

# Effect of allergic rhinitis and asthma on the quality of life in young Thai adolescents

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## Summary

**Background:** Despite an increasing recognition that both asthma and allergic rhinitis are serious health disorders in Thailand, their combined effects on patients' quality of life in the Thai population has not been reported.

**Objective:** The study aimed to evaluate the impacts of allergic rhinitis and asthma on the quality of life of young adolescents in Thailand.

**Methods:** A total of 1,440 pupils, aged 12-14 years, were randomly recruited from 4 schools located in Bangkok and Pathum Thani Province. Allergic rhinitis and asthmatic symptoms were identified by the International Study of Asthma and Allergies in Childhood (ISAAC) written questionnaire. The Pediatric Quality of Life Inventory (PedsQL) questionnaire was used to evaluate their quality of life.

**Results:** There were 1,230 completed questionnaires for analysis. The prevalence of allergic rhinitis alone, asthma alone and diseases co-occurrence was 32.8%, 7.2%, and 12.7% respectively. Pupils with respiratory allergy had significantly lower PedsQL mean scores than healthy pupils, for all dimensions ( $p < 0.006$ ). The greatest reduction of the PedsQL mean score was for emotional functioning. Among pupils with allergic rhinitis, those who were also affected with asthma

had significantly lower mean scores, for all quality of life domains (all  $p < 0.001$ ). Compared to allergic rhinitis, asthma significantly reduced PedsQL mean scores in almost all domains ( $p < 0.001$ ), except for physical health.

**Conclusions:** Allergic rhinitis and asthma have a significant influence on the quality of life in young Thai adolescents, in particular regarding emotional functioning. Asthma has stronger negative effects on life quality than allergic rhinitis, especially regarding psychosocial health. (*Asian Pac J Allergy Immunol 2015;33:222-6*)

**Keywords:** allergic rhinitis, asthma, pupils, quality of life, young adolescent

## Introduction

Allergic diseases are increasingly common. According to the worldwide International Study of Asthma and Allergies in Childhood (ISAAC) report, the estimated cumulative prevalence of Thai adolescent, aged 13-14, for allergic rhinitis and asthma were 21.0% and 11.6% respectively in 2006.<sup>1</sup> The burden of respiratory allergy is high, having a strong impact on individuals life quality and on society.<sup>2,3</sup> Allergic rhinitis and asthma affect patients to different extent with variable restriction in the physical, emotional, and social aspects of the patient's life.<sup>4,5</sup> They may be seen as two presentations of the same disease by sharing common epidemiologic, histologic, physiologic and immunopathologic linkages.<sup>6</sup> The personal burden of illness, perceived by patients, cannot be fully evaluated by objective measures of diseases severity, because clinical indices only moderately correlate with how patients feel and are able to function on a daily basis.<sup>4</sup> When measuring quality of life, data are collected directly from the patients, which somewhat differ from those obtained with the conventional measurement used in clinical practice. Instruments for measuring quality of life can be subdivided into generic and specific tools. The generic tools measure multi-dimensions in different health conditions whereas specific tools are focus on measuring particular aspect of a certain disease.<sup>7</sup>

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Submitted date: 4/8/2014

Accepted date: 12/11/2014



There are several epidemiological studies addressing burden of childhood respiratory allergy in Thailand.<sup>8,9</sup> However, the effect of allergic rhinitis or asthma together on the quality of life in Thai population has not yet been evaluated. While, specific instruments, in Thai version, assessing the quality of life related to asthma or allergic rhinitis are available and have been used,<sup>10,11</sup> the synergistic influences of allergic rhinitis and asthma on patients' quality of life have not been investigated, despite their frequent co-occurrence. To date, the Thai version of the generic instrument known as the Pediatric Quality of Life Inventory Core Scales (PedsQL) has been validated and is available for assessing the quality of life for children and adolescents across different health conditions.<sup>12,13</sup> Considering the availability of such instruments, this study aimed to measure the effect of allergic rhinitis or asthma together on the quality of life among young Thai adolescents.

