

# Prevalence of Childhood Asthma and Allergy in an Inner City Malaysian Community: Intra-observer Reliability of Two Translated International Questionnaires

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## Summary

### Objectives

(a) To examine the intra-observer reliability of the Malay language versions of two international respiratory questionnaires, i.e. the International Study of Asthma and Allergy in Children (ISAAC) and the American Thoracic Society (ATS) questionnaires, and (b) using the more reliable of these questionnaires, to estimate the prevalence of asthma and allergy related symptoms in an ethnically homogenous inner city community in Kuala Lumpur.

### Methods

The study was conducted among 7 to 12 year old school children of Malay ethnic origin living in an inner city area of Kuala Lumpur. The sample consisted of 787 children attending the only primary school in the area. The Malay versions of both questionnaires were administered twice, one month apart, and were completed by parents. Agreement between the first and second responses to the same questions were assessed by Cohen's kappa. Kappa values  $<0.4$  were indicative of poor intra-observer reliability,  $0.4 - 0.59$  moderate reliability,  $0.6 - 0.79$  good reliability and  $>0.79$  excellent reliability.

### Results

77.9% and 36.3% of parents responded to the first and second administrations of the questionnaires respectively. Kappa values of  $>0.4$  were obtained in 15/16 (93.8%) and 17/27 (63.0%) questions of the ISAAC and ATS questionnaires respectively. Excellent kappa values were obtained in 4/16 (25%) questions of the ISAAC questionnaire versus only 1/27 (3.7%) questions of the ATS questionnaire. From the ISAAC questionnaire, all questions on wheeze had good reliability while those on asthma had excellent reliability. Questions on allergic symptoms had poor to moderate reliability. In contrast, from the ATS questionnaire, questions on wheeze had moderate reliability while questions on asthma were excellently reliable. Questions on allergic symptoms had moderate to good reliability while those on cough, phlegm and bronchitis had poor reliability.

According to the ISAAC questionnaire the prevalence of ever wheeze, wheeze in the last 12 months, ever asthma and wheeze with exercise in the last 12 months was 12.5%, 6.6%, 10.3% and 5.9% respectively. The prevalence of ever sneeze or runny nose, sneeze or runny nose in the last 12 months, watery eyes in the last 12 months and ever eczema was 15.2%, 11.1%, 4.4% and 8.5% respectively.

### Conclusions

The translated ISAAC questionnaire was more reliable than the translated ATS questionnaire. Asthma and related symptoms were common among Malay school children in inner city Kuala Lumpur.

**Key Words:** Asthma prevalence, Allergy, ISAAC questionnaire, Intra-observer reliability, Cohen's Kappa

### Introduction

Asthma is recognised as a distinct clinical entity and there is no definite consensus regarding its definition and identification criteria in epidemiological studies<sup>1,2</sup>. Epidemiological surveys in asthma prevalence continue to rely heavily on self administered questionnaires. They are widely acceptable, cheap, convenient and are not operator dependent. However for comparisons of asthma prevalence among populations speaking different languages, they are less reliable<sup>3</sup>.

In an international study aimed to determine the validity of questionnaires in measuring asthma relevance, significant variations in specificity and sensitivity in relation to bronchial hyper responsiveness were shown between different European countries with different languages<sup>4</sup>. This suggests that translating questionnaires into other languages may influence the findings particularly with respect to questions with descriptive terms such as wheeze and morning tightness. In addition there are very few studies that examine the repeatability of respiratory symptoms. One such study was conducted in Australia assessing the repeatability of respiratory symptom questionnaires by administering the questions to 67 patients nine weeks after an initial questionnaire. The questionnaire on wheeze was more repeatable than the question on productive cough<sup>5</sup>.

