

Exploring facilitators and barriers in asthma management in rural, semi-urban and urban populations in Vellore, India

Williams, Iestyn; Daniel, Jefferson; Mansur, Adel H.; Christopher, Devasahayam Jesudas; Krishna, Mamidipudi Thirumala

DOI:
[10.1111/cea.14477](https://doi.org/10.1111/cea.14477)

License:
Creative Commons: Attribution (CC BY)

Document Version
Publisher's PDF, also known as Version of record

Citation for published version (Harvard):
Williams, I, Daniel, J, Mansur, AH, Christopher, DJ & Krishna, MT 2024, 'Exploring facilitators and barriers in asthma management in rural, semi-urban and urban populations in Vellore, India: an interview study of patients and primary care physicians', *Clinical & Experimental Allergy*. <https://doi.org/10.1111/cea.14477>

[Link to publication on Research at Birmingham portal](#)

General rights

Unless a licence is specified above, all rights (including copyright and moral rights) in this document are retained by the authors and/or the copyright holders. The express permission of the copyright holder must be obtained for any use of this material other than for purposes permitted by law.

- Users may freely distribute the URL that is used to identify this publication.
- Users may download and/or print one copy of the publication from the University of Birmingham research portal for the purpose of private study or non-commercial research.
- User may use extracts from the document in line with the concept of 'fair dealing' under the Copyright, Designs and Patents Act 1988 (?)
- Users may not further distribute the material nor use it for the purposes of commercial gain.

Where a licence is displayed above, please note the terms and conditions of the licence govern your use of this document.

When citing, please reference the published version.

Take down policy

While the University of Birmingham exercises care and attention in making items available there are rare occasions when an item has been uploaded in error or has been deemed to be commercially or otherwise sensitive.

If you believe that this is the case for this document, please contact UBIRA@lists.bham.ac.uk providing details and we will remove access to the work immediately and investigate.

Exploring facilitators and barriers in asthma management in rural, semi-urban and urban populations in Vellore, India: An interview study of patients and primary care physicians

To the Editor,

The Global Burden of Disease (GBD) study reported an estimated 269 million patients with asthma worldwide, including approximately 35 million in India.^{1,2} Whilst prevalence of asthma and other allergic conditions such as eczema is relatively low, the substantial population burden is exacerbated by patchy health service frameworks, lower health literacy levels in rural areas, and high levels of indoor and outdoor air pollution. These make management of asthma challenging in India (Krishna, Krishna, Krishna, Lancet planet health).³⁻⁷ Previous studies exploring reasons for uncontrolled asthma in India have focussed mainly on the paediatric age group,^{8,9} and data on adult asthma patients are sparse.

This study aimed to understand patient and primary care physician views and perspectives regarding asthma, and the facilitators and barriers to uptake of treatment and engagement with health services in Vellore district, South India. Semi-structured interviews were conducted with a purposively selected sample of patients and primary care physicians to address the research aims. Patient interviewees ($n=46$) were ≥ 18 years old and had physician-diagnosed asthma as per GINA 2021 guidelines.⁹ Patients were identified from three primary care sites selected to include rural, semi-urban and urban areas, drawing on the knowledge and networks of the India-based members of the research team. We contacted the Vellore branch of the Indian Medical Association and obtained a list of medical practitioners in Vellore. Physicians ($n=20$) who manage asthma were shortlisted, including in rural, semi-urban and urban areas. Semi-structured interviews took place face to face and were conducted by the author team using topic guides designed to cover the primary research aims (Table 1).

Further study details can be found at <https://zenodo.org/records/10469856>. Three main themes were identified from the data: patient understanding of treatment, barriers to access and improving asthma management.

Physicians expressed concern over levels of patient adherence with prescribed care, citing poor knowledge and patients often being unable to provide an accurate symptom history. In apparent support of these claims, patient interviewees voiced fears that asthma is 'contagious', and expectations of a 'cure' for the condition.

Some attributed onset to unlikely causes such as faulty medication, or poisonous water.

