Supplementary table 2. Characteristics of the included studies

Number	Study, year, country	Study design	Intervention	Tools	Sample	Educator	Setting	Outcomes	NOS Score[a]	Support for judgement
1	Taggartat[33], 1991, USA, Pubmed	Controlled clinical trial	increasing patient and parent confidence and skills, not just knowledge, relative to the management of acute episodes of asthma and on increasing referral to a continuous medical care setting.	Written materials, videotape presentations, nurse discussion (face to face & online)	40 children aged 6-12 years	nurses, physicians, health educators, a child life specialist and a psychologist	Hospital	Study children with more severe asthma experienced a statistically significant decrease in emergency room visits.	S*** C* O***	(1) No control group (2) Children's disease might be improved naturally through time
2	Shelledy[34], 2005, USA, Pubmed	Longitudinal study	physical assessment of the patient; environmental assessment and	Written materials such heck lists, etc (face to face)	18 asthmatic children, ages 3 to 18 years	Respiratory therapist	Home	There were significant reductions in hospitalizations, ED visits and physician	S*** C* O***	(1) does not control time-dependent variables or or variability in the severity of

			recommendations; Medications and knowledge about equipment					office visits.		illness
3	Shaak[35], 2020, USA, Pubmed	Longitudinal study	Asthma symptoms, common asthma triggers and steps to avoid them and medications	Educational curriculum (face to face)	81 children aged between 1 to 15 years	Community health workers	Community and home	There was also a significant decrease in the number of Emergency Department visits and hospital days.	S*** C* O**	small sample size, the lack of data of comparison group and drop-out group
4	Safi[36], 2016, USA, EMBASE	Longitudinal study(retrospective)	Basic asthma pathophysiology and medications; increasing self-management skills, including proper	Written materials (face to face)	172 children age 36 months – 18 years	Social workers	clinic	asthma education was effective in reducing healthcare utilization by reducing rates of ED	S*** * C E**	(1) Missing data (2) the level of intervention varies (3) patients may not mention cares outside of hospitals

			technique of medication delivery devices, etc					visits and hospitalizations.		
5	Riera[19], 2014, USA, Pubmed	Longitudinal study	(a)medication recognition and administration, (b) peak flow use (if their child was 5 years old) and (c) action plan dissemination.	Education fair (face to face)	17 care givers of children ages 1-12 years old	Physician	Community	Mean clinic visits, emergency department visits and hospitalizations remained unchanged.	S*** C O** *	(1) comparison maybe influenced by other reasons (2) the information may not be accurately imparted
6	Montalvo [28], 2011, USA, EMBASE	Longitudinal study	Medical education related to health behaviors	Home visit (face to face)	109 children from 6 months to 21 years of age	Health educator and health representative	Home	The program has succeeded in decreasing both ED visits and hospitalizations	NA	Only the abstract is available.
7	Marshall	Longitudinal study	Asthma	Home visit (face to face)	70 children	Medical	home	Results	S***	(1) outcome

	[37], 2020, USA, Pubmed		self-management education, environmental trigger remediation education, and low-cost trigger remediation supplies			home team		showed significant improvements in asthma control, health care use, and environmental trigger reduction.	* C* O*	was based on caregivers' self-report (2) small sample size (3) pharmacy claims was incomplete and could not be included
8	Condren[40], 2005, USA,	Longitudinal study(retrospective)	basic pathophysiology of asthma, symptoms of asthma, goals of asthma therapy , role of medications, adverse effects of medications, treatment of symptoms,	Questionnaire (face to face)	57 patients with a mean age of 8.5 years	a general pediatrician , a clinical pharmacist, and a registered nurse.Medical residents, medical students, pharmacy resi-dents, and pharmacy	asthma clinic	program decreases hospitalizations, emergency department visits,	S*** C* E**	(1) no comparisons, so time could be one of the impact factors (2) High patient drop-out rate

			recognizing and modifying triggers, etc			students also assisted with the clinic.				
9	Davis [41], 2019, USA, Pubmed	Longitudinal study	Education: (a)identifying the patient's asthma triggers (b) identifying the patient's asthma symptoms(c) goals of asthma treatment	Oral communication (face to face)	12 children (2-6 years old:n=5; 7-12 years old:n=5; 13-17years old:n=2	Asthma educator	hospital	parent/guardian knowledge regarding asthma can be increased and optimal home management improved by personalized, patient-specific education.	S*** C* O**	(1) Small sample size (2) the outcome assessment was done immediate after intervention (3) Other confounding variables
10	Espinoza-Palma[42], 2009, Chile, Pubmed	RCT	(1)a general education about the etiology, triggers, types, severity, and	Oral communication;booklets (face to face)	77 children 5 to 15 years of age（8.0 ± 2.34years old）	Asthma educator(nurse)	hospital	Asthma education with or without a self-management plan during	NA	NA

			treatment of asthma and the correct use of the inhalers with spacers. (2)Children in the ESM group received the same general education and booklet including a self-management guideline.					asthma hospitalization were effective in reducing emergency visits and future rehospitalizations.		
11	Johnson[44], 2006, USA,	A prospective/observational study	(1)provide asthma awareness to learners;(2) teach asthma management skills; and (3) teach parents to manage	The Open Airways of Schools curriculum (face to face)	87 children(mean age: 6.6 years range 7 months – 17 years)	a full-time medically trained project director and four peer asthma educators	School, library	There are improvements in asthma-related outcomes over a 24-month period	S*** C* O*	(1) no comparison (2) low follow up rate (3) selection bias (4) the approach to assign the asthma disease

			asthma.							severity (5) self-report of symptoms
12	Julian [45], 2015, France,	prospective, monocentric, before-and-after,interventional study	The pathophysiology of asthma, the symptoms of the disease, the triggering factors, etc	Written Action Plan; interview;games (face to face)	31 children, aged 5 to 11 years old	the pediatric pulmonologist	hospitals	The program decrease in the overall cost of asthma management	S*** C* O**	The effect time is uncertain
13	Broquet[43], 2013, France, Pubmed	a prospective longitudinal study	MES includes disease knowledge, inducement, family life, inhalation technology and treatment plan	Courses in asthma school;questionnaire (face to face)	27 children and their parents were included. The mean age was 7.02 years.	Asthma educators	Asthma School	Interactive education on asthma improves clinically important outcomes and quality of life in children and their families.	S** C* O***	(1) Small sample size (2)only the patients who knows French were included(3)other confounding variables
14	Calvo [46], 1998, Spain	Controlled observational study	(1) To raise awareness of the disease (2) To	theoretical and practical sessions;questionnaires ;video;meetings;slides and videos;guide booklets (face to face & online)	61 asthmatic children 34% of children are	pediatricians and nurses from two	Health center	Group health education for asthmatic	S*** C* O****	(1) Other confounding variables (2) small sample

			cultivate the concept of self-care (3), improve clinical progress as much as possible.		under 2 years old (21 children), 24% are 3-5 years old (15 children), and 41% are over 5 years old (25 children).	primary health care clinics		children improves both the knowledge and the self-management of the disease by the patients and their parents		size
15	Lebras-Isabet[39], 2004, France, Pubmed	Retrospective and comparative study	inhalation techniques, the role of each prescription treatment, the prediction and management of asthma attack	Meetings (face to face)	66 children (mean age=9.3 years)	Nurses and pediatric pulmonologists	school	Asthmatic children education is a useful tool to improve medical follow-up and to decrease hospitalizations number.	S** C* E** *	(1) Do not consider the extent of intention to receive education (2) the age of children might affect the result

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