Brunekreef studied the reproducibility of answers to childhood respiratory symptoms by administering two

childhood respiratory questionnaires i.e. the American Thoracic Society (ATS) and World Health Organisation (WHO) questionnaires twice within a month interval to the same population of Dutch school children aged 6 - 12 years old<sup>6</sup>. This study showed that questions on wheeze, asthma, bronchitis, cough and phlegm and pneumonia gave good to excellent reproducibility with Kappa values ranging from 0.6 - 0.96. Questions about 'phlegm', 'cough', chest, ' and 'runny nose' were less satisfactory in this respect. In Malaysia only the ATS questionnaire is available in the translated versions. It was used in two previous studies<sup>7</sup> (Hisham S, unpublished data). We have translated the International Study on Asthma and Allergy in Children (ISAAC) questionnaire into Bahasa Malaysia and investigated its reliability compared to the American Thoracic Society (ATS) questionnaire.

### Materials and Methods

This study was conducted among all primary school children aged between 7 to 12 years from a single primary school in inner city Kuala Lumpur. The majority of students were Malays, (99.5%) including 143 (18%) Malay Indonesian immigrant children. This school was chosen because of the homogeneity of its population which allowed us to study the questionnaires intended. In this study, we used the translated versions of two international respiratory questionnaires i.e. the modified ATS and the ISAAC questionnaires.

The ISAAC questionnaire was translated into Bahasa Malaysia and then retranslated by an independent translation into English. The ATS questionnaire had been translated in a similar manner previously<sup>7</sup>.

All the school teachers were briefed on the nature of the study and the way of answering the questionnaires. They were then required to impart this information to all the students and thus to the parents. The teachers were instructed to collect all the questionnaires within a week. The second set was distributed a month later and also collected within a week.

An information sheet was given to all parents explaining details of the study. In the information sheet they were informed that a second set of questionnaire would be distributed a month later and they were required to answer the questionnaires as in the first set.

The data was summarised in Database 4.0 and analysed by cross tabulation using Epi 5 programme. Agreement between the first and second responses to the same questions was assessed by Cohens' Kappa. This is a

chance-corrected measure of agreement between two answers. According to Landis and Koch, Kappa values of <0.4 were indicative of poor reliability, 0.4 - 0.59 moderate reliability, 0.59 - 0.79 good reliability and >0.79 excellent reliability<sup>8</sup>.

The prevalence of respiratory and allergic symptoms and estimates of morbidity such as admissions and medications used were calculated from the first set of responses from the ISAAC questionnaire.

This study has been approved by the ethics committee of Universiti Kebangsaan Malaysia. Informed consent was obtained from the school and the parents involved.

## Results

Six hundred and ten (77.9%) and 284 (36.3%) parents responded to the first and second administrations of questionnaire respectively. From the 610 responders 303 (49.7%) children were females and 307 (50.3%) were males. The rate of response was highest from parents of children aged seven years i.e. 20.8%.

**Table I**  
**Degree of Repeatability of Respiratory Symptoms when Asked Twice**  
**Using the ISAAC Questionnaire**

Core questions	Respiratory Symptoms	Kappa
Wheezing module	ever wheeze	0.67
	wheeze in the last 12 months	0.63
	disturbed sleep due to wheeze	0.90
	wheeze with exercise last 12 months	0.64
	nocturnal cough last 12 months	0.51
	ever had asthma	0.81
Rhinitis module	ever sneeze/runny nose/blocked nose	0.49
	sneeze/runny nose last 12 months	0.55
	watery eyes last 12 months	0.52
	nose problems interfere with daily activity past 12 months	0.59
Eczema	itchy rash an and off last 6 months	0.34
	itchy rash last 12 months	0.80
	rash at flexures	0.83
	rash completely clear last 12 months	0.53
	disturbed sleep by itchy rash	0.65
	ever had eczema	0.48

**Intra-observer reliability of the translated ISAAC and ATS questionnaire**

The ISAAC questionnaire consists of three main modules i.e. wheeze, rhinitis and eczema.

Table I shows the results of the repeatability analysis for childhood respiratory symptoms when asked twice using the ISAAC questionnaires. Questions on 'ever had asthma' and 'sleep disturbance due to wheeze' had excellent reliability (Kappa >0.79) while questions on 'ever wheeze', 'current wheeze' and 'wheeze with exercise' had good reliability (Kappa 0.59 - 0.79).

