

Supplemental Information

MORE DETAILS ABOUT THE STUDY SETTINGS

Hong Kong is 1 of the most densely populated cities in the world (6690 persons per square kilometer).⁸⁰ About 11.1% of the total population (804 000) is made up of children aged 15 years or below.⁸⁰ The estimated local prevalence of asthma in children is 10.2%.⁸¹ The study hospital is a public, acute care hospital under the regulation of the Hong Kong Hospital Authority. The hospital serves 2 out of 18 districts in Hong Kong. In 2016, these 2 districts had a total child population of 132 000 (15.7% of the total population under the age of 14 in Hong Kong).⁸²

The Department of Paediatric and Adolescent Medicine of the study hospital provides outpatient services in the ambulatory care clinic (ACC) and in a nurse-led clinic for children aged 17 years or below with respiratory health problems. These children are referred to these 2 clinics from private practitioners' clinics, the general outpatient clinics, or the inpatient wards where the child has been hospitalized because of an asthma attack and requires additional outpatient follow-ups.

The ACC is a specialist outpatient clinic where children (accompanied by their parents) who have been diagnosed with asthma, allergic rhinitis, pneumonia, and obstructive sleep apnea can access medical consultation services provided by pediatricians and receive education from an advanced practice nurse on how to manage their condition. In

general, parents and their children diagnosed with asthma will visit to the ACC once every 3 to 4 months for a review of the child's asthma symptoms, asthma action plan, and medication regimen (eg, ICSs or inhaled bronchodilators). If they miss the appointment, the nurses in the clinic will call the parents back and arrange another appointment within 1 month. Every month, ~380 to 400 children attend the ACC for outpatient care, one-fifth of whom (80 children) have asthma.

The nurse-led clinic is another outpatient clinic in which children with asthma, who have been hospitalized repeatedly because of asthma attacks, receive an additional asthma consultation service from an advanced practice nurse specializing in pediatric respiratory care. Every month, ~40 to 50 children with asthma (accompanied by their parents) visit the nurse-led clinic for the above service.

MORE DETAILS ABOUT MEASURES

Six parental outcomes were assessed at baseline, postintervention, and at 6 months postintervention as the secondary outcomes. The psychometric properties of the instruments for assessing the parental outcomes are stated in the following.

PF

The Acceptance and Action Questionnaire-II was used to assess the PF of the parents.⁴⁸ The parents rated 7 statements on a 7-point Likert scale from 0 (never) to 4 (always). The possible range of scores for each

scale ranging from 1 (never true) to 7 (always true) (eg, "My painful experiences and memories make it difficult for me to live a life that I would value"). A higher total score indicates poor PF. The possible range of scores is 1 to 7. The Acceptance and Action Questionnaire-II exhibited good internal consistencies (the mean of the $\alpha = 0.84$; range $\alpha = 0.86-0.88$) and test-retest reliabilities over a 3-month interval ($r = 0.81$) and 12-month interval ($r = 0.79$), respectively.⁴⁸

Psychological Adjustment to the Child's Asthma

The PEI scale was used to capture the psychological adjustment of parents in caring for a child with asthma.^{49,50} The PEI scale contains 25 statements with 3 subscales for assessing the illness-specific psychological distress experienced by parents who have a child with chronic illness, including guilt and worry (eg, "I feel guilty because my child became ill while I remained healthy"), unresolved sorrow and anger (eg, "I am jealous of parents who have healthy children"), and long-term uncertainty (eg, "I worry about whether my child will be able to live independently as an adult"), together with 1 subscale on perceived emotional resources (eg, "I feel ready to face challenges related to my child's well-being in the future"). The parents rated the degree to which each statement applied to them over the past month on a 5-point Likert scale from 0 (never) to 4 (always). The possible range of scores for each

PECI subscale is 0 to 4. The PECI scale had adequate internal consistencies (α in each subscale = 0.72–0.89)⁴⁹ and test-retest reliabilities over a 2-week interval (r in each subscale = 0.83–0.86).⁵⁰ The PECI also possessed strong construct validity. It has significant correlations with other standardized measures of parental adjustment, such as the Brief Symptom Inventory, Caregiver Strain Questionnaire, and Global Assessment of Functioning.^{49,50}