Many self-described as adhering to prescribed treatment regimens, including tablets, inhalers or a combination of both. However, some expressed a reluctance to use inhalers for fear of becoming 'dependent'. Some physicians also described poor compliance following initial symptom relief. As a result of these limitations, some judged patients—especially those in older age categories—to be unable to appropriately use the Metered Dose Inhaler (MDI), and they therefore prescribed oral medication. This problem was compounded by the lack of time available to them to overcome the technical challenges patients faced, or to explain the benefits of inhalers.

Patients reported obstacles to accessing mainstream health services, with financial barriers the most frequently cited. Some described reliance on family members to pay for treatment and others selling land and possessions for this reason. Linked to this were concerns about travel and waiting times, which were especially cited by patients in rural or semi-urban areas.

Social stigma was also noted by physicians and a small but significant number of patients, who described people 'looking at them differently' or avoiding them due to their asthma. Many patients expressed a preference for alternative treatments (e.g., Ayurveda and Siddha medicine), or a willingness to supplement standard treatments with ointments, herbs and steam inhalation.

Physicians reported shortages in training and education in asthma management since qualifying, and agreed that updated training would be beneficial, including in treatment of allergic rhinitis. Key points of consensus were that training should be practically focussed, available online (as well as in person) and should focus on 'refreshing' of core elements and updating on new developments.

Other suggestions included targeted education and awareness raising for patients, allied with resources for follow-up, including via telephone. Training for patients and communities was recommended in areas of prevention/lifestyle, management and combatting social stigma. Patients and physicians emphasized the need to address affordability of treatment, for example, through reducing treatment costs for lower socio-economic patient populations and offering online consultations. Cultural and religious aspects were important

This is an open access article under the terms of the [Creative Commons Attribution](https://creativecommons.org/licenses/by/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2024 The Authors. *Clinical & Experimental Allergy* published by John Wiley & Sons Ltd.

in shaping attitudes and behaviours, and this was consistent across geographical groups.

Purposive sampling of participants from varying settings within the Vellore district make our findings widely relevant with respect to geographical area of residence, given the differences in socio-economic status, literacy, levels of indoor and outdoor pollution, access to medical care, and cultural and social factors. The study sample is also diverse with respect to age, gender and socio-economic strata. However, some of these findings may not be generalisable to other Indian states and union territories owing to differences in cultural and social factors, and further multi-centre studies that do not rely solely on clinic populations are needed to gain insight to help inform a strategic response at the national level.

In conclusion, this study highlights significant gaps in the level of understanding of adult patients regarding the fundamental aspects

Summary box

- In India, there are deficits in asthma self-management and asthma training for primary care physicians.
- We advocate culturally tailored interventions for patients and clinically oriented training for primary care physicians.

of asthma and its management in Vellore district and some gaps in basic training for primary care physicians in the diagnosis and management of asthma. The data call for multi-pronged strategies including culturally tailored and targeted supportive interventions towards improving asthma care, as well as provision of free or subsidized treatment for those economically deprived. Furthermore,

TABLE 1 Demographic details of interviewees in each sample group.

Part one: Patient interviewee characteristics					
Age (years)	Comorbidities	Gender	Religion	Socio-economic status ^a	Type of housing
<i>Urban area</i>					
33	GERD	M	Hindu	Upper middle	Pucca
49	GERD, Hypertension	F	Hindu	Lower middle	Pucca
62	Old cerebrovascular accident	M	Hindu	Lower middle	Pucca
49	GERD, Depression, anxiety, rheumatism, diaphragm palsy, endometriosis	F	Hindu	Lower middle	Pucca
45	No	F	Hindu	Lower middle	Pucca
50	GERD, post-COVID	M	Hindu	Lower middle	Pucca
42	No	M	Hindu	Lower middle	Pucca
48	Dyslipidemia, nasal polyposis	F	Hindu	Lower middle	Pucca
26	Nephropathy	M	Hindu	Lower middle	Pucca
25	Hypothyroid	F	Muslim	Lower middle	Pucca
30	PCOD	F	Christian	Lower middle	Pucca
51	GERD, post-COVID	M	Hindu	Lower middle	Pucca
32	GERD, Post-COVID	M	Hindu	Lower middle	Pucca
23	No	F	Hindu	Upper middle	Pucca
48	Hypertension, dyslipidaemia	M	Hindu	Upper middle	Pucca
<i>Rural area</i>					
49	Old cerebrovascular accident	F	Hindu	Upper lower	Semi pucca
60	Renal surgery	F	Hindu	Upper lower	Semi pucca
55	Hypertension	F	Hindu	Lower middle	Pucca
90	No	M	Hindu	Lower middle	Semi pucca
48	No	F	Hindu	Upper lower	Semi pucca
35	Depression	F	Hindu	Lower middle	Pucca
70	No	M	Hindu	Lower middle	Semi pucca
40	No	F	Hindu	Lower middle	Pucca
49	No	M	Hindu	Lower middle	Pucca
70	No	F	Hindu	Upper lower	Semi pucca