All the core questions on rhinitis were moderately reliable. In the eczema module, the core questions had mixed results ranging from good (Kappa=0.6 - 0.79) to excellent reliability. However when the specific word 'eczema' was used the reliability was poor.

Excellent Kappa values were obtained in 4/16 (25%) questions from the ISAAC questionnaire.

Table II shows the repeatability of respiratory symptoms from the ATS questionnaire. The reliability of minor symptoms such as cough and phlegm were poor. Bronchitis is not a well understood terminology in the

**Table II  
Degree of Repeatability of Respiratory Symptoms when Asked Twice using ATS Questionnaires**

Degree of Repeatability	Respiratory Symptoms	Kappa
Poor (Kappa <0.4)	ever had bronchitis	0.21
	frequent shortness of breath/phlegm	0.34
	cough without cold	0.36
	frequent cold	0.36
	phlegm without cold	0.36
Moderate (Kappa 0.4 - 0.59)	wheeze without cold	0.40
	allergic to medicine	0.40
	frequent wheeze (day and night)	0.41
	ever had sinusitis	0.41
	shortness of breath more than twice	0.44
	cough with cold	0.45
	phlegm with cold	0.45
	ever had whooping cough	0.51
	wheeze with cold	0.54
	wheeze with exercise	0.57
	lung disease before two years	0.58
Good (Kappa 0.6 - 0.79)	ever had measles	0.60
	ever had fever	0.60
	excessive phlegm during lung disease	0.65
	ever had eczema	0.67
	wheeze disappeared	0.71
	ever had pneumonia	0.72
	allergic to dust	0.73
	shortness of breath with requiring medicine	0.74
	shortness of breath with wheeze	0.78
	lung disease last 12 months	0.78
Excellent (Kappa >0.79)	ever had asthma	0.90

Malay language, thus the reliability was poor. Questions pertaining to wheeze were moderately reliable. Questions that were disease specific such as measles and pneumonia had good reliability. An excellent Kappa value was obtained only on one question i.e. 'ever had asthma'.

### Prevalence of asthma, eczema and allergic rhinitis

The cumulative prevalence of asthma defined as 'ever wheeze' was 12.5%. The prevalence of current asthma defined as wheeze in the last 12 months was 6.6%. The prevalence of ever had asthma and exercise induced asthma was 10.3 % and 5.9% respectively. The prevalence of 'ever had rhinitis' and 'rhinitis in the last 12 months' were 15.2% and 11.1% respectively. The prevalence of 'ever had eczema' and 'itchy rash' in the last 12 months' were 6.7% and 6.3% respectively (Table III). All symptoms of asthma and allergy were higher in males than females. However this was not statistically significant ( $p > 0.05$ ).

Amongst those who ever had asthma, only 0.2% were on regular medications, 4.6% visited a doctor for asthma, 2% had follow-up for asthma, 2.2% visited the Emergency Department and 0.6% were admitted at least once for the past 12 months.

**Table III**

### Prevalence of Asthmatic and Allergic Symptoms

Symptoms	Prevalence (%)
Ever wheeze	12.5
Current wheeze	6.6
Ever had asthma	10.3
Wheeze with exercise in the last 12 months	5.9
Ever sneeze/runny/blocked nose	15.2
Sneeze/runny /blocked nose in the last 12 months	11.2
Itchy rash in the last 6 months	5.9
Itchy rash in the last 12 months	5.6
Ever had eczema	8.5

### Discussion

The translated versions of the international questionnaires have been used in many epidemiological studies in countries where English is not the first language used at home<sup>9,10</sup>.

In this study the response rate to the first set of questionnaires was 78% and only 38% when asked a second time one month apart. Similar response rates were seen in the Bruneekreef study (3344 responded to the first and only 411 responded to the second questionnaire) and the response rate may have been lower if the study was repeated more than twice<sup>6</sup>.

