

Skills Amongst Parents of Children with Asthma: A Pilot Interventional Study in Primary Care Setting

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Summary

The increasing prevalence of childhood asthma has become a concern among health practitioners. Effective management emphasizes long-term management and inhaled therapy has become the mainstay home management for children. However, proper utilization of medication is pertinent in improving control. Proper asthma education is mandatory in improving skills and confidence amongst parents. To assess the skills of using the metered-dose inhaler (MDI) with a spacer among asthmatic children before and after educational intervention and to analyse any difficulties which may occur amongst the participants in executing the assessment steps. A cross-sectional clinic based study involving 85 parents and children with asthma. A standardized metered-dose inhaler-spacer checklist of eight steps of medication usage and five steps of cleaning the spacer were used as the assessment tools for pre and post intervention. The performance on using the inhaler-spacer and spacer cleaning knowledge pre and two months post intervention was evaluated. One point was given for each correct step and zero points for incorrect answers/steps. The mean score for skills of inhaler technique improved significantly after educational intervention (3.51 to 6.01, $p < 0.0001$) as did the mean score for parental knowledge of spacer cleaning technique (1.35 to 3.16, $p < 0.001$). Analysis showed only a limited improvement even after an educational session in three steps of inhalation technique: step 5 (23.5% / 69.4%), step 6 (28.2% / 68.2%) and step 7 (25.9% / 61.2%). Parents with asthmatic children had poor skills in utilizing their children's medication. A short-term educational intervention was able to improve overall knowledge and skill but certain skills need more emphasizing and training.

Key Words: Childhood asthma, Inhaler, Spacers, Skills, and Asthma education

Introduction

Childhood asthma is a chronic respiratory illness with significant morbidity and mortality. Despite established worldwide consensus and clinical guidelines, the prevalence of asthma has gradually increased over the last two decades¹. Clinical observations have shown that many asthmatic children in Malaysia were under assessed and inadequately treated². The usage of metered dose inhalers (MDIs) with spacers has been in the picture for long term asthma management in Malaysia for quite some time, but many asthmatic

children and their parents are still not familiar with this method. This lack of knowledge and familiarity by these children and their parents has caused many uncertainties, misuse, over-dosages or simply diminished interest that often lead to uncontrolled asthma and eventually unnecessary hospitalization. Without doubt, education and proper demonstration are important components in long term asthma management. It offers knowledge in understanding the disease and self-management skills in handling exacerbations of asthma at home. Various literature

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reviews have elaborated on childhood asthma and the importance of asthma education programs in reducing morbidity and mortality^{3,4}.

A pilot study was designed to assess the skills of inhaler technique amongst parents with asthmatic children attending a primary care clinic before and after an asthma education program.

Material and Methods

Subjects

A total of 85 subjects i.e. parents and children with physician diagnosed asthma using inhaler with spacer were recruited for this study. The children were between 1 and 12 years old (mean \pm SD: 4.7 \pm 2.4). All subjects had asthma as a primary problem and had experienced asthma symptoms in the last 12 months. Their medications included metered dose inhaler (MDI) medication with Aerochamber spacer. The same parent was assessed pre and post intervention. Children with concurrent illness that might interfere with the parent's judgment during the session were excluded from the study.

Design

The study was designed as a cross-sectional interventional study conducted in a primary care clinic. 'Klink HUKM Taman Jaya, Cheras' was a primary care clinic for Hospital University Kebangsaan Malaysia (HUKM). It was a general primary care clinic with attendances of 2500 to 3000 patients per month. Pediatric cases comprised of 15 -20%, with asthma patients comprising of further 60% of follow-up cases. The clinic was situated in a suburban area in Kuala Lumpur, the capital city of Malaysia, with a catchment's area of 150 000 population, consisting of young working class families, and of mixed racial distribution. Potential participants (parents with asthmatic children) were recruited in the waiting area. Pamphlets were distributed to the parents, which explained the nature and process of the study, together with contact details of the Primary investigator (PI). Those who agreed were then scheduled for two visits each (0 and 2 months). In the first visit (0 month), activities included; evaluation on how they instituted the medication (metered-dose inhaler with Aerochamber spacer) to their children, and assessment on how they should clean the spacer. A standardized MDI-spacer checklist was used as the assessment tool, which had two sections; (i) an 8 steps scale for the technique of using the MDI with spacer and (ii) a 5 steps scale for the technique of cleaning the Aerochamber spacer. For

each correct step demonstrated / described, one point was given and zero points for incorrect answers or steps. The higher the score, the greater the skill in using the inhaler with spacer.

