

# Asthma Education: How Much Does it Improve Knowledge of Childhood Asthma Amongst Medical Students and Paramedics?

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## Summary

The objective of this study was to measure the knowledge of childhood asthma among medical students and paramedics. A previously validated questionnaire about childhood asthma was completed by 281 of 314, third and fifth year medical students at Universiti Kebangsaan Malaysia, Kuala Lumpur. Their knowledge of asthma was assessed during the first and last weeks of their paediatric rotation. A similar questionnaire was completed by 23 of 60 paramedics from various medical disciplines in Hospital Kuala Lumpur. They had attended a two-day seminar on respiratory diseases and their knowledge was assessed prior to and six weeks after the seminar. On the initial assessment the mean score for the final year medical students was 24.5, third year medical students 20.9 and paramedics 18.3. After intervention their mean scores increased significantly to 26.3 ( $p < 0.0001$ ), 24.6 ( $p < 0.0001$ ) and 21.3 ( $p < 0.0001$ ). After intervention, the final year medical students improved significantly in all questions except in the management of acute asthma. Post intervention, third year medical students showed a significant increase in knowledge pertaining to symptomatology, pathophysiology, trigger factors and prophylactic drugs used in asthma management. Although the knowledge of paramedics improved post intervention, they had major deficiencies in knowledge about pathophysiology, trigger factors, preventive and acute asthma therapy, side effects of asthma treatment as well as clinical scenarios. Improvement after intervention was only seen in six of the 31 questions. This study demonstrated an increase in knowledge about childhood asthma among medical students and paramedics after a short intervention.

**Key Words:** Asthma education, Childhood asthma, Questionnaire, Asthma knowledge

## Introduction

Many published studies have revealed that the majority of asthmatics and their parents have a poor understanding of their diseases and management. Martin *et al*; followed a group of asthmatic children from seven years old and reported that their asthma knowledge at age 21 was poor, the incidence of smoking was disturbingly high, loss of time from work wash high and exercise restriction was common<sup>1</sup>. Other studies have shown primary deficiencies in the areas of therapeutics and crisis management<sup>2,3,4</sup>.

Hindi-Alexander identified factors for increase in asthma morbidity and mortality; which include delay in getting and receiving care, medication misuse, inappropriate care and others such as infections<sup>5</sup>. All these factors are preventable and at least three can be included in the asthma education programme. In the past few years, many programmes have been developed to help children with asthma and their families. These programmes have been described in out patient clinics in hospital, medical office settings, computer oriented instructions, camps programmes and short term community agency programmes<sup>6,7,8</sup>.

Educational programmes will offer patients opportunities to increase their understanding and assist them in managing their conditions effectively by participating with their physicians in controlling their asthma, thus reducing mortality and morbidity<sup>9</sup>. Seaton emphasised that proper management depends on educating the patients to understand his/her condition, to recognise signs of deterioration and to adjust his/her treatment accordingly<sup>10</sup>.

Improvement in the health of patients will depend on both the individual patient and the health care professionals including doctors, nurses and paramedics. Educational programmes allow patients to be responsible and in control of their own illnesses.

In Malaysia, health education is still in the infancy period although it has been evaluated extensively in other developed countries<sup>11,12</sup>. No established programmes have been designed or tested in the Malaysian population. In order to implement such programmes, it is important to assess the knowledge about childhood asthma among our health care providers. Medical students and paramedics have important roles to play in asthma management and it is important to ensure that they have high knowledge about asthma and their management.

Therefore this study was conducted with the aims of assessing whether there is an increase in knowledge of childhood asthma among the third and fifth year medical students after completing their paediatric rotation and whether a short intervention in asthma education would improve knowledge about childhood asthma amongst paramedics.

## Materials and Methods

### Subjects

#### 1. Medical students

The third and fifth year medical students from the Faculty of Medicine, Universiti Kebangsaan Malaysia were recruited in this study. There were 150 third year and 164 fifth year medical students. All the students that participated in the study gave verbal consent. This was a cross sectional study conducted from December 1995 to December 1996.

The third year students were in their first clinical paediatric rotation for six weeks. They were taught on general principles of paediatrics which included history taking and physical examination of common diseases in childhood including asthma. They were not tested on paediatric clinical skills prior to their posting. During this paediatric rotation they had had no formal lecture or teaching on childhood asthma. They had two clinical teaching rounds a week. During this posting they may have been exposed to cases of asthma in the wards which they would have discussed with their lecturer.