We have found that the translated version of the ISAAC questionnaire was superior to the ATS questionnaire in intra-observer reliability. Both the ISAAC and ATS questionnaires showed excellent reliability on a specific question 'ever had asthma'. The word 'asthma' has been synonymous to the Malay translation of 'asma'. It is regularly and widely used in the Malay population and well understood and well accepted. However its reliability may differ when asked in Chinese or Indian population which were not studied.

In contrast, there is no exact translation of the word 'wheeze' in Malay. Therefore it has been translated as a noise or whistling sound in the chest. This is not an exact translation which may bring different meanings to different individuals. Therefore the Kappa values were lower in both questionnaires. This may be improved by using a video questionnaire which has been used together with the ISAAC questionnaire which depicts five scenes of young people manifesting clinical pictures of asthma (wheeze, night cough, exercise dyspnoea)<sup>11</sup>.

There is no problem in translating symptoms of rhinitis from the ISAAC questionnaire. However these symptoms may be minor to parents and their ability to recall may be poor. Therefore questions on rhinitis had moderate reliability. In the ATS, there are no questions on rhinitis.

There were mixed patterns of reliability on the questions of eczema. When the questions involved describing the rash and areas involved, the reliability were excellent. However when the question was specific in asking about

the rash which was present on and off for at least six months the reliability was poor. This could be due to recall problem of duration rather than poor comprehension of the question. The reliability on the question 'ever had eczema' was poor. The word was translated into Malay as 'eksema' and is widely used in the medical context. However it is not commonly used among the Malay population in contrast to the word 'asma'. Again in the ATS questionnaire there are no specific questions on eczema.

In general, the repeatability pattern was clearer in the ISAAC questionnaire compared to the ATS questionnaire. This may be due to a few reasons.

Firstly the ISAAC questionnaire was designed to measure asthma and allergic symptoms in children compared to the ATS questionnaire which measured a variety of symptoms but not specific. Secondly, the ISAAC questionnaire contained questions that were symptoms specific emphasizing in three major areas i.e. wheezing, rhinitis and eczema. These are better recalled and understood by most parents. The ATS questionnaire is not symptom specific. There were many questions on minor symptoms such as runny nose/congested nose, cough and phlegm. The repeatability of these questions was low as in previous studies<sup>7</sup>. These symptoms changed too often that parents did not realise or remember exactly the frequency of occurrence particularly in the Malaysian society where the average number of children in a family is four to five.

When the questions were more specific such as disease related or symptom specific such as wheeze and shortness of breath, the reliability improved since parents remembered these symptoms well.

By using the ISAAC questionnaire the prevalence of ever wheeze (cumulative prevalence) was 12.5% and the prevalence of current asthma as perceived by parents, was 6.6% which were similar to previous studies<sup>7</sup>. Over years the prevalence of asthma among school children in

Kuala Lumpur has not increased tremendously. However the prevalence is higher compared to another local study conducted in a rural area in Malaysia among the aborigines (Hisham S unpublished data).

The prevalence of exercise related asthma was 5.9 % which was low compared to the western countries<sup>12</sup>. This may be due the higher humidity present in Kuala Lumpur. However this needs further validation with exercise testing.

Rhinitis and eczema are commonly associated with asthma; rhinitis being higher (Table III). This shows that the inner city children are more susceptible to asthma and allergic symptoms compared to those in rural areas which may be environmental because of their higher exposure to air pollutants<sup>13,14</sup>. In conclusion it is important to test the reliability of the questionnaire used in epidemiological studies because the more reliable the questionnaire the more useful it will be. This is also important when a questionnaire is being translated into another language despite it being tested for reliability in the original language.

This study has shown that the Bahasa Malaysia version of ISAAC respiratory symptoms questionnaire showed a better and clearer repeatability pattern thus more reliable than the translated version of the ATS questionnaire. The ISAAC written questionnaire has been previously evaluated against airway hyperresponsiveness to hypertonic saline. It was found to be specific and sensitive<sup>15</sup>. Therefore future studies are required to validate the ISAAC questionnaire against airway hyperresponsiveness to hypertonic saline in measuring asthma prevalence in Malaysia.

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