## Methods

A total of 1,440 pupils, aged 12-14 years, were randomly recruited from 4 schools located in Bangkok and surrounding Pathum Thani Province. The self-reported ISAAC and PedsQL questionnaires including assent forms were distributed to pupils in their classrooms. The ISAAC written questionnaire was used to identify who had respiratory allergy including asthma and allergic rhinitis. Subjects were considered to have asthmatic symptoms if wheezing or whistling was experienced. The questionnaire also included questions to delineate their experience of wheezing or whistling in the chest for the past 12 months, if they have ever been diagnosed with asthma. Allergic rhinitis was considered to be present if the subject had experienced repetitive sneezing, rhinorrhea, or nasal congestion when they did not get cold or flu. The questionnaire items further delineated if they had ever experienced repetitive sneezing, rhinorrhea, or nasal congestion for the past 12 months, if they had ever been diagnosed with allergic rhinitis.<sup>1</sup>

The 23-item PedsQL questionnaire encompasses the following subscales: physical functioning (8 items), emotional functioning (5 items), social functioning (5 items), and school functioning (5 items). The instructions accompanying the questionnaire ask how many issues associated with each subscale has been encountered during the past one month. A 5-point response scale is used for the parent proxy-report: (a) "never" score 0, (b) "almost never" 1, (c)

"sometimes" 2, (d) "often" 3, and (e) "almost always" 4. Items are reverse-scored and linearly transformed to a 0-100 scale (0=100, 1=75, 2=50, 4=0), so that higher scores indicated better quality of life.<sup>12</sup> The quality of life scores are reported as two summary scores and one overall score. The Physical Health Summary score (8 items) is the same as the physical functioning subscale and the psychosocial health summary score (15 items) covers the emotional, social, and school functioning subscales. The study was approved by the ethics committee of the Thammasat University.

## Statistical analysis

Statistical analysis was performed using the STATA statistical package, version 9.0. Descriptive statistics were used to account for the characteristics of the subjects in the study. Categorical variables were described as frequency and percentage while continuous variables were described as means and standard deviation (SD). Independent t-tests were used to compare the PedsQL mean scores between healthy subjects and subjects with respiratory allergy. One-way analysis of variance (ANOVA) was used to compare the PedsQL mean scores among the three groups of respiratory allergy with the F-statistic. Subsequently, a series of pairwise t-tests with Bonferroni correction was computed.

## Results

There were 1,230 completed questionnaires used for analysis (completion rate of 85.4%). Subject's characteristics are summarized in Table 1. According to the ISAAC written questionnaire, there were 648 subjects (52.7%) having respiratory allergy. The prevalence of allergic rhinitis alone, asthma alone and their co-occurrence was 32.8%, 7.2%, and 12.7% respectively.

According to the self-reported PedsQL mean scores, subjects with respiratory allergy had significantly lower PedsQL mean scores for all dimensions (all  $p < 0.006$ ) as compared to healthy pupils (Table 2). Both physical and psychological summary mean scores were significantly lower than those of healthy pupils ( $p < 0.001$ ). The greatest reduction of the PedsQL mean score (11.8, 95% confidence interval: 6.3-17.3) was for emotional functioning.

According to pupils with allergic rhinitis, those with allergic rhinitis alone had the highest PedsQL mean scores while those who also had asthma had



**Table 1.** Subjects and family characteristics

	Frequency (%) n=1230
Gender	
Boys	667 (54.2%)
Girls	563 (45.8%)
Maternal age, mean $\pm$ SD, years	38.7 $\pm$ 5.2
Paternal age, mean $\pm$ SD, years	41.9 $\pm$ 5.9
Paternal highest education	
Primary school or lower	189 (15.4%)
Secondary school	535 (43.5%)
Bachelor degree	442 (35.9%)
Higher than Bachelor degree	64 (5.2%)
Body mass index, mean $\pm$ SD, Kg/M <sup>2</sup>	20.0 $\pm$ 14.4
Overweight (BMI>25 Kg/M <sup>2</sup> )	169 (13.7%)
Respiratory allergy	648 (52.7%)
Allergic rhinitis alone	403 (32.8%)
Asthma alone	89 (7.2%)
Co-existence disease	156 (12.7%)

significantly lower mean scores, for all domains (all  $p < 0.001$ ). Compared to allergic rhinitis alone, asthma alone significantly reduced PedsQL mean scores in almost all domains ( $p < 0.001$ ), except for physical health. Among asthmatic subjects, allergic rhinitis significantly reduced PedsQL mean scores for physical health and emotional functioning only ( $p < 0.05$ ).

### Discussion

The high prevalence of allergic rhinitis (45.5%) and asthma (19.9%) in young adolescents was consistent with the previous reports in Thailand.<sup>8,9</sup> The burden of respiratory allergy remained high since the first survey using the ISAAC

questionnaires in 1998 in this country which reported prevalences of allergic rhinitis and asthma of 38.7 % and 13.6% respectively.<sup>14</sup> Our study showed that respiratory allergy significantly reduced quality of life in all the domains explored, especially in relation to emotional aspects.

