

Innovations

Impact of Educational Intervention on Caregivers' Knowledge and Techniques of Metered Dose Inhalers for Asthmatic Children in Chengalpattu

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Abstract

This study addresses the pressing issue of paediatric asthma, a global public health concern associated with frequent hospitalizations and absenteeism among children and adolescents. Focusing on caregivers, the research assesses their comprehension and utilization of metered dose inhalers (MDIs), pivotal in asthma management. Employing an educational program and a quasi-experimental design, the study evaluates the impact of interventions on caregiver knowledge and practice. Results from 40 participants indicate substantial improvements post-intervention, with a notable increase in both knowledge and practice levels. Additionally, demographic characteristics such as age and educational level exhibit significant correlations with knowledge, while personal habits play a pivotal role in practice. Crucially, the study establishes a positive relationship between knowledge and usage levels of MDIs among caregivers. Overall, these findings underscore the efficacy of educational interventions in enhancing MDI utilization for paediatric asthma management, offering valuable insights into addressing this critical public health issue.

Keywords: Awareness education, knowledge, techniques, caregivers, asthmatic children.

Introduction

Asthma is a chronic inflammatory condition of the airways characterised by recurrent episodes of breathlessness, chest tightness, wheezing, and coughing. These episodes can be induced by various factors including allergens, workplace irritants, drugs, and stress¹. Aerosol therapy is the cornerstone of treatment for many respiratory disorders in children, including those with asthma, cystic fibrosis, croup, and bronchopulmonary dysplasia. Inhaler devices are a mainstay in the management of respiratory infections. The correct use of inhaler devices is one of the most important aspects and it emphasizes the importance of assessing inhalation technique to improve the efficