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# Evaluation of the efficacy of asthma information videos ('Moving On Asthma') at improving knowledge in teenage children

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## Abstract

**Introduction:** Asthma is a common inflammatory condition that can be life threatening. The National Review of Asthma Deaths (2014) recommended: *Parents and children...should be educated about managing asthma*. The aim of this study was to assess the efficacy of an educational video on asthma at improving knowledge in adolescent children.

**Methods:** A 3-min asthma education video was shown to young people aged 13–15 years in two contrasting schools. Knowledge of asthma was evaluated using a 6-question form completed at 3 timepoints: baseline (pre), immediately after intervention (post), and 1 week later (delayed). A total of 151 data sets from two schools were analysed.

**Results:** Knowledge was significantly improved immediately after watching the video for four out of six questions, indicating that the video was successful in effectively educating the children about asthma. There was no significant change to responses between immediately after watching the video and a week later, suggesting retention of the knowledge gained from viewing the intervention material.

**Conclusion:** The results suggest acquisition and retention of knowledge in young people after watching a video on asthma, providing evidence to support the use of digital, video-assisted, internet-based learning tools such as the 'Moving on Asthma' website as an aid to regular clinics for young people with asthma.

## KEYWORDS

asthma, children, education, knowledge, transition

## 1 | INTRODUCTION

Asthma is a common inflammatory respiratory condition caused by the paroxysmal and reversible obstruction of the airways; with acute asthma involving both bronchoconstriction and an excessive production of secretions in the airways. This inflammation of the airways

causes the well-known symptoms of wheeze as well as cough, shortness of breath and chest tightness. Asthma is common in adolescence, with at least 14% of 13 to 14-year-old in Western Europe experiencing wheeze over a 12-month period.<sup>1</sup> Asthma can be life threatening and the United Kingdom has the highest rate of deaths due to asthma for 10 to 24-year-olds in Europe.<sup>2</sup>

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In 2014, the UK National Review into Asthma Deaths (NRAD) found there were potentially avoidable factors related to patients and their families in 126 of 195 (65%) deaths, including inadequate information, education and advice on managing asthma. An apparent lack of adherence to advice was also a common finding.<sup>3</sup> One important recommendation made by the NRAD was that 'Parents and children, and those who care for or teach them, should be educated about managing asthma. This should include emphasis on "how," "why" and "when" they should use their asthma medications, recognising when asthma is not controlled, and knowing when and how to seek emergency advice'.

Self-management education is a fundamental aspect of chronic disease management and educational interventions improve adherence and asthma control, lessening the financial burden on health services and improving the quality of life for individual children.<sup>4,5</sup> However, no nationally endorsed educational resources exist for children and families to address this.<sup>6</sup>

The study team has designed an educational video resource: [www.movingonasthma.org.uk](http://www.movingonasthma.org.uk), to support clinicians in adolescent health and equip young people with asthma as they prepare to transition to adult care. The aim of this study was to evaluate the effectiveness of the resource in improving asthma knowledge in both asthmatic and asthma-naïve young people.

## 2 | METHODS

### 2.1 | Ethics and study design

The study design was a prospective observational evaluation of children in a school setting and was approved by the University of Sheffield Ethics Committee (Application 045070).

### 2.2 | Participant selection and recruitment

Senior teachers from a number of secondary schools were identified through existing contacts and approached requesting support with this study, with two expressing interest and the ability to run the study at their school. School A, a co-educational secondary school with an 'average' rating and School B, a grammar school for girls with a rating of 'well above average'. The target year groups were Year 9 and 10 (13 to 15-year-olds). All children in these year groups were invited to take part with no exceptions.

Parents and their young people were given age-appropriate written information via links sent to the administrators at the schools. Parents were asked to provide consent for their child to take part and each student completed an Assent form.

### 2.3 | Intervention and evaluation

The designated intervention was a 3-min video describing and explaining the symptoms of asthma: <https://movingonasthma.org.uk/>

[topic/symptoms/](#). The video was selected from a large video-based resource previously developed by the study team with extensive input from young people and their parents in the form of a series of co-design workshops. This particular video was selected because it was felt by the team to be a video that contained factual information about asthma that could be tested using a quiz. It was also picked as being of a suitable length for use in the study.

The study questionnaire (Supporting Information: Appendix 1) was administered via a 'Google Docs' form at three time-points: pre-intervention ("Pre-test"), immediately post-intervention ("Post-test") and 1 week following the video observation ("Delayed test"). Each participant was assigned a unique identifier.

