Mini Version of the Pediatric Asthma Quality of Life Questionnaire (MiniPAQLQ): Validity among Thai Asthmatic Children

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Background: The assessment of the quality of life among patients and their parents is increasingly recognized as an important chronic disease such as asthma.
Objective: The present study assessed the validity and reliability of the Thai Mini PAQLQ in Thai asthmatic children by comparison with the PAQLQ.
Material and Method: The authors performed a 9-week Descriptive cross sectional study. The mini PAQLQ (Thai version) consists of 11 items which are categorized into symptoms, activities, emotions. Cronbach's alpha was used to test for internal consistency reliability. The Pearson's correlation co-efficients was used to test Criterion validity.
Results: 58 patients, aged 7-17 years were recruited in the study. 45 patients completed the study. The mean age of patients was 10.5 ± 2.7 years. The intraclass correlation between PAQLQ and MiniPAQLQ for total, activities and symptoms were moderately strong except in emotion domain (ICC = 0.65). The correlations between the PAQLQ and MiniPAQLQ were 0.80-0.72. Both quality of life questionnaires correlated strongly with the asthma control questionnaire but not with PEFR.
Conclusion: The MiniPAQLQ is valid and reliable when compared to the PAQLQ. It can be used with confidence for monitoring in a pediatric asthma clinic.

Keywords: Children, Asthma, Quality of life, MiniPAQLQ

Asthma is the most common chronic illness in childhood and adolescence, with increased prevalence worldwide[1]. Prevalence of childhood asthma increased from 4.2-13% within the last decade in Thailand[2,3]. Its impact on the child and their family is far reaching.

In evaluating patients with asthma, the authors generally rely on reported clinical symptoms, examination and physiological measures such as an apulmonary function test, although these do not directly assess the effects of asthma on daily living and have limitations in children.

Such frequency of symptoms leads to a significant number of days lost in school attendance, interference with physical exercise, and under achieving at school because of interrupted sleep. In cases of more severe asthma, the more frequent amount of school absences may affect the individual's education and possibly choice of career[4]. In addition to the extensive individual burden of asthma, the burden on the family is substantial. Additional housework may be required to reduce the child's exposure to potential environmental triggers. Time "off work" may also be required to take care of a sick child in cases of severe asthma[5,6].

The assessment of the quality of life among patients and their parents is increasingly recognized as an important health issue, especially in chronic diseases such as asthma[7,8]. Several benefits assist in the monitoring of a patients treatment, a combination of understanding the patient's emotions[9], and the increased effectiveness of communications between patients and physicians.

The standard and quality of questionnaire can aid a physician to emphasize the vital dimensions of patient care, and improving the functioning and wellbeing of the patient[10]. The Pediatric Asthma Quality of life Questionnaire (PAQLQ) is a validation

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tool to measure the problems of pediatric asthma experienced in the lives of patients, which was developed and validated by Juniper et al[11]. It is a disease-specific questionnaire of asthma by asking children with asthma to identify 23 items including physical, emotion and activity. The questionnaire has been translated into Thai accommodates cultural differences and behavior that establish validity, reliability and responsiveness by Poachanukoon et al[12]. However, the original version PAQLQ take a long time to complete and require trained personnel to administer it, to ensure the same information is recorded each time. The authors developed a mini version of the pediatric asthma quality of life questionnaire (PAQLQ) for Thai asthmatic children to identify all three domains most relevant to them and to reduce the time taken in answering the questionnaire.

The presented evaluate the validity, and reliability of the Thai miniPAQLQ in comparison to the Thai standard PAQLQ.

Material and Method
Subjects

The present study was conducted between March 2013 and December 2013. Children who were diagnosed asthma for at least 6 months were enrolled from the Pediatric allergy clinic, Thammasat Hospital, Pathumtani. Diagnosis of asthma was defined by the GINA guideline. Patients aged 7-17 year old were eligible. Children had to be able to perform a reliable lung function test (PEFR and/or Spirometry) and understand the Thai version of the questionnaire. Children who had illnesses other than asthma that might have an impact on their health-related QoL were excluded.