TABLE 1 (Continued)

Part one: Patient interviewee characteristics					
Age (years)	Comorbidities	Gender	Religion	Socio-economic status ^a	Type of housing
57	No	M	Hindu	Upper lower	Semi pucca
71	No	F	Hindu	Upper lower	Semi pucca
40	GERD, diabetes	F	Hindu	Upper lower	Semi pucca
78	No	F	Hindu	Lower middle	Pucca
82	Hypertension	M	Hindu	Lower middle	Semi pucca
<i>Semi-urban area</i>					
28	No	F	Hindu	Lower middle	Pucca
68	Insomnia, hypertension, diabetes	M	Christian	Lower middle	Semi pucca
25	Depression, anxiety	F	Hindu	Lower middle	Semi pucca
69	Diabetes	M	Hindu	Upper middle	Pucca
58	Depression, anxiety	M	Hindu	Upper middle	Pucca
66	Osteoarthritis	M	Hindu	Lower middle	Semi pucca
65	No	F	Hindu	Lower middle	Semi pucca
43	No	F	Hindu	Lower middle	Semi pucca
86	Hypertension	F	Hindu	Lower middle	Pucca
54	Hypertension	F	Hindu	Lower middle	Pucca
92	Hypertension	M	Hindu	Lower middle	Semi pucca
60	Hypertension	F	Christian	Lower middle	Pucca
54	Diabetes	F	Hindu	Lower middle	Pucca
63	Anxiety	F	Hindu	Lower middle	Semi pucca
45	No	F	Hindu	Lower middle	Semi pucca
Part two: Physician interviewees					
Code	Age	Gender	Qualification	Place	
1	52	M	MD General Medicine	Gudiyatham	
5	46	F	MBBS	Gudiyatham	
3	54	M	DNB Respiratory Medicine	Sripuram	
4	65	M	MD Paediatrics	Vellore	
7	42	F	MD Paediatrics	Sathuvachari	
8	36	M	MD Respiratory Medicine	Vellore	
6	35	F	MD Anaesthesia in General practice	Vellore	
9	31	F	MD Respiratory	Vellore	
10	34	M	MD General Medicine	Vellore	
11	34	M	MS ENT	Vellore	
12	28	F	MD General Medicine	Vellore	
13	31	M	MD Community health	Bagayam	
14	32	M	MD General Medicine	Ranipet	
15	34	M	MD Respiratory Medicine	Vellore	
2	42	M	MBBS	Ranipet	
16	32	F	MD General Medicine	Vellore	
17	29	M	MD General Medicine	Ranipet	
18	34	M	MD General Medicine	Vellore	
19	35	F	MD Community health	Chittoor	
20	37	F	MBBS	Karigiri	

Abbreviations: F, female; M, male.

^aSocio-economic status is using Modified Kuppusamy Scale.

sustainable practical and clinically orientated training initiatives are needed for primary care physicians.

AUTHOR CONTRIBUTIONS

IW was involved in study design, data analysis and was lead for drafting the manuscript. JD was the primary researcher and was involved in data analysis and was co-lead in drafting the manuscript. DJC and MTK were principal investigators and led study design, data interpretation and contributed to drafting the manuscript. AM was involved in data interpretation and contributed to drafting the manuscript. All authors had full access to all the data in the study and had final responsibility for the decision to submit for publication. IW and JD accessed and verified the data.

