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Geoclimatic risk factors for childhood asthma hospitalization in southwest of Iran

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Abstract

Background: Asthma is a chronic respiratory disease resulting from a complex interaction between genetic and environmental factors. Among environmental factors, climatic and geographical variations have an important role in increasing asthma hospitalization. The current study aimed to investigate the effect of geoclimatic factors on the occurrence of childhood asthma hospitalization in Fars province, southwest Iran.

Method: We mapped the addresses of 211 hospitalized patients with childhood asthma (2016–2019) and investigated the effects of different temperature models, mean annual rainfall and humidity, number of frosty and rainy days, evaporation, slope, and land covers on the occurrence of childhood asthma hospitalization using a geographical information system. The Kriging and Spline methods have been used for generating interpolated models. Data were analyzed using logistic regression.

Results: In the multivariate model, urban setting was recognized as the most important childhood asthma hospitalization predictor ($p < 0.001$, odds ration [OR] = 35.044, confidence interval [CI] = 9.096–135.018). The slope was considered the determinant of childhood asthma hospitalization when analyzed independently and its increase was associated with decreased childhood asthma hospitalization ($p = 0.01$, OR = 0.914, CI = 0.849–0.984).

Conclusion: In the current study, the urban setting was the most important risk factor associated with increased childhood asthma hospitalization.

KEYWORDS

asthma hospitalization, childhood asthma, geoclimatic factors, GIS

1 | INTRODUCTION

Asthma is the most common chronic disease among children, which affects about 7.5% of this population worldwide.[1] Asthma is associated with airway hyper-responsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness, and coughing.[1] According to recent studies, its incidence has increased globally in the latter part of the 20th century, especially in developed countries and is associated with psychological and socioeconomic burdens for both children and their families.[2] In Iran, its prevalence was estimated at 4.36–8.8 for children.[3]

Zahra Kanannejad and Mohammad Shomali contributed equally to this study.

medication and socioeconomic status, have not been considered. Also, some other environmental determinants like air pollution should be analyzed in future investigation.

5 | CONCLUSION

In conclusion, the current retrospective study has reported urban setting as an important factor affecting the occurrence of childhood asthma in Fars province, southwestern Iran. The univariate model showed slope as a significant variable which was not significant in the multivariate model.

Understanding the geographical factors determining childhood asthma may be helpful for disease control and management. In particular, more research with a greater sample size is needed on the relationship between location and occurrence of childhood asthma and the effect of changing lifestyles of asthmatic patients.

AUTHOR CONTRIBUTIONS

Zahra Kanannejad: Conceptualization (equal); data curation (equal); investigation (equal); methodology (equal); project administration (equal); writing—original draft (equal); writing—review and editing (equal). **Mohammad Shomali**: Conceptualization (equal); data curation (equal); investigation (equal); methodology (equal); project administration (equal); writing—original draft (equal). **Hossein Esmailzadeh**: Writing—review and editing (equal). **Seyed Hesamedin Nabavizadeh**: Writing—review and editing (equal). **Koorosh Nikaein**: Investigation (equal). **Zahra Ghahramani**: Data curation (equal). **Mohammad Amin Ghatee**: Formal analysis (equal); methodology (equal); software (equal); supervision (equal); writing—review and editing (equal). **Soheila Alyasin**: Funding acquisition (equal); project administration (equal); writing—review and editing (equal).

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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