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REVIEW

How are 'urban' and 'rural' defined in publications regarding asthma and related diseases?☆

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Abstract
Background: Global variations in the prevalence of asthma and related diseases have suggested that environmental factors are causative, and that factors associated with urbanisation are of particular interest. A range of definitions for 'urban' and 'rural' have been used in articles on asthma and related diseases, making it difficult to assess their importance as aetiological factors. This study sets out to examine such definitions used in the literature.
Methods: Medical and social science databases were searched for articles that made distinctions of 'urban' and/or 'rural' in the context of asthma and related diseases.
Results: The search identified 73 articles and categorised four types of definitions. A specific definition of urban or rural was used in 19 (26%) articles. Nine (12%) articles used non-specific and/or administrative definitions. There were 23 (32%) articles that described locations as 'urban' or 'rural' but did not indicate if the description defined 'urban' or 'rural'. Distinctions were made between urban and rural locations without a description or definition in 22 (30%) articles.
Conclusions: There is substantial variation in the definitions of 'urban' and 'rural' in articles regarding asthma and related diseases. It would be advantageous to have clearer and more precise definitions of 'urban' and 'rural' which could facilitate aetiological research and also comparisons between locations, especially in international studies.

Introduction

Global patterns in the prevalence of asthma, rhinoconjunctivitis and eczema symptoms have been identified by The International Study of Asthma and Allergies in Childhood (ISAAC) and pointed to environmental factors as potentially causative.[1–4] The increasing burden of these diseases around the world has emphasised the importance of epidemiological studies of specific environmental factors,[5] with urbanisation being of particular interest.[6] Distinct

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urban–rural differences have been observed in many locations, especially in several African studies where lower levels of asthma were found in rural than urban areas.[7–9] Increases in prevalence of asthma symptoms over time have been associated with rural–urban transitions[10] and there is evidence to demonstrate that increasing asthma trends may have reached a plateau in most urbanised English language and Western European countries.[11] These trends suggest that global changes in the prevalence of asthma and related diseases, which occur with changes in environmental conditions,[5,11,12] may be affected by specific aspects of urbanisation.

However, there is currently no standard definition of urbanisation and studies use a wide range of approaches to make the distinction between 'urban' and 'rural' locations. The absence of a universal method of defining 'urban' and 'rural' creates difficulties in pursuing aetiology and comparing studies. Dichotomised distinctions within countries will not reflect levels of urbanisation within or between countries which comprise multiple continuous variables[13,14] and are unlikely to reflect the overall contributions of urban and rural residence as aetiological factors for the prevalence of asthma and related diseases.

Definitions for 'urban' and 'rural' which are clearer and more precise would allow for comparisons between studies and more meaningful investigations into the effect of urban and rural residence on asthma and related diseases. This review investigates definitions of 'urban' and 'rural' used in publications about asthma and related diseases, including consideration of country income level for studies where specific definitions were found.

Methods

A literature search was conducted in November and December 2011 across a variety of databases including PubMed, Medline (OvidSP), ScienceDirect, Scopus and Embase. Google Scholar was used for specific article searches and reference lists of articles found were also searched. The major search terms used were 'asthma', 'urban', 'rural', 'urbanisation' and 'urbanization'. Minor search terms included 'definition', 'rhinoconjunctivitis', 'eczema', 'bronchospasm' and 'epidemiology'.

'Asthma and related diseases' included asthma, exercise induced bronchospasm, reversible airway obstruction, bronchial hyperreactivity, rhinoconjunctivitis and eczema (in some studies asthma was termed an atopic disease). The main focus in this study however, was on the prevalence of asthma. The search was limited to the English language while not limited to studies on children to allow a wider search range. There was also no specified time frame for article publication dates.

Articles were included if the main topic of interest included asthma and related diseases and identified whether the location was 'urban' or 'rural'. Publications were categorised into four types: a specific definition of 'urban' or 'rural'; a non-specific definition; a description but no definition; the terms 'urban' and 'rural' were used but with no description or definition.

Results

The literature search found 73 articles which met the criteria described in ''Methods'' section. Descriptions of 'urban' and 'rural' classifications used in the studies were found in ''Methods'' section in most of the articles.

Of these 73 articles, 19 articles (26%) distinguished between 'urban' and/or 'rural' using a specific definition as described in Table 1. Most of these 19 articles used population-based definitions such as population density[15] or population based Urban Influence Codes (UIC),[16] particularly the studies from high income countries; two articles from low and lower middle income countries used a wider range of specific factors.[17,18]

The other 54 (74%) articles (citations are available on request) used less specific definitions. Non-specific or administrative definitions were used in nine articles (12%), for example, ''large cities with urban lifestyle'' vs. ''mostly rural lifestyle''[19] or used a metropolitan centre as 'urban' and locations outside of the centre being 'rural'[20] or used ''doctor estimate of urban/rural ratio of clientele''.[21]

In 23 articles (32%), a location was stated to be 'urban' or 'rural' and then differences between the urban and rural locations were described with little or no indication of whether the description was used to make this distinction. For example, in one study, The Gambia is described as 'urban' but it is not clear whether the following descriptions were used to make the urban–rural distinction.[22] ''Banjul, the capital on an island in the River mouth, is the oldest urban settlement in The Gambia, and has a population of approximately 42,000. The Gambia has no major industry. Many of the working population in Banjul are involved in small industry, trade crafts or are employed in the civil service.''

Distinctions between 'urban' and 'rural' without a stated definition and no further description were made in 22 articles (30%). For example, ''The population investigated comprised all 17 year old boys in one seaside urban area of Israel''.[23]

Discussion

In this investigation of definitions of 'urban' and 'rural' in articles about asthma and related diseases substantial variations were found. Most articles (74%) did not give specific definitions. Many articles simply stated whether a location was 'urban' or 'rural' before describing but not defining differences between locations. In others there was little or no description of how 'urban' or 'rural' was defined, such as using an administrative definition, making the assumption that it was intuitively obvious that a city centre was 'urban' and locations outside of this were considered 'rural'. For approximately one-third of the studies, it was unclear how the distinction between 'urban' and 'rural' was made at all. In the 26% of articles where specific definitions were used, population based classifications using an urban centre and then subsequently labelling surrounding areas as rural were the most common definitions, perhaps because these are relatively simple methods for defining 'urban' and 'rural' using widely available national census data.