A link to the 'Google Docs' form was sent to the administrators at the schools. The videos and evaluations were completed in class assembly time. After obtaining parental consent and assent from the young people, each pupil was asked to complete the pre-intervention test. The "Pre-test" included demographic questions about the participants' school and year group. It then asked each participant to state whether they were currently taking any asthma treatment to allow subgroup analysis. Pupils were then shown the video, following which they were asked to complete the "Post-test". The "Delayed test" was completed in assembly time 1 week later.

### 2.4 | Data selection and analysis

Three sets of data were exported to Microsoft Excel for each participant, matched using their unique identifier. Obvious errors were excluded, such as duplicates and unmatched sets. Paired data were analysed for the three time-points using the McNemar test to compare correct and incorrect responses from the same individuals. Subgroup analysis of children with and without a diagnosis of asthma and attending the two separate schools was planned. Significance was assumed at a level of  $p < 0.05$ .

## 3 | RESULTS

The video was shown to 195 children from School A and 138 from School B. After removing incomplete data sets, 151 were included for final analysis, 130 from School A and 21 from School B.

Table 1 shows, for each question, how many of the students provided the correct response in the Pre, Post and Delayed Tests ( $n = 151$ ). There was a significant increase in the number of correct responses between the Pre-test and Post-test for questions 1, 2, 5 and 6. For question 3, there was a nonsignificant increase and for question 4, there was a significant decrease in the number of correct responses. There was no significant change between the Post-test and Delayed test responses for all questions. From the pretest to the Delayed-test there was a significant increase in the number of correct responses for questions 1 and 6 with a small but nonsignificant increase in correct responses for questions 2, 3 and 5 and a small but nonsignificant decrease in the number of correct responses for question 4.

**TABLE 1** Correct responses from young people at both schools combined for the pretest, posttest and Delayed-tests ( $n = 151$ ).

Both schools ( $n = 151$ )												
Question	Pretest		Posttest		Delayed-test		Pre-Post		Pre-Delayed		Post-Delayed	
	Correct	%	Correct	%	Correct	%	$\chi^2$	$p$ Value	$\chi^2$	$p$ Value	$\chi^2$	$p$ Value
1	71	47.0	127	84.1	124	82.1	77.65	<b>&lt;0.01</b>	42.92	<b>&lt;0.01</b>	0.17	0.68
2	130	86.1	141	93.4	138	91.4	5.33	<b>0.02</b>	2.04	0.15	0.31	0.58
3	125	82.8	127	84.1	134	88.7	0.00	1.00	3.37	0.07	2.12	0.15
4	126	83.4	109	72.2	117	77.5	3.67	0.06	2.06	0.15	1.75	0.19
5	138	91.4	145	96.0	144	95.4	12.50	<b>&lt;0.01</b>	3.13	0.08	0.00	1.00
6	44	29.1	88	58.3	79	52.3	72.25	<b>&lt;0.01</b>	23.59	<b>&lt;0.01</b>	2.56	0.11

Note: Table includes  $\chi^2$  and  $p$  Values calculated using McNemar's test. Bold figures represent significant values at a significance threshold of  $p < 0.05$ .

**TABLE 2** Correct responses from young people at School B only for the pretest and posttest only ( $n = 95$ ) and for all three timepoints [ $n = 21$ ].

School B ( $n = 95$ [21])												
Question	Pretest		Posttest		Delayed-test		Pre-Post		Pre-Delayed		Post-Delayed	
	Correct	%	Correct	%	Correct	%	$\chi^2$	$p$ Value	$\chi^2$	$p$ Value	$\chi^2$	$p$ Value
1	38 [10]	40 [47.6]	84 [19]	88.4 [90.5]	[16]	[76.2]	42.19	<b>&lt;0.01</b>	3.13	0.1	1.33	0.25
2	91 [21]	95.8 [100]	93 [21]	97.9 [100]	[21]	[100]	0.17	0.68	*	*	*	*
3	95 [21]	100 [100]	93 [20]	97.9 [100]	[21]	[100]	0.50	0.48	*	*	0.00	1.00
4	88 [21]	92.6 [100]	91 [21]	95.8 [85.7]	[18]	[85.7]	0.44	0.51	1.33	0.25	1.33	0.25
5	84 [21]	88.4 [100]	93 [21]	97.9 [100]	[21]	[100]	7.11	<b>0.01</b>	*	*	*	*
6	28 [7]	29.5 [33.3]	80 [17]	84.2 [76.2]	[16]	[76.2]	46.45	<b>&lt;0.01</b>	5.82	<b>0.02</b>	0.00	1.00

Note: Table includes  $\chi^2$  and  $p$  Values calculated using McNemar's test, where possible. Bold figures represent significant values at a significance threshold of  $p < 0.05$ .

\* $p < 0.05$ .