Ethical approval was granted by the Ethics Committee of the Faculty of medicine Thammasat University. Signed informed consent was obtained from all parents. The children were invited to consent or decline the offer to participate in the study depending on their age and level of understanding.

Study design

In this 8-week Descriptive Cross-sectional study, all the children received standard care according to GINA guidelines on the management of asthma[13]. Each visit was undertaken by the same specialist for continuity in evaluation and management. The interviewer was a member of the pediatric clinic trained in the administration of the disease-specific questionnaire (PAQLQ) to ensure accuracy and reliability of the data and reduce bias.

The children were assessed at first week while attending routine outpatient appointments at the Pediatric allergy clinic, Thammasat Hospital. The date was recorded on the day of enrollment, and was used to assess the internal consistency of the questionnaire including patient symptoms, B-agonist, Spirometer and/ or PEFR before taking asthma medications, and for assessing demographic characteristics.

After recruitment, patients were reevaluated at 4 and 8 weeks later. At each visit, the patients completed the Mini PAQLQ by themselves, and then they were interviewed for standard PAQLQ. After that, they answered a Siriraj asthma control questionnaire, and were measured by lung function test by PEFR. Siriraj asthma control questionnaire development was validated and reliability by Ratikorn et al consisted of 5 items including activity 1 item , medication 1 item and symptoms 3 items[14].

The children were encouraged to answer the questions by themselves. If they failed to understand the Question, the interviewer simply repeated the question without explaining or changing any of the questions in the questionnaire. Parents were told explicitly not to interrupt the interviewer as to ensure that the children were not influenced by their parent's opinion. Parents could sit behind or slightly to the side of the child during the interview.

The questionnaires were asked in the same order at each visit. The Mini PAQLQ was complete first followed by the standard PAQLQ and asthma control questionnaire. The first visit took approximately 30 minutes and approximately 15-20 minutes in the other visit.

Outcome measures

The PAQLQ and Mini PAQLQ consist of three domains (symptoms, activity, and emotional function). All domains have impact on the quality of life during the previous week. Patients answered both types of questions verbally. Responses to each domain are scored on a standard scale of 1-7 (where 1 indicates maximum impairment and 7 indicates no impairment) in Thai language as similar to published studies [12]. The Questions are equally weighted and their response combined to create mean scores for each domain and a mean score for overall quality of life.

The PAQLQ contain 23 questions including the 10 symptom questions (such as wheezing cough); the activity limitation 5 questions (such as play, sport) and the emotional function 8 questions (such as

frightened, frustrated). The miniPAQLQ was developed using recognized item reduction techniques and ANOVA for shortening the quality-of-life questionnaire[15,16]. Each item was shown as a function of each severity indicator separately, ranked from best to worse, following which the top item was selected. The miniPAQLQ contains 11 questions each relating to the three domains: symptoms 5 questions, activity limitation 3 questions, and emotional function 3 questions). It is suitable for children over 7 years old to understand the questionnaire.

Statistical analysis

The sample size of 44 subjects calculated by Standardized mean difference (Cohen's d) effect sizes that the difference in the response of matched pairs is normally distributed with standard deviation 1 and moderate sample size bias 0.5 base on 90% power at the 0.01 level of significance (Two tailed). Compare original PAQLQ and miniPAQLQ by intraclass correlation coefficient (ICC) are greater than 0.70, which indicates good consistency between the two questionnaires. Using Cronbach'alpha in each domain and each questionnaire, are greater than 0.8, which indicates good internal consistency. Cross-sectional and longitudinal validity of original PAQLQ and miniPAQLQ evaluate by calculating the Pearson's correlation co-efficient.

All statistics and data were analyzed using SPSS statistics version 17.0 (Chicago, USA). A p-value of <0.05 was considered statistically significant.