The final year students were on their second rotation in paediatrics for eight weeks. Their emphasis was on ward work and clinical skills. They were trained as junior house officers and were required to know about common diseases in childhood which includes asthma management.

The level of asthma knowledge was assessed by using a standard questionnaire in English. The questionnaire consisted of 31 questions pertaining to symptomatology, epidemiology, pathophysiology, precipitating factors and asthma management. Each response was given a score of one and the maximum score was 31. The questionnaire was obtained from Fitzclarence and Henry et al and had been validated and used with permission<sup>13</sup>. (Appendix 1) The responses were either true, false or "fill in the blanks". Assessment was based on model answers.

During the first week of the paediatric posting, all the students were given the questionnaire which was to be completed within 30 - 45 minutes. Four weeks later a formal and standard lecture about childhood asthma was delivered by a Paediatric Chest Physician to both third and fifth year medical students. The lecture emphasized the definition, epidemiology, pathophysiology, clinical manifestations and management of asthma. Six to eight weeks later the students were required to answer the same questionnaire.

#### 2. Paramedics

The second group of subjects consisted of paramedics from various disciplines in Hospital Kuala Lumpur. A two-day seminar on respiratory diseases was held by the hospital in the month of September 1996. Sixty paramedics including staff nurses, assistant nurses, ward

sisters and medical assistants attended the course. All the participants were given the same asthma knowledge questionnaire which was completed before the session started. Two days of lectures were given by the same Paediatric Chest Physician covering topics in general respiratory illnesses which included a two hour lecture on asthma. They were told that after the session they would receive a similar set of questionnaires to be mailed to the researcher upon completion. Participants were contacted twice by phone to prompt them to reply if no responses were received by eight weeks. All participants consented to participate verbally.

All data was summarized in Microsoft Excel and analyzed using the Epi Info 6 and Minitab version 5 software. Chi-square analysis was performed for each question to compare the difference between the medical students and the paramedics and between the third and fifth year medical students. An ANOVA, paired and unpaired student t-tests were performed on the total scores of the groups. P value <0.05 was considered statistically significant.

## Results

All 314 year three and year five medical students responded to the initial questionnaire. One hundred and sixty (97.6%) year five and 121 (80.7%) year three students completed the repeat questionnaire. There were 159 males and 155 females. Sixty paramedics completed the initial questionnaire and only 23 (38.3%) responded to the repeat questionnaire.

Table I summarised the pre and post intervention scores.

The final year medical students showed good responses in answering the asthma knowledge questionnaire after

completion of their paediatric rotation. Only eight questions failed to distinguish between pre and post rotation results. After intervention, they were able to identify that cough (97.5%), wheeze (100%) and shortness of breath (97.5%) were symptoms of asthma. At the beginning of their paediatric rotation they answered well in pharmacotherapy questions. Prior to intervention, 106 (66.3%) students named steroids as a prophylactic medication which increased to 148 (92.5%) after the lecture. Seventy four (48.8%) students named sodium cromoglycate as prophylactic medication which increased to 124 (77.5%) after the lecture.

Most of them knew that  $\beta_2$  -agonists (150/93.8%), steroids (107/66.9%) and theophylline (67/41.9%) were drugs used in acute asthma and very few knew of ipratropium bromide (17/10.6%) and oxygen (13/8.1%) as other forms of treatment in the acute crisis prior to intervention. However after the lecture there was no significant increase in knowledge in this area.

Prior to intervention, final year students knew that injections do not cure asthma (149/91.3%), that asthma is not an infectious disease (158/98.8%) and a short course of steroids does not cause significant side effects (154/96.3%). Post intervention, one hundred and fifty nine (99.4%) knew that parental smoking worsened the child's asthma and 160 (100%) answered correctly that frequent asthmatics should receive preventive medication.

The third year students showed a steep increase in knowledge i.e. an increase in score of 3.8 pertaining to symptomatology, pathophysiology, trigger factors and prophylactic medications in asthma. One hundred and fifty eight students (97.5%) correctly identified allergens as the most important triggers of asthma exacerbations, followed by physical or emotional stress and infections.