Among pupils with respiratory allergy, allergic rhinitis had the least effects on quality of life, consistent with results from previous studies.<sup>5,15</sup> Asthma further reduced all aspects of the quality of life in pupils with allergic rhinitis. On the other hand, allergic rhinitis significantly reduced the quality of life, only for physical health and emotional functioning in asthmatic pupils. Psychosocial health was significantly disturbed in asthmatic pupils (regardless of allergic rhinitis). Physical health was comparably disturbed in pupils with isolated allergic rhinitis and isolated asthma. This contrasts with the findings from Leynaert, et al<sup>5</sup> and Kalpaklioglu, et al<sup>15</sup> who reported that asthmatic patients (with or without allergic rhinitis) were more likely to have physical problems. Kalpaklioglu, et al<sup>15</sup> also reported that patients with isolated allergic rhinitis had more issues related to mental health than those with isolated asthma. Patients with allergic rhinitis with or without asthma were associated with impaired psychosocial health. However, diagnostic accuracy, severity distribution, and appropriate treatment in school-based and hospital-based settings may differ and result in different conclusion.

The ISAAC questionnaire has been validated and widely used in epidemiological studies for allergic diseases.<sup>1,8,16</sup> and the asthma definition and diagnostic has shown to have high agreement rate with physician diagnosis.<sup>17</sup> The PedsQL, Thai version, has been validated in terms of internal consistency, reliability and discriminatory properties.<sup>12</sup> While, the strength of this study is that

**Table 2.** PedsQL mean scores (SD) between healthy and respiratory allergy

	Healthy subjects N=582	Respiratory allergy N=648	Mean difference (95% confidence intervals)	p- value
Total Score	82.5 (9.5)	74.1 (10.3)	8.4 (4.8-11.9)	<0.001
Physical Health	86.2 (8.1)	78.2 (13.5)	8.0 (3.9-12.0)	<0.001
Psychosocial Health	80.5 (11.4)	71.9 (10.7)	8.6 (4.6-12.5)	<0.001
Emotional Functioning	76.0 (15.7)	64.2 (15.0)	11.8 (6.3-17.3)	<0.001
Social Functioning	86.4 (12.0)	79.2 (12.9)	7.2 (2.7-11.6)	0.002
School Functioning	79.1 (13.5)	72.2 (13.7)	6.9 (2.0-11.8)	0.006

**Table 3.** PedsQL mean scores (SD) among subjects with respiratory allergy

	Allergic rhinitis alone N=403	Asthma alone N=89	Coexisting disease N=156	p-value by F tests
Total Score	77.1 (10.9)	71.3 (6.08)**	68.1 (7.1)*#	<0.001
Physical Health	79.7 (14.7)	79.2 (8.3)	74.0 (12.6)*#	<0.001
Psychosocial Health	75.8 (11.2)	67.0 (5.5)**	65.0 (6.1)*	<0.001
Emotional Functioning	69.6 (15.2)	60.0 (10.3)**	53.0 (9.1)*#	<0.001
Social Functioning	81.6 (12.4)	76.1 (11.4)**	75.0 (16.9)*	<0.001
School Functioning	76.0 (15.1)	65.0 (8.7)**	66.9 (7.9)*	<0.001

\* A pairwise 't' tests with Bonferroni correction between allergic rhinitis alone group and coexisting group was statistical significance ( $p < 0.001$ ).

\*\*A pairwise 't' tests with Bonferroni correction between allergic rhinitis alone group and asthma alone group was statistical significance ( $p < 0.001$ ).

# A pairwise 't' tests with Bonferroni correction between asthma alone group and coexisting group was statistical significance ( $p < 0.05$ ).

we evaluate quality of life in relation to overall respiratory allergies in Thai patients, there are several limitations. Generalization of the result to the whole population is limited since pupils in the study were randomly recruited from 4 schools, located in the central part of Thailand. Accuracy of identification of allergic rhinitis and asthma by questionnaire-based study in community-based setting is also limited. The sensitivity of the generic tool as PedsQL is another limitation to assess quality of life impairment. Further studies with larger sampling areas in community-based setting and with the consideration of a wider range of diseases in hospital-based setting using specific tools for measuring quality of life in relation to allergic rhinitis or asthma together should complement, corroborate or challenge our results.

In conclusion, respiratory allergy has a significant effect on the quality of life in young Thai adolescents. Emotional functioning is affected the most and plays an important role in psychosocial health disturbance. Asthma affects the quality of life more than allergic rhinitis, especially considering psychosocial health dimensions.

### Acknowledgments

The project was funded by the Faculty of Medicine, Thammasat University. We sincerely thank all the school personnel and all pupils who participated in the study.

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