Results

Fifty-eight subjects were enrolled; the forty-five children completed the study. Others lost follows-up. The mean age of patients was 10.5 ± 2.7 years (ranges 7-17years). Most of asthmatic patients were boys (67.2%). Most of asthmatic children had allergic rhinitis (89.7%). Forty-nine patients underwent skin prick testing. 84.5% of patients show positive results. The most common aeroallergens were house dust mite and cockroaches. Most of patients (72.4%) were classified as asthma controlled. Demographic data and baseline characteristic are shown in (Table 1). For overall quality of life scores and all domains showed good quality of life scores. There were no differences in scores between PAQLQ and miniPAQLQ. At week 1, Cronbach's alpha coefficients for overall and all domains were 0.85-0.97 in PAQLQ and 0.89-0.72 in miniPAQLQ. The correlation between the two instruments was 0.80-0.72. At week 2, Cronbach's alpha

Table 1. Patient characteristics in the validation study (n = 58)

Age (mean ± SD)	10.5 (2.74)
Male (%)	39 (67.2)
BMI (mean ± SD)	19.31 (5.43)
PEF (mean of % predicted ±SD)	93.12 (16.14)
Co-morbidity (%)	
Allergic rhinitis	52 (89.7)
Allergic conjunctivitis	2 (3.4)
Allergic rhinoconjunctivitis	2 (3.4)
Allergic rhinitis and atopic dermatitis	2 (3.4)
Passive smoking (%)	15 (25.9)
Family of atopic disease (%)	35 (60.3)
Pet in the house (%)	30 (51.7)
Skin prick test (%)	
Negative results	9 (15.5)
HDM	10 (17.2)
Flowers	1 (1.7)
Cockroach	3 (5.2)
Animal hair	1 (1.7)
HDM + Flowers	3 (5.2)
HDM + Cockroach	16 (27.6)
HDM + Animal hair	1 (1.7)
Cockroach + Animal hair	1 (1.7)
HDM + Cockroach + Animal hair	5 (8.6)
HDM + Cockroach + Flowers	5 (8.6)
All (HDM + Cockroach + Animal hair)	3 (5.2)
Level of asthma control (%)	
Control	42 (72.4)
Partly control	7 (12.1)
Uncontrol	9 (15.5)
Asthma reliever medication (%)	
None	33 (56.9)
Short-acting β2-agonist	25 (43.1)
Asthma controller medication (%)	
None	29 (50)
ICS	15 (25.9)
ICS + LABA	11 (19)
ICS + LABA + LTRA	2 (3.4)
IT	1 (1.7)

Data are presented as mean ± SD or number. BMI = body mass index; PEF = peak expiratory flow; HDM = house dust mite; ICS = inhaled corticosteroid; LABA = long-acting β2-agonist; LTRA = Leukotriene receptor antagonist: IT = Immunotherapy

coefficients for overall and all domains were 0.96-0.86 in PAQLQ and 0.89-0.72 in miniPAQLQ. The correlation between the two instruments was 0.88-0.73. At week 3, Cronbach's alpha coefficients for overall and all domains were 0.93-0.77 in PAQLQ and 0.90-0.78 in miniPAQLQ. The correlation between the two instruments was 0.86-0.65.

Comparing original PAQLQ and Mini PAQLQ by intraclass correlation coefficient (ICC) were greater than 0.70, which indicates good consistency except in emotion in week 3 (ICC = 0.65). There was a correlation between the two questionnaires except in emotion week 3 (Pearson's correlation co-efficient = 0.68). Each domain and each questionnaire had moderate internal consistency. (Table 2-4) shows the correlation between two questionnaires at the first three clinic visits. The cross-sectional validity between PAQLQ, miniPAQLQ and clinical outcome is shown in (Table 5). The correlation between each of the questionnaires and the Siriraj asthma control Questionnaire was strong (-0.53 to -0.79), but the correlation of each questionnaire

Table 2. Pediatric Asthma Quality of Life Questionnaire (PAQLQ) and Pediatric miniAsthma Quality of Life Questionnaire (miniPAQLQ) at Visit 1 (n = 45)

| Domain	PAQLQ[+] (±SD)	MiniPAQLQ[+] (±SD)	ICC	Correlation pearson	PAQLQ Cronbach's alpha	MiniPAQLQ Cronbach's alpha
Overall	5.70±1.17	5.12±1.19	0.80 (0.67-0.89)*	0.80	0.97	0.89
Symptoms	5.55±1.28	5.02±1.30	0.72 (0.55-0.84)*	0.72	0.93	0.72
Emotions	5.86±1.16	5.23±1.40	0.75 (0.60-0.85)*	0.76	0.92	0.84
Activity	5.69±1.18	5.19±1.26	0.75 (0.58-0.85)*	0.75	0.85	0.74

