Although, there were limitations in relation to the availability of all clinical parameters for those included, this study demonstrated that the BSI may not be ideal in an Aboriginal people's context, while the FACED was shown to be highly unreliable. Hence, it is imperative that Aboriginal population-specific bronchiectasis assessment tool be developed and assessed immediately across Aboriginal people's contexts to ensure appropriate management in regional and remote settings.

Until future concrete recommendations and guidelines are developed specific to adult Indigenous people, it is extremely critical that every effort be considered to reduce the overall bronchiectasis burden in this population. Therefore, in addition to addressing social determinants, educating patients on their bronchiectasis condition, via providing resources, and the training and upskilling of Aboriginal health workers in remote and rural areas in the diagnosis and management of bronchiectasis should be in the forefront. Further, self-management on sputum clearance and access to dedicated chest physiotherapy services and monitoring will help to prevent recurrent exacerbations and hospital admissions. Early interventions, with protocols managed through dedicated chronic disease management programmes with appropriate antimicrobial therapy if clinically indicated according to sputum culture results, will likely reduce decline in lung function. Spirometry and yearly chest X-ray when feasible may also aid in monitoring the progression of disease and impact of interventions and physiotherapy.[24]

To conclude, disappointingly, the age-standardised rate of hospitalisations and deaths from respiratory diseases among Aboriginal people (Fig. S1) has not decreased over the last decade (2010–2019). It is reasonable to speculate that these higher hospitalisation and mortality rates could be related to a higher bronchiectasis burden in this population, including the lack of dedicated Aboriginal people's specific management guidelines.[24] It is also stems from the impacts of colonisation, including intergenerational trauma, mistrust of the health system, overcrowded housing and gaps in educational and health opportunities.[25] Therefore, there is an urgent need for attention and targeted actions to address bronchiectasis in this population, and more importantly, research funding bodies need to recognise the importance of directing future clinically and culturally appropriate research in this area, fostering clinician-led research that leverages first-hand knowledge and experience in managing Aboriginal patients with chronic respiratory disorders, so that bronchiectasis does not continue to remain a neglected chronic lung disease.

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Supporting Information

Additional supporting information may be found in the online version of this article at the publisher's web-site:

Figure S1. Rate of hospitalisations (2009–2010 to 2018–2019) and deaths (2010–2019) due to respiratory disease, by Indigenous status (age-standardised). Source: www.indigenoushpf.gov.au.