Intervention in the form of an asthma education was conducted during the initial consultation. Only the PI was involved in the educational intervention programs to prevent bias of miscommunication and for uniformity of information. A flip chart and placebo MDI with Aerochamber spacer device were used as the education tools. The developments of these tools were based on the Position Statement of Childhood Asthma, Ministry of Health 1996 and Australian Childhood Asthma National Management Handbook 1996 which fulfilled educational needs of children with asthma. The flip chart contained sections on: the concept of asthma as an inflammatory disease, symptoms and signs of asthma attacks, trigger factors and how to identify them, concept of two classes of medication i.e. reliever and prophylaxis medication, recognizing acute attacks and steps of self treatment at home. Participants were also taught the correct technique of using the medication with Aerochamber spacer. The sessions were held in the clinic consultation room and took 25 -30 minutes per session.

At the end of the session, parents were encouraged to ask questions and no requested additional information was withheld from any parent. Parents were then given appointments for post test assessment in approximately in two months time. A period of two months was chosen as it was the routine follow-up period for patients with asthma in the clinic. The second assessment was similar to the first visit, and marks were given for each correct technique demonstrated or explained. Comparisons of pre and post educational intervention were then made. This study was aimed to assess whether there was any improvement in terms of knowledge and skills of handling asthma medications after a brief educational intervention given in a busy clinic setting and also to identify any difficulties in performing the basic steps of both inhalation and cleaning techniques of the MDI medications.

Statistical analysis

Data was analyzed using SPSS 10.0 for Windows statistical package. Descriptive analysis was obtained for demographic characteristic. For analysis of the mean score of inhaler technique, paired t-test was used to compare between pre and post intervention results. Questions were then analyzed individually and comparisons between pre and post interventional were

done using Chi-square analysis. A P – value less than 0.05 was considered significant.

Results

Social demographic characteristics

Table I shows the demographic characteristics and status of asthma of the children recruited. The mean age was 4.7 ± 2.4 years, with the majority of the attendees below six years old (77.8%). During the study period, only mild and moderate asthmatic cases were surveyed. There were no severe asthmatic cases noted as this is a primary care clinic and most severe asthmatic cases were either directly admitted to the hospital or were under pediatric specialist follow-up. Out of 104 total asthma cases, only 85 children recruited for the interventional study as they were using the inhaler spacer as mode of treatment at home.

Knowledge of inhaler technique among parents

Table II shows the mean score obtained by the participants before and after intervention. There was significant improvement of skills in handling the medication even after a single interventional session. Pre educational session results showed that only a single participant was able to obtain full marks in inhalation technique, the majority of participants

(70.6%) scored 4/8 and below. In the spacer cleaning technique, 29.4% scored 0/5 and 83.5% were only able to score up to 2/5 before education interventions were given to them. Post educational intervention showed marked improvement with both sections. The scoring trends were aligned towards maximum marks (65.8% scored a minimum of 6 steps correct in inhalation technique and 78.8% scored a minimum of three steps correct in the cleaning technique). The significant improvement after intervention, showed the ability of improvement of skills in handling the inhaler spacer device even after one session of educational intervention.

Parental performance in individual steps in asthma management

Table III shows analysis of individual steps of parents' performance in handling the inhaler with spacer. Although parents showed overall improvement at two months, steps 5, 6 and 7 were the least improved. In the assessment of cleaning technique, the number of participants that were able to list correctly the needed steps was low at 0 month (pre intervention session) with a highest score of 23.5% in Step 4. Results at two months showed significant improvement in all five steps. However, parents still scored the least in Step 3 compared to other steps (pre intervention – 4.7%, post-intervention – 58.8%).

Table I: Demographic Features of Children With Asthma

Items	N=85	%
Sex		
Male	49	47.1
Female	55	53.9
Ethnic group		
Malays	78	75.0
Chinese	15	14.4
Indian	11	10.6
Age distribution		
1 to 3 years	39	37.5
4 to 6 years	42	40.4
7 to 9 years	18	17.3
10 to 12 years	5	4.9
Asthma status		
Mild	42	40
Moderate	62	60
Severe	0	0
Usage of medication		
Inhaler with spacer	85	81.7
Inhaler alone	8	7.7
Oral medication	11	10.6

Table II: Scores of using the inhaler with spacer Pre and post educational intervention.

Mean score	Pre-intervention (N : 85)	Post-intervention (N : 85)	t- test	P value
Inhaler technique	3.51	6.01	0.446	< 0.0001
Cleaning technique	1.35	3.16	0.357	0.001

Table III: Parents' performance in handling the inhaler with spacer pre and post intervention.