[+] = measured on 7-point scale where 7 = no impairment and 1 = maximum impairment (mean ± SD)
* p-value <0.01, ICC = intraclass correlation coefficient

Table 3. Pediatric Asthma Quality of Life Questionnaire (PAQLQ) and Pediatric miniAsthma Quality of Life Questionnaire (miniPAQLQ) at Visit 2 (n = 45)

Domain	PAQLQ[+] (±SD)	MiniPAQLQ[+] (±SD)	ICC	Correlation pearson	PAQLQ Cronbach's alpha	MiniPAQLQ Cronbach's alpha
Overall	5.91±1.06	5.66±1.01	0.88 (0.79-0.93)*	0.87	0.96	0.89
Symptoms	5.84±1.11	5.63±1.19	0.80 (0.67-0.89)*	0.81	0.91	0.83
Emotions	6.10±1.11	5.91±1.17	0.80 (0.66-0.87)*	0.79	0.93	0.82
Activity	5.75±1.14	5.48±1.15	0.73 (0.55-0.84)*	0.72	0.86	0.76

[+] = measured on 7-point scale where 7 = no impairment and 1 = maximum impairment (mean ± SD)
*p-value <0.01, ICC = intraclass correlation coefficient

Table 4. Pediatric Asthma Quality of Life Questionnaire (PAQLQ) and Pediatric miniAsthma Quality of Life Questionnaire (miniPAQLQ) at Visit 3 (n = 45)

Domain	PAQLQ[+] (±SD)	MiniPAQLQ[+] (±SD)	ICC	Correlation pearson	PAQLQ Cronbach's alpha	Mini PAQLQ Cronbach's alpha
Overall	6.07±0.84	5.86±0.96	0.83 (0.72-0.91)*	0.85	0.93	0.90
Symptoms	6.05±0.88	5.91±0.99	0.82 (0.71-0.90)*	0.83	0.88	0.78
Emotions	6.30±0.85	5.97±1.16	0.65 (0.44-0.79)*	0.68	0.88	0.84
Activity	5.75±1.12	5.60±1.33	0.86 (0.76-0.92)*	0.87	0.77	0.85

[+] = measured on 7-point scale where 7 = no impairment and 1 = maximum impairment (mean ± SD)
* p-value <0.01, ICC = intraclass correlation coefficient

Table 5. Cross-sectional validity (Pearson correlation coefficient) (n = 45)

Instrument	Siriraj asthma control questionnaire		PEFR	
Visit	PAQLQ	MiniPAQLQ	PAQLQ	miniPAQLQ
1	-0.54*	-0.53*	0.11+	0.12+
2	-0.64*	-0.64*	0.19+	0.17+
3	-0.79*	-0.75*	0.07+	0.19+

* *p*-value <0.01; + *p*-value >0.01
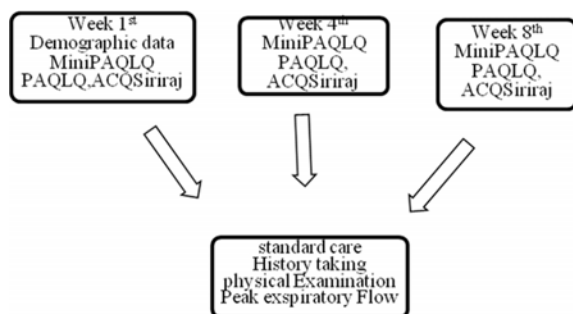
Fig. 1 Descriptive of administration of the questions each week.

with PEFR was not (0.07 to 0.19).