### 3.1 | School A versus School B

Data were collected at all three timepoints for all children at School B, but only 21 children completed the Delayed test at School B. Results for School A reflected the overall results. Table 2 shows the responses from School B only. Due to small numbers, McNemar's test was not possible for some values. For questions 2 and 5, all children responded correctly in all three tests.

### 3.2 | Asthmatic versus nonasthmatic children

A total of 116 children stated that they were not taking asthma treatment and 14 stated that they were. Due to small numbers, McNemar's test was not possible for some values. Results for the nonasthmatic children reflected the whole group; those with asthma had a significant change from the pretest to the Delayed test for question 1 (Table 3).

## 4 | DISCUSSION

Amongst 151 young people aged 13–15 years, knowledge was significantly improved immediately after watching an asthma education video, based on a six-question quiz, for four out of six questions, indicating that the video was successful in effectively educating the children about asthma. There was no significant change to responses immediately after watching the video and a week later, suggesting retention of the knowledge gained from viewing the intervention material.

Responses from the two contrasting schools were similar although young people at the school attaining 'well above average' ratings gave correct responses to 50% of the questions even before watching the education video. Very few the young people declared themselves to be taking treatment for asthma (14/151) but a significant increase in correct responses for only one of the six questions indicated that ongoing education is needed even in the asthmatic cohort.

Correct responses to one of the questions (question 4) decreased after watching the video in the overall cohort. This may reflect an

**TABLE 3** Correct responses from asthmatic children only for all three timepoints ( $n = 14$ ).

Asthmatics only (n=14)												
Question	Pretest		Posttest		Delayed-test		Pre-Post		Pre-Delayed		Post-Delayed	
	Correct	%	Correct	%	Correct	%	$\chi^2$	p Value	$\chi^2$	p Value	$\chi^2$	p Value
1	7	50	12	85.7	13	92.9	2.29	0.13	4.17	0.04	0	1.00
2	11	78.6	11	78.6	13	92.9	*	*	0.5	0.48	0.5	0.48
3	12	85.7	13	92.9	13	92.9	0.00	1	0.00	1.00	*	*
4	13	92.9	11	78.6	11	78.6	0.25	0.62	0.25	0.62	0.50	0.48
5	12	85.7	12	85.7	12	85.7	*	*	*	*	*	*
6	4	28.6	6	42.9	7	50.0	0.50	0.48	1.33	0.25	0.00	1.00

Note: Table includes  $\chi^2$  and  $p$  Values calculated using McNemar's test, where possible. Bold figures represent significant values at a significance threshold of  $p < 0.05$ .

\* $p < 0.05$ .

omission within the video to educate the information effectively, that the young people already knew the answer and therefore the education was not needed or that the question was not sufficiently effective in testing the young people's knowledge.

Our results concur with Wilson and colleagues who assessed the efficacy of video and print materials for promoting patient education about asthma and found that patients in all of the intervention groups performed significantly better than control participants with video-based materials providing added benefits to retention if patients are able to keep and review the materials they are shown.<sup>7</sup>

Asthma education has traditionally been delivered on a one-to-one basis in a clinic setting with limited scope for regular reinforcement. Digitally delivered content however, addresses this issue, providing a permanent resource that children and families can access as instructed when necessary. In this way the pace of learning can be adapted to meet individual requirements; there is consistency in the advice delivered and, with potential efficiency savings, there is an opportunity to redirect resources.

A limitation of this study is that, as the video resource was evaluated mainly in adolescents who did not have asthma, it cannot be concluded that the video resource will be effective for young people with asthma. The results do however show that asthma education and retention of information can be gained in the adolescent population more generally. The students were aware from the consent process that they would be asked to perform the quiz again a week later, which could have affected their retention and could also have accessed the video again, should they have wanted to, via the 'Moving On Asthma' website which was cited in the participant information leaflet.

The results provide evidence to support the use of the 'Moving on Asthma' website as an educational resource for young people and further research is needed to apply the same methodology to adolescents with asthma, subcategorising the participants by severity and type of care (primary, secondary or tertiary) to clearly understand its use and in which type of setting.

## AUTHOR CONTRIBUTIONS

Adam Gardiner contributed to the conception and design of the work, the acquisition and interpretation of data and drafted the manuscript. Moira Gibbons contributed to the conception and design of the work and critical revision of the manuscript for important intellectual content. Nicki Barker contributed to the conception and design of the work and critical revision of the manuscript for important intellectual content. Heather Elphick contributed to the conception and design of the work, the interpretation of data and critical revision of the manuscript for important intellectual content.

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## CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

## ETHICS STATEMENT

The study design was approved by the University of Sheffield Ethics Committee (Application 045070).

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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