Psychological Symptoms

The DASS-21 (a short form of the original Depression Anxiety Stress Scale-42) with 21 statements was used to evaluate the states of depression (eg, “I felt that I had nothing to look forward to”), anxiety (eg, “I felt I was close to panic”), and stress in adults (eg, “I found myself getting agitated”).⁵¹ The parents rated the degree to which each statement applied to them in the past week on a 4-point Likert scale from 0 (does not apply to me at all) to 3 (applies to me very much or most of the time). The subscale scores for depression, anxiety, and stress subscale were multiplied by 2, with 0 to 42 being the possible range of scores. A higher score in each subscale indicates more severe symptoms of depression, anxiety, or stress. The cutoff scores indicating at least a mild level of psychological symptoms for an individual are 9 for depression, 7 for anxiety, and 14 for stress, respectively.⁸³ The reliabilities for the depression, anxiety, and stress subscales in DASS-21 were 0.82, 0.88, and 0.90, respectively.⁵¹

Asthma Knowledge

The AKQ was used to assess the parents’ knowledge of understanding childhood asthma.⁵² The AKQ has 25 true and false statements concerning children’s asthma symptoms, types of asthma triggers, common asthma treatments, and preventive strategies (eg, “Smoking in the home can make a child’s asthma worse”). The parents

were asked to choose the right answer to each statement. Better asthma knowledge is indicated in a higher score. The possible range of scores is 0 to 25. The AKQ had adequate internal consistency (α = 0.69) and representativeness to cover the practical aspects of childhood asthma care as recommended by the national experts in the Child Asthma Management Program executive committee.⁵²