**Table I**  
**Mean Scores (Range) and Mean Differences on Asthma Knowledge Questionnaire Among the Third and Fifth Year Medical Students and Paramedics Before and After Asthma Education**

Group	Before Education Pre	After Education Post	Mean Difference (CI)	P-value
Year 3	20.9 (14 - 29)	24.6 (18 - 30)	3.83 (3.3, 4.3)	<0.0001
Year 5	24.5 (17 - 31)	26.3 (19 - 31)	2.2 (1.9, 2.4)	<0.0001
Paramedics	18.3 (17 - 23)	21.3 (17 - 25)	3.2 (2.4, 3.9)	<0.0001

After the intervention, they were able to list inhaled steroids (65/53.7%) and sodium cromoglycate (55/45.4%) as preventive medications. Premedication with inhaled salbutamol or sodium cromoglycate were named as measures to prevent exercise induced asthma. However it is worrying that students thought it is permissible to continue two hourly nebuliser despite the child being breathless at home.

Among the paramedics, only six questions showed a significant improvement after the intervention. Paramedics showed deficiency in therapeutic knowledge of asthma. On repeat questionnaire, 15 (65.2%) named steroids as preventive medication and none mentioned sodium cromoglycate. Eighteen of 23 (78.3%) named (2 agonist and eight of 23 (34.8%) named steroids as drugs used in acute treatment. Only a few mentioned ipratropium bromide and theophylline as medications that can be used in acute asthma. On initial questionnaire there were no responses to the question of oxygen used. However after intervention 11 paramedics realised that oxygen was one of the measures used in acute asthma. Initially none named premedication with salbutamol or sodium cromoglycate as drugs that can be used in the prevention of exercise induced asthma. Only one person mentioned that warming up can be used as another measure of exercise induced asthma.

After attending the seminar, all of them (23) knew that swimming is not the only suitable exercise, parental smoking may cause worsening in the child's asthma, asthmatic children should lead normal lives and children with frequent asthma should have preventive therapy. With regard to the other questions, there was no significant improvement after the intervention.

## Discussion

This study was able to demonstrate that i) there was an increase in knowledge of childhood asthma among the third and final year medical students after completion of their paediatric rotation and ii) a short intervention in asthma education can improve knowledge about childhood asthma among paramedics.

The response rate to the questionnaire was good among medical students but poor among paramedics. i.e. only 38.3%. The reason was that perhaps paramedics did not

see the relevance of asthma knowledge to their clinical practice. The scores among medical students increased significantly after the paediatric rotation with the short intervention of asthma education. Even though this was their first clinical encounter for the third year medical students, they had basic fundamental knowledge of childhood asthma. This may be attributed to their basic tutorial exposure to asthma in their integrated curriculum which included asthma. Generally the findings of each group were lower than that obtained by RL Henry who tested the same questionnaire on medical students of the University of Newcastle<sup>13</sup>. Their third year and fifth year students had mean scores of 25.6 and 28.7 respectively. However their paediatric nursing staff showed a higher mean score of 26.2 after the intervention. This could be due to our paramedics being from various medical disciplines including outpatient clinics, physician clinics and casualty departments. Five of the 23 paramedics who work in a paediatric unit showed better scores (range 23 - 24). In another local study (unpublished data) the final year medical students showed a higher score of 27.1 (n=54) and the nurses scored 19.9 (n=27). There was no intervention given to both these groups. Their scores were higher perhaps because those participating were interested to participate in the study. Our final year medical students obtained scores which were similar to the nursing staff of Newcastle i.e. 26.3.

In general, the final year medical students had a good basic knowledge in childhood asthma which they learnt during their third year rotation. However it is worrying that senior students exhibit deficiencies in the area of asthma management. They were unable to list the three main drugs used in the treatment of acute asthma correctly at the end of their rotation. Although 97.5% named salbutamol and 63% named steroids, only a small percentage mentioned theophylline, oxygen and ipratropium bromide. Therapeutic aspects of asthma are part of the syllabus of the final year in medical school. The fact that there was poor knowledge on the use of oxygen and steroids which are two important modes of therapy in acute asthma is worrying. This reflects a poor understanding of the pathophysiology of asthma and may result in undertreatment of the disease. Undertreatment is still common in the management of asthma in Malaysia. Students need to know that there is a limit to the home management of asthma and delays in seeking treatment may result in disastrous outcomes.