Steps	Pre - Intervention (N:85)	Post - Intervention (N : 85)	P value
1. Remove cap of inhaler	70 (82.4%)	81 (95.3%)	<0.0149
2. Shake inhaler	50 (58.8%)	80 (94.1%)	<0.0001
3. Insert inhaler to spacer	68 (80.0%)	78 (91.8%)	<0.0276
4. Hold correctly in horizontal way	32 (37.6%)	68 (80.0%)	<0.0001
5. Activate inhaler for once only	20 (23.5%)	59 (69.4%)	<0.0001
6. Inspiration slowly and deeply	24 (28.2%)	58 (68.2%)	<0.0001
7. Breathe normally for 5 to 6 times	22 (25.9%)	52 (61.2%)	0.0003
8. Hold for 1 minute for the next puff	20 (23.5%)	72 (84.7%)	<0.0001

Table IV: Parents' performance of process in cleaning the spacer pre and post intervention

Steps	Pre-Intervention (N: 85)	Post - Intervention (N : 85)	P value
1. The mask can be cleaned by running water	12 (14.1%)	69 (81.2%)	<0.0001
2. Only water can be poured into the body of the spacer. Rinse over it several times until it is clean.	10 (11.8%)	69 (81.2%)	<0.0001
3. It is not necessary to brush the body of the spacer as it will lose its static atmospheric environment of the apparatus.	4 (4.7%)	50 (58.8%)	<0.0001
4. Wipe the water off by using a piece of cloth or tissue	20 (23.5%)	60 (70.6%)	<0.0001
5. Leave it to dry for the next use	15 (17.6%)	54 (63.5%)	<0.0001

Discussion

Inhalation therapy allows medication to be administered directly to the site of action, therefore utilizing much smaller doses. The current recommendation of using spacer devices has been extremely helpful as the trapped aerosol can be inhaled slowly therefore eliminating the need for precise coordination^{5,6}. This is the first study to our knowledge attempting to assess the effect of a short education course on the methods of delivery of asthma medication to pediatric patients attending a primary care clinic.

The study demonstrated that participants scored less than 50% of total scores before educational intervention, compared with other similar studies which recorded at least 50% scores on knowledge at initial contact. The findings can be attributed to several factors. Participants recruited for this study were follow-up patients, but many were still unfamiliar with the medication and devices. The nature of the primary care clinic, which provides general care and therefore is usually busy, may result in insufficient demonstration by the health care staff regarding the proper usage of medication and devices in managing asthma at home. The use of inhaler medication as an exclusive therapy

for asthma may be viewed differently from a western point of view, as many were familiar with oral medication as a treatment of asthma. Studies^{7,8,9} have highlighted the reluctance of parents in administering inhalers to their children, as they viewed oral therapy as the 'proper' and 'effective' way of administering asthma medications. Parents admitted having difficulties in administering the medication devices to their children, but were hesitant to ask for help from their attending doctors during the follow-up. Our study showed overall significant improvement in all steps of basic handling and cleaning techniques of asthma medication and devices after a single educational intervention given in a clinic session. This study was able to reproduce results of other studies abroad which looked into the effectiveness of educational intervention in promoting better asthma management^{10,11}.

On the other hand, analysis of individual steps showed mixed results with regard handling and cleaning. Assessment of handling technique showed overall improvement in each individual step. However, steps 5,6 and 7 showed less than 70% improvement in post-interventional sessions, which were similar to the study done by Chen SH *et. al*¹². These steps are the most crucial steps in any asthma- inhalation therapy; therefore this finding might reflect overall lack of success in persuading parents the benefits of the exclusive use of inhalation therapy for home asthma management programs. The cleaning technique assessment showed lower overall percentages compared with the previous section. Parents still had the misconception that brushing the inner surface of the spacer was the way of cleaning it. Emphasis should be given to preserving the antistatic environment as loss of such properties would promote adherence of medication to the inner surface therefore reducing the available dose for inhalation¹³. This study demonstrated that although overall skills might be improved with a single educational session, it might not adequately cover individual steps of both inhalation

and cleaning techniques. Thus, emphasis should be given in formulating proper educational programs especially in primary care settings. This will ensure better understanding and outcomes of asthmatic children in the long run. A supplied educational sheet with easy to follow diagrams might be useful in enhancing understanding. Educating parents about the proper technique would encourage them to take responsibility for day to day management and hence make self management possible.

As this study was the first to look into education intervention in a primary care clinic, it was not without limitations. Patients were not randomized, nor was there a control group for comparison. It was not possible to avoid the lack of generalisability and the small sample size which may affect the results. There was also no available data on the parents as they were not officially registered with the clinic. It is suggested that if such a study is undertaken in the future it should be a randomised, controlled trial. The study should also be extended to the severity of disease, morbidity and use of emergency services.

Conclusion

Short-term educational intervention was able to improve overall parental skills of using MDIs with spacer for their children. It is important to check the inhaler technique at every consultation to improve parental knowledge and efficacy.

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