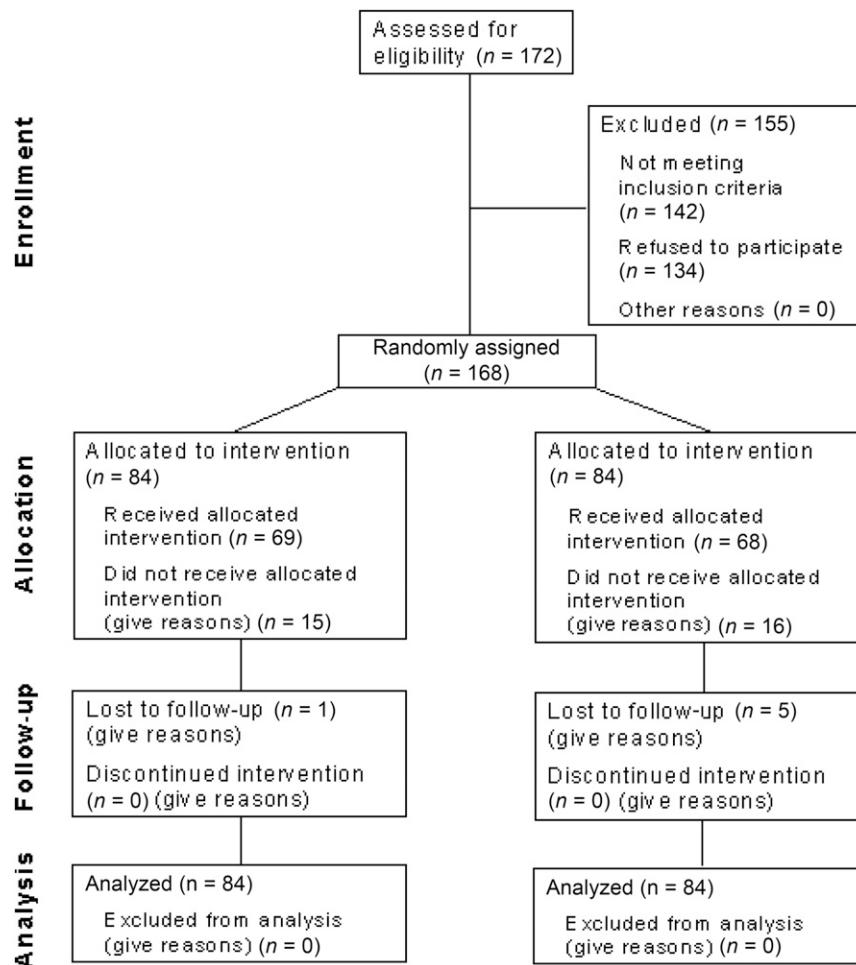
Asthma Management Self-Efficacy

The PAMES was employed to assess the self-efficacy of parents in managing their children’s asthma.⁵³ The PAMES consists of 13 questions with 2 subscales for assessing the self-efficacy of parents in preventing (eg, “How sure are you of being able to use the medication correctly?”) and managing childhood asthma exacerbations (eg, “How sure are you that know when to take your child to the Accident and Emergency Department during a serious breathing problem?”). The parents rated the strength of their beliefs in a variety of situations related to childhood asthma management on a 5-point rating scale from 1 (not at all sure) to 5 (completely sure). The possible range of scores for each PAMES subscale is 1 to 5. Better self-efficacy is indicated in a higher score. The PAMES had satisfactory internal consistency (α of each subscale = 0.77–0.82) and strong construct validity with the self-efficacy of children in managing asthma (r = 0.36).

Quality of Life

The PACQL scale was used to measure the well-being of parents in caring for their children with asthma.⁵⁴ The PACQL has 13 questions with 2 subscales used to assess the emotional function and the activity limitations of parents. The parents recalled their experiences during the previous week and rated them on a 7-point Likert scale from 1 (severe impairment) to 7 (no

impairment). The possible range of scores for each PACQL subscale is 1 to 7. A better quality of life is indicated in a higher score. The PACQL had stable reliabilities within intervals of 4 weeks (intraclass correlation coefficient = 0.80–0.85), and its established minimal clinically important difference score was 0.5.⁸⁴ Using PACQL to measure the quality of life of parents via the PACQL scale has been shown to reflect the current situation of asthma control in children.⁸⁵

**SUPPLEMENTAL FIGURE 2**

The CONSORT diagram used to show the flow of participants through each stage of a randomized trial.

SUPPLEMENTAL TABLE 6 Part 1: Your Index Child's Information

	Question	Answer
A1	Your child's sex	Male or female
A2	Your child's age	_____ years old
A3	What was the age of your child when he or she was first diagnosed with asthma?	_____
A4	Date of your child's latest asthma attack	____ yy ____ mm ____ dd

Question items in the questionnaire (English version) were to be completed by parents for reporting their child's asthma conditions. The following instructions were given: please tick the box or fill in the blanks as appropriate.

SUPPLEMENTAL TABLE 7 During the Past 30 Days, How Often Did Your Child Have the Following Conditions?

	Question	Answer
B2	Symptoms of asthma (chronic cough, wheezing, shortness of breath, or chest tightness) throughout the day?	_____day(s)/ per week
B3	Symptoms of asthma (chronic cough, wheezing, shortness of breath, or chest tightness) making it difficult for him/her to stay asleep at night?	_____night(s) per week
B4	Symptoms of asthma (chronic cough, wheezing, shortness of breath, or chest tightness) that needed to be relieved with ventolin (blue inhaler)?	_____day(s) per week
B5	Symptoms of asthma (chronic cough, wheezing, shortness of breath, or chest tightness) that caused your child slow down or stop during play or exercise?	_____ day(s) per week
B6	During the past 6 months, how many different times did your child stay in any hospital overnight or longer because of his/her asthma?	
B6	Public and/or private hospital admission	No or yes, _____time(s)
B7	During the past 6 months, how many times did your child visit an emergency department because of his/her asthma?	No or yes, _____time(s)
B7	Besides those emergency department visits, during the past 6 months, how many times did your child see a doctor for treatment of worsening asthma symptoms?	
B8	General outpatient clinics	No or yes, _____time(s)
B9	Private practitioners' clinics	No or yes, _____time(s)

Question items in the questionnaire (English version) were to be completed by parents for reporting their child's asthma conditions. The following instructions were given: please tick the box or fill in the blanks as appropriate.

SUPPLEMENTAL REFERENCES

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