Discussion

The miniPAQLQ scores strongly correlated with the Thai standard PAQLQ. The authors found acceptable internal consistency (alpha >0.7) for both questionnaires except in the emotion domain. Same physician and same interview that was a member of the pediatric clinic trained in the administration of the disease-specific questionnaire (PAQLQ) to ensure accuracy and reliability of the data and reduce bias. This result suggested that the emotion questions had been modified more in the miniPAQLQ for Thai asthmatic children. The strength of correlation is the same as previous studies[17]. The PAQLQ and miniPAQLQ were good in internal consistency. The very poor correlation of the PAQLQ and miniPAQLQ with lung function observed in the present study was a similar to results in previous studies[12,18]. A single measurement FEV1 in each visit may not accurately reflect clinical condition throughout an entire month. The patients who completed the PAQLQ who needed an interviewer to spend more time than with the miniPAQLQ question-naire done by self-administration. The present study did not measure the responsiveness of this question-naire because most of patients in that period had good asthma control throughout the study. However, the results in a previous study in Thailand showed good responsiveness of the original PAQLQ. Further study on the responsiveness of miniPAQLQ should be evaluated.

Conclusion

The miniPAQLQ showed good correlation with PAQLQ except in the emotional domain. Both instruments can be used for asthma monitoring and research.

What is already known on this topic?

There has miniPAQLQ in English that is used worldwide which has good correlation in symptoms, emotion, activity among Caucasians whose weather conditions and culture are not the same as in Thailand. MiniPAQLQ that validate Caucasians might not be suitable for Thailand.

What this study adds?

This present is the first miniPAQLQ in Thai version that assessment of the quality of life among asthmatic patients in Thailand. It may be used with confidence in monitoring patients in an asthma clinic.

Potential conflicts of interest

None.

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Appendix 1. Item selection for the miniAsthma Quality of Life Questionnaire

Question No.	Original PAQLQ in Thai version	MiniPAQLQ Thai version
1a	Activity (exercise)	
2a	Activity with animal	omit
3a	Activity (leisure)	
4s	Symptom (cough)	
5e	Emotion (be irritable)	
6s	Symptom (tried)	omit
7e	Emotion (worried)	
8s	Emotion (bothering)	omit
9e	Emotion (angry)	omit
10s	Symptom (wheezing)	
11e	Emotion (feel annoyed)	omit
12s	Symptom (chest tightness)	
13e	Emotion (feel different from friend)	omit
14s	Symptom (deep breath)	
15e	Emotion (feel worried because unable to catch up with friends)	omit
16s	Symptom (woken at night)	omit
17e	Emotion (feel frustrated)	
18s	Symptom (Short of breath)	omit
19a	Activity (couldn't catch up with friend because of asthma)	omit
20s	Symptom (sleepless)	
21e	Emotion (frighten because of asthma)	
22a	Activity (asthma bothered activity last week)	
23s	Symptom (difficult to get deep breath)	omit

Appendix 2. MiniPAQLQ with multiple choices

1. (Activity) How limited have you been during last week doing exercise (such as running, swimming, bicycling, climbing a ladder, uphill) as a result of your asthma?

    1. Totally limited   2. Extremely limited   3. Very limited   4. Moderate limitation

    5. Some limitation   6. A little limitation   7. Not at all limited

2. (Activity) How limited have you been during last week doing activity with your friends and family (such as playing on the play ground or picnic) as a result of your asthma?

    1. Totally limited   2. Extremely limited   3. Very limited   4. Moderate limitation

    5. Some limitation   6. A little limitation   7. Not at all limited

3. (Symptoms) How much of the time did the cough bothering you last week?

    1. All of the time   2. Most of the time   3. A good bit of the time   4. Some of the time

    5. A little of the time   6. Hardly any of the time   7. None of the time

4. (Symptoms) How much of the time did the wheezing that bothering you last week?

    1. All of the time   2. Most of the time   3. A good bit of the time   4. Some of the time

    5. A little of the time   6. Hardly any of the time   7. None of the time

5. (Symptoms) How much of the time did tightness of chest that bothering you last week?

    1. All of the time   2. Most of the time   3. A good bit of the time   4. Some of the time

    5. A little of the time   6. Hardly any of the time   7. None of the time

6. (Activity) Let you think about activity that you did last week, how limited did the asthma bothering you when you doing that activity?

