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Review Paper

Urbanization and non-communicable disease in Southeast Asia: a review of current evidence



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ABSTRACT

Objective: Non-communicable diseases (NCDs) have been highlighted as a major public health issue in the Southeast (SE) Asian region. One of the major socio-environmental factors that are considered to be associated with such a rise in NCDs is urbanization. Urbanization is associated with behavioural changes such as eating an unhealthy diet, and a decrease in physical activities, which may result in associated obesity. The SE Asian region also has a substantive burden of infectious disease such as HIV and malaria, which may modify associations between urbanization and development of NCDs.

Study design: A systematic review was conducted until April 2013.

Methods: Using four databases: EMBASE, PubMed, GlobalHealth and DigitalJournal, the systematic review pools existing evidence on urban-rural gradients in NCD prevalence/incidence.

Results: The study found that in SE Asia, urban exposure was positively associated with coronary heart disease, diabetes and respiratory diseases in children. Urban exposure was negatively associated with rheumatic heart diseases. The stages of economic development may also modify the association between urbanization and NCDs such as diabetes.

Conclusion: There was pronounced heterogeneity between associations. It is recommended that future studies examine the major constituents of NCDs separately and also focus on the interplay between lifestyle and infectious risk factors for NCDs. Prospective studies are needed to understand the diverse causal pathways between urbanization and NCDs in SE Asia.

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Introduction

In 2011, The Lancet launched a series of articles on ‘Health in Southeast Asia’, one of which highlighted non-communicable diseases (NCDs) as a major public health issue in the region.¹ Under the World Health Organization's framework, one of the major upstream socio-environmental factors considered to be associated with such a rise in NCDs is urbanization.² Urbanization is associated with increased downstream behavioural risk factors such as unhealthy diets and decreases in physical activity which is thought to result in obesity. All of these risk factors are seen as shared causes for NCDs which are classified into four main groups: cardiovascular disease (mainly ischaemic heart disease and cerebrovascular disease), cancer, chronic respiratory disease and diabetes.

The associations between urbanization, risk factors for NCDs and development of NCDs are established in western countries, but evidence from low- and middle-income countries are often based on extrapolation from large population surveys.^{3,4} Furthermore, many low- and middle-income countries face the double burden of infectious and non-infectious diseases.⁵ A subset of infectious agents are thought to be associated with the development of some NCDs such as cancer⁶ and rheumatic heart disease.⁷ The interplay between socio-environmental and behavioural risk factors, along with the potential modifying role of infectious risk factors, may result in variations in the association between urbanization and different NCDs which may differ from what is seen in more developed countries.⁸

The aim of this study is to provide a systematic review of studies exploring the relationship between urban exposure and the four major groups of NCDs in Southeast (SE) Asia. In particular, the review will investigate whether the associations are consistent across i) different countries, ii) different subtypes of diseases classified within the same group of NCDs and iii) across different groups of NCDs. Due to different underlying causes/mechanisms for developing NCDs along with possible interplay between infectious and non-infectious causes of NCDs, the authors hypothesized that the association between urban exposure and NCDs is likely to vary by country and across NCD subtypes.

Methods

Search strategies and procedures

Four databases were used for searches: EMBASE, PubMed, GlobalHealth and DigitalJournal until April 2013. DigitalJournal is a database which contains electronic health science journals from SE Asia.⁹ Separate searches for each of the four main groups of NCDs had been conducted. The search strategies using EMBASE can be found in [Appendix 1](#). For DigitalJournal, only simple keyword searches were possible. The search terms for urban exposure only were used. An additional cited-reference search from articles included in the review was also conducted.

Inclusion and exclusion criteria

Criteria for articles to be included in the review were that they must:

- i) have a defined measure of one of the main group of NCDs; cardiovascular disease, cancer, chronic respiratory disease (including asthma and allergies) and diabetes;
- ii) have a clearly defined measure for urban exposure;
- iii) have a direct control group or comparison group such as a semi-urban or rural group;
- iv) report (or have data to able to calculate) quantitative measures for association between urban exposure and one of the NCD groups or individual diseases; and
- v) be published in English or Thai.

The studies that were conducted outside the SE Asian region or studies with historical controls were excluded, where the prevalence/odds/incidence of NCDs were measured at different time points. SE Asia countries included in the review were Brunei Darussalam, Cambodia, Indonesia, Laos PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, and Vietnam. And also the articles that were classified as reviews by their respective journals and articles that were not full reports such as conference abstracts or editorials had been excluded. There were no restrictions on the type of designs as long as the inclusion criteria were met.

Screening and data extraction

Article abstracts were screened by two independent reviewers and classified into three subgroups:

- i) clearly not relevant
- ii) potentially relevant
- iii) relevant to review

All articles initially classified as clearly not relevant were reviewed by a third reviewer to double-check for potentially relevant articles initially excluded. All articles identified as potentially relevant and relevant were retrieved and reviewed by the lead author. If full-text articles were not retrievable or additional data was required to make a decision on inclusion or exclusion of a study, the corresponding authors were contacted.

Standard data extraction forms, one for each type of study design, were derived from a small sample of articles included in the review. Article information such as the author's name, country of conduct, year of fieldwork and publication, sample size, definition of urban and rural exposure and how the NCD of interest was defined and diagnosed were recorded. The Gross National Income (GNI) per capita, as reported by the United Nations,¹⁰ corresponding to the country and year of fieldwork was also included. Depending on the type of study design, the main measures of disease frequency were the prevalence/odds/risk of the NCD along with the corresponding crude and adjusted measures of relative effect. Information was also collected on which factors were controlled for if adjusted relative risks were reported.

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