ACKNOWLEDGEMENTS

We would like to acknowledge the UK R&I Global Challenges Research Fund via Institute of Global Innovation, University of Birmingham, UK, funding the research reported in this paper. We thank all interviewees who gave up their time to share their views and experiences with us.

FUNDING INFORMATION

UK R&I Global Challenges Research Fund via Institute of Global Innovation, University of Birmingham, UK.

CONFLICT OF INTEREST STATEMENT

In the past 36 months, the team have received funds to conduct the study reported in the manuscript from the Institute for Global Innovation, University of Birmingham, UK. Dr Adel H Mansur has received personal and institutional funds for talks, advisory board meeting attendance, and educational grants from Astrazeneca, GSK, Novartis, BI, Chiesi, Teva, and Sanofi.

DATA AVAILABILITY STATEMENT

Deidentified data collected in the study will be available on reasonable request from the authors.

ETHICS STATEMENT

Research ethics approval for the study was secured from the Universities of Birmingham (ERN_21_0069) and Christian Medical College, Vellore (IRB Min No. 14029).

Iestyn Williams¹ 

Jefferson Daniel² 

Adel H. Mansur³ 

Devasahayam Jesudas Christopher²

Mamidipudi Thirumala Krishna⁴

¹School of Social Policy, Health Services Management Centre, University of Birmingham, Birmingham, UK

²Department of Pulmonary Medicine, Christian Medical College, Vellore, Tamil Nadu, India

³Department of Respiratory Medicine, University Hospitals Birmingham NHS Foundation Trust, Birmingham, and Institute of Inflammation and Ageing, University of Birmingham, Birmingham, UK

⁴Institute of Immunology and Immunotherapy, University of Birmingham and Department of Allergy and Immunology, University Hospitals Birmingham NHS Foundation Trust, Birmingham, UK

Correspondence

Iestyn Williams, School of Social Policy, HSMC, Park House, University of Birmingham, Edgbaston, Birmingham.
Email: i.p.williams@bham.ac.uk

Iestyn Williams and Jefferson Daniel are joint first authors.

Devasahayam Jesudas Christopher and Mamidipudi Thirumala Krishna are joint senior authors.

ORCID

Iestyn Williams  <https://orcid.org/0000-0002-9462-9488>

Jefferson Daniel  <https://orcid.org/0000-0003-4285-7910>

Adel H. Mansur  <https://orcid.org/0000-0002-8615-8778>

REFERENCES

- Vos T, Lim SS, Abbafati C, et al. Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the global burden of disease study 2019. *Lancet*. 2020;396(10258):1204–1222.
- Global asthma network. The Global Asthma Report. 2022. <https://firsnet.org/images/publications/s1.pdf>
- Krishna MT, Mahesh PA, Vedanthan PK, Mehta V, Moitra S, Christopher DJ. The burden of allergic diseases in the Indian subcontinent: barriers and challenges. *Lancet Glob Health*. 2020;8(4):e478–e479.
- India State-Level Disease Burden Initiative Air Pollution C. The impact of air pollution on deaths, disease burden, and life expectancy across the states of India: the global burden of disease study 2017. *Lancet Planet Health*. 2019;3(1):e26–e39.
- Langan SM, Mulick AR, Rutter CE, et al. Trends in eczema prevalence in children and adolescents: A global asthma network phase I study. *Clin Exp Allergy*. 2023;53(3):337–352.
- Asher MI, Rutter CE, Bissell K, et al. Worldwide trends in the burden of asthma symptoms in school-aged children: global asthma network phase I cross-sectional study. *Lancet*. 2021;398(10311):1569–1580.
- Mahesh PA, Moitra S, Mabalirajan U, et al. Allergic diseases in India – prevalence, risk factors and current challenges. *Clin Exp Allergy*. 2023;53(3):276–294.
- Grover C, Goel N, Chugh K, et al. Medication use in Indian children with asthma: the user's perspective. *Respirology*. 2013;18(5):807–813.
- Rastogi D, Gupta S, Kapoor R. Comparison of asthma knowledge, management, and psychological burden among parents of asthmatic children from rural and urban neighborhoods in India. *J Asthma*. 2009;46(9):911–915.