    1. Totally limited   2. Extremely limited   3. Very limited   4. Moderate limitation

    5. Some limitation   6. A little limitation   7. Not at all limited

7. (Emotion) How much of the time did you moody about asthma last week?

    1. All of the time   2. Most of the time   3. A good bit of the time   4. Some of the time

    5. A little of the time   6. Hardly any of the time   7. None of the time

8. (Emotion) How much of the time did you worried about asthma last week?

    1. All of the time   2. Most of the time   3. A good bit of the time   4. Some of the time

    5. A little of the time   6. Hardly any of the time   7. None of the time

9. (Emotion) How much of the time did you annoyed because of asthma last week?

    1. All of the time   2. Most of the time   3. A good bit of the time   4. Some of the time

    5. A little of the time   6. Hardly any of the time   7. None of the time

10. (Symptoms) How much of the time did breathlessness that bothering you last week?

    1. All of the time   2. Most of the time   3. A good bit of the time   4. Some of the time

    5. A little of the time   6. Hardly any of the time   7. None of the time

11. (Symptom) How much of the time did sleepless at night because of asthma last week?

    1. All of the time   2. Most of the time   3. A good bit of the time   4. Some of the time

    5. A little of the time   6. Hardly any of the time   7. None of the time

ทดสอบความเที่ยงความน่าเชื่อถือของแบบสอบถามคุณภาพชีวิตของเด็กโรคหืดฉบับย่อในเด็กไทย

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ภูมิหลัง: การประเมินคุณภาพชีวิตของคนไข้ผู้ป่วยและผู้ปกครองจำเป็นในโรคที่มีผลต่อสุขภาพหลายด้านและยาวนานอย่างเช่น โรคหืด

วัตถุประสงค์: เพื่อทดสอบความเที่ยงความน่าเชื่อถือของชุดคำถามประเมินคุณภาพชีวิตของเด็กโรคหืดฉบับย่อเป็นภาษาไทยเทียบกับชุดคำถามฉบับเต็ม (PAQLQ)

วัสดุและวิธีการ: เป็นงานวิจัยเชิงพรรณนาแบบตัดขวางใช้เวลาติดตามการรักษา 9 สัปดาห์ ชุดคำถามฉบับย่อ 11 ข้อ ประกอบด้วยการประเมินคุณภาพชีวิต 3 ส่วนได้แก่ อาการ, กิจกรรม, อารมณ์ ซึ่งแต่ละส่วนมีคะแนนตั้งแต่ 0 ถึง 7 โดยคะแนนที่สูงบ่งบอกถึงคุณภาพที่ดีกว่าใช้ค่า Cronbach's alpha ในการประเมินความเที่ยงความน่าเชื่อถือภายในชุดคำถามและค่า Pearson's correlation co-efficients ประเมินความเที่ยงความน่าเชื่อถือระหว่างชุดคำถาม

ผลการศึกษา: มีผู้เข้าร่วม 58 รายจากกลุ่มอายุ 7-17 ปี ติดตามการรักษาสมบูรณ์ 45 คน มีอายุเฉลี่ย 10.5±2.7 ปีความเที่ยงความน่าเชื่อถือระหว่างชุดคำถามโดยใช้ค่า intraclass correlation coefficient (ICC) พบว่าชุดคำถามทั้ง 2 ด้าน โดยรวม, กิจกรรม, อาการ มีความเที่ยงความน่าเชื่อถือระดับดียกเว้นด้านอารมณ์ (ICC = 0.65). Pearson's correlation co-efficients มีค่า 0.80-0.72 และมีความสัมพันธ์สอดคล้องกับชุดคำถาม ประเมินการควบคุมอาการ แต่ไม่มีความสัมพันธ์สอดคล้องกับเครื่องวัดความจุปอด

สรุป: ทั้งชุดคำถามฉบับเต็มและฉบับย่อมีความเที่ยงความน่าเชื่อถือ สามารถนำมาใช้ประโยชน์ในการติดตามอาการ ผู้ป่วยโรคหืดได้