## ORIGINAL ARTICLE

With regard to prevention of exercise induced asthma, it should be emphasised that in addition to premedication, warming up and improvement in the background asthma control are important factors.

The third year medical students demonstrated a lower score when compared to their seniors. Again they did not perform well in areas of acute asthma management which was not taught in their syllabus. Their opinions on the clinical scenarios (question 22) were similar to their seniors. One would hope that the third year students would be able to acquire this knowledge when they reach the final year of medical school. The deficiency in this area of management was similarly obtained by RL Henry among medical students in the University of Newcastle, NSW Australia<sup>13</sup>.

The paramedics scored poorly before and after intervention programmes especially in the areas of pathophysiology, trigger factors, preventive and acute

therapy and side effects of asthma treatment. There may be several explanation for the poor results. Firstly this group has never been exposed to paediatric asthma and its management. Secondly, asthma may not have been covered in lectures during their training. Although there was improvement, their repeat score remained poor which may be due to the fact that they only had a two hour lecture. Their level of comprehension is perhaps lower than that of medical students due to the poorer background medical knowledge.

A longer teaching series at a pace appropriate for their level and allowing for more discussion should be considered. Greater usage of audiovisual equipment may improve their understanding of asthma. Asthma education is certainly an important component of asthma management. Well informed and knowledgeable patients and healthcare givers will ensure a better control of the disease and better quality of life for the patients and their family.

## Appendix 1

### Asthma knowledge questionnaire: Questions with a true or false response; marked (T/F)

1. What are the three main symptoms of asthma?
2. More than one in 10 children will have asthma at some time during their childhood. T/F
3. Children with asthma have abnormally sensitive air passages in their lungs. T/F
4. If one child in a family has asthma then all his/her brothers and sisters are almost certain to have asthma as well. T/F
5. Most children with asthma have an increase in mucus when they drink cow's milk. T/F
6. Write down all the things you know that cause asthma (sometimes called trigger factors)
7. During an attack of asthma the wheeze may be due to muscle tightening in the wall of the air passages in the lungs. T/F
8. During an attack of asthma the wheeze may be due to swelling in the lining of the passages in the lungs. T/F
9. Asthma damages the heart. T/F
10. Write down two asthma treatment (medicines) which are taken every day on a regular basis to prevent attacks of asthma from occurring.
11. What are three asthma treatments (medicines) which are useful during an attack of asthma?
12. Antibiotics are an important part of treatment for most children with asthma. T/F
13. Most children with asthma could not eat dairy products. T/F
14. Allergy injection could cure asthma. T/F
15. If a person dies from an asthma attack, this usually means that the final attack must have begun so quickly that there was no time to start any treatment. T/F
16. People with asthma usually have nervous problems. T/F
17. Asthma is infectious (i.e. you can catch from another persons). T/F
18. Inhaled medications for asthma (e.g. ventolin puffers, rotacaps) have fewer side effects than tablets. T/F
19. Short course of oral steroids (such as prednisolone) usually cause significant side effect. T/F
20. Some asthma treatment (such as ventolin) damages the heart. T/F
21. A 5 year old boy has an attack of asthma and takes two puffs of ventolin from a puffer (metered dose inhaler). After five minutes he is no better. Give some reasons why this might have happened?

22. During an attack of asthma which you are managing at home your child requires the nebuliser mask every two hour. He/she is gaining benefit but is very breathless after two hours. Provided that he/she does not get any worse it is fine to continue with two hourly treatment. T/F
23. Write down ways of helping to prevent attacks of asthma during exercise.
24. Children with asthma become addicted to their asthma drugs. T/F
25. Swimming is the only suitable exercise for asthmatics. T/F
26. Parental smoking may make the child's asthma worse. T/F
27. With appropriate treatment most children with asthma should led a normal life with no restriction on activity. T/F
28. The best way to measure severity of a child's asthma is for the doctor to listen to his chest. T/F
29. Asthma is usually more of a problem at night than during the day. T/F
30. Most children with asthma have stunted growth. T/F
31. Children with frequent asthma should have preventive drugs. T/F

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