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Epidemiology of Asthma in Selected Pacific countries

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Abstract

Background

In this thesis, I describe a series of studies of the prevalence, causes, and management of asthma in the Pacific. The core study of the thesis is Phase III of the International Study of Asthma and Allergies in Childhood (ISAAC). The ISAAC study is the largest worldwide epidemiological study on asthma prevalence and was established partly in response to the increases in asthma prevalence in most parts of the world over the last two to three decades. The ISAAC Phase I study found large variations in asthma prevalence globally, but no Pacific countries were involved. Thus, the situation in the Pacific was relatively unknown due to lack of standardised studies on prevalence and time trends. The burden and impact of other non-communicable diseases such as cardiovascular and other metabolic disorder on the other hand have been the target of various studies in the Pacific for the past few decades. The ISAAC Phase III study was therefore conducted in eight Pacific countries to address the above issues, as well as to enhance Pacific participation and contribution to international research on the causes and control of asthma. The collaboration also served the purpose of encouraging and strengthening health research capacity in the Pacific. The ISAAC Phase III study was followed by an asthma self-management intervention trial conducted in Tonga by the ISAAC Tonga study team.

Methods

The work presented in this thesis involved: (i) the conduct of the ISAAC Phase III study in the six Pacific islands of Tokelau, Samoa, Fiji Islands, Tonga, Niue and the Cook Islands, as well as the incorporation into the analysis of data that had already

been collected in French Polynesia and New Caledonia; (ii) analysis of the data from an environmental asthma risk factor questionnaire which was included in the ISAAC survey in three countries (Samoa, Fiji and Tokelau); (iii) the conduct of the Tonga Asthma Self-management Study which was intended to assess whether the introduction of asthma education, including asthma self-management plans, would reduce morbidity from asthma.

Results

A total of 20,876 13-14 year olds, in the eight countries involved, participated in the ISAAC Phase III survey, with an overall response rate of 92%. The survey showed that there was considerable variation in the prevalence of asthma symptoms between the eight countries, ranging from 5.8% for current wheeze in Samoa to 16.2% in Tonga. Tokelau reported the highest prevalence (19.7%) for current wheeze, but the number of participants was relatively small. The prevalences of asthma symptoms among Pacific children in the Pacific were lower than those reported for Pacific, Māori and European children living in New Zealand from a previous study (ISAAC Phase I) conducted ten years earlier using the same methodology. The prevalence of 'asthma ever' in Pacific children living in the Pacific was also lower than that found among Pacific, Māori and European children in New Zealand.

The ISAAC Phase III environmental questionnaire data was collected in Samoa, Fiji and Tokelau. The analyses indicated that the major factors associated with current wheeze (across the three countries) were paracetamol use in the previous year (odds ratio (OR) = 1.36, 95% CI 1.15-1.61), the use of open fires for cooking (OR = 1.34, 95% CI 1.13-1.58), lack of physical activity as indicated by television viewing more

than 3 hours per day (OR = 1.24, 95% CI 1.04-1.47), regular meat consumption (OR = 1.30, 95% CI 1.09-1.54) and regular cereal consumption (OR = 1.29, 95% CI 1.07-1.54). However, these risk factors were not particularly strong, and did not account for a large proportion of asthma cases (i.e. they had relatively low population attributable risks).

The asthma self-management plan intervention study resulted in significant improvements in asthma morbidity and the management of asthma among individuals and the service provision. The success of the introduction of the self-management plan, in the context of an asthma clinic, was reflected by improvement in measures of asthma morbidity, such as peak expiratory flow rates and nights woken with asthma or coughing. There was also a reduction in the requirement for acute medical treatment, indicated by a decrease in emergency department hospital visits for asthma and hospital admissions. The programme was so successful that the intervention study evolved into a full regular asthma clinic for the main island of Tonga. It is now intended that the asthma self-management programme will be extended throughout the rest of Tonga, through the primary health care system.

Conclusions

The ISAAC Phase III survey has shown that, although there is a significant level of morbidity, asthma prevalence in Pacific countries is lower than those among Pacific people in New Zealand. Together with the large variations in prevalence between the six Pacific countries that participated, this further lends support for the role of environmental risk factors in asthma. The availability of data on eight countries using a standardised methodology also provides useful information on the burden of asthma

in the Pacific that is comparable to other countries regionally and internationally as well as forming a basis for ascertaining trends in the future. The crucial role of asthma self-management plans in asthma management is supported by the findings of the Tonga study, and its implementation is essential in the resource-scarce Pacific health setting. The collaborative nature of ISAAC in the Pacific has further raised awareness of the need for capacity building and creating networks and environments that enhance health research in areas other than asthma. The study has also nurtured an environment and network that encourages and strengthens the establishment of health research as one of the vital tools for achieving better health.

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Abbreviations

BHR	Bronchial hyperresponsiveness
BMI	Body Mass Index
CI	Confidence Interval
Can f 1	Dog allergen
Can f 2	Dog allergen
Fel d 1	Cat allergen
Der p 1	Dermatophagoides pteronyssinus allergen
Der f 1	Dermatophagoides farinae allergen
ECRHS	European Community Respiratory Health Survey
EQ	Environmental Questionnaire
FEV₁	Forced Expired Volume in 1 second
FVC	Forced Vital Capacity
GINA	Global Initiative for Asthma
GNP	Gross National Product
HDM	House Dust Mite
IgE	Immunoglobulin-E
ISAAC	International Study of Asthma and Allergies in Childhood
OR	Odds Ratio
PEF	Peak Expiratory Flow
PEFR	Peak Expiratory Flow Rate
POR	Prevalence Odds Ratio