ONLINE SUPPLEMENTARY MATERIAL

Text S1: Asthma education intervention

Pre-study training

Before the study started, four "lay educators" received training by the study doctor. These staff had completed secondary school, with a Malawi School Certificate of Education, but had no previous medical education experience or training. All were employed as "fieldworkers" with the Malawi-Liverpool-Wellcome Trust Clinical Research Programme and had received spirometry training (Certificate of Competence in Foundational Spirometry) on their previous projects. The lay educators spent time with the study doctor in the paediatric clinic to gain experience with asthma patients and their families. Formal training comprised four hour-long tutorials (Table S1), with an accompanying training manual for self-study, after which the educators were required to gain at least 80% in a knowledge test (comprising 20 true/false questions) and demonstrate competence at delivering the asthma education session in a role-play session. The educators were supported by the study medical staff and encouraged seek advice throughout the study period.

Table S1. Pre-study asthma training for lay educators

Session	Topic	Key content
1	What is asthma	Chronic inflammation of airways and airway narrowing Recurrent symptoms; cough, wheeze, difficulty breathing Impact of poor asthma control, including death with severe attack Symptoms can be well controlled with inhaled treatment Common triggers for asthma symptoms
2	Asthma treatment	Types of inhaler: relievers (β_2 agonist) and preventers (steroid) Use of a spacer to improve drug delivery Importance of long-term adherence
3	Self-management	Monitoring of symptoms What to do in an asthma attack Asthma Action Plans
4	Practical session	Inhaler technique – how to demonstrate How to deliver an asthma education session

Education session content

Study participants received a 1-hour individualised asthma education session, delivered to the child and their carer by lay educators, with oversight by the study doctor or nurse. A structured approach, with checklist (Table S2), was followed to ensure intra- and inter-educator consistency. Education sessions were conducted in Chichewa, and patients received a written asthma action plan, also in Chichewa.

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Patients with poor control (cACT≤19) or airway obstruction (FEV_1/FVC below lower limit of normal) at the time of the first education session, attended a further session at 6-weeks to check understanding and encourage adherence.

Table S2. Asthma education checklist

General approach	Please tick
Establish good rapport with child and family	
Establish what is known already about asthma, treatments etc	
Explore beliefs, fears and concerns (cause of asthma, effect of medications)	
Content	
What is asthma?	
What symptoms does asthma cause?	
Rationale for treatment – differences between “relievers” and “controllers”	
Encourage adherence, even when control is good	
Inhaler/spacer skills training	
• Including demonstration of inhaler/spacer technique by fieldworker	
• Observe participant’s technique	
Discuss possible triggers and avoidance	
How to recognise worsening symptoms and what to do	
Discuss and provide written asthma action plan	
Arrange next medical review	
Answer any questions	

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Table S3. Baseline responses to cACT questionnaire from participants and carers.

	Question	Score	Responses n (%)
Child	How is your asthma today?	0 (very bad)	1 (0.8)
		1 (bad)	8 (6.7)
		2 (good)	58 (48.3)
		3 (very good)	53 (44.2)
	How much of a problem is your asthma when you run, exercise or play sports?	0 (it's a big problem)	7 (5.8)
		1 (it's a problem and I don't like it)	24 (20.0)
		2 (it's a little problem but it's OK)	71 (59.2)
		3 (it's not a problem)	18 (15.0)
	Do you cough because of your asthma?	0 (yes, all the time)	3 (2.5)
		1 (yes, most of the time)	15 (12.5)
		2 (yes, some of the time)	102 (85.0)
		3 (no, none of the time)	0
	Do you wake up during the night because of your asthma?	0 (yes, all the time)	0
		1 (yes, most of the time)	10 (8.3)
		2 (yes, some of the time)	90 (75.0)
		3 (no, none of the time)	20 (16.7)
Carer	During the last 4-weeks, how many days did your child have any daytime asthma symptoms?	0 (everyday)	0
		1 (19-24 days)	0
		2 (11-18 days)	4 (3.3)
		3 (4-10 days)	28 (23.3)
		4 (1-3 days)	69 (57.5)
		5 (not at all)	19 (15.8)
	During the last 4-weeks, how many days did your child wheeze during the day because of asthma?	0 (everyday)	0
		1 (19-24 days)	0
		2 (11-18 days)	1 (0.8)
		3 (4-10 days)	18 (15.0)
		4 (1-3 days)	42 (35.0)
		5 (not at all)	59 (49.2)
	During the last 4-weeks how many days did your child wake up during the night because of asthma?	0 (everyday)	0
		1 (19-24 days)	0
		2 (11-18 days)	4 (3.3)
		3 (4-10 days)	16 (13.3)
		4 (1-3 days)	53 (44.2)
		5 (not at all)	47 (39.2)

Table S4. Comparison of those with and without spirometry data at 3-month follow-up

	With spirometry data n=99	**Without spirometry data n=15**	**Bivariate analysis**
Age, mean (SD) years	9.7 (2.7)	9.2 (3.3)	p=0.56†
Sex: female, n (%)	35 (35.4)	3 (20.0)	p=0.38‡
Baseline ACT, mean (SD)	20.3 (2.6)	19.7 (2.5)	p=0.43†
Study arm: intervention, n (%)	50 (50.5)	6 (40.0)	p=0.63‡

†Student's t-test for continuous data, ‡Pearson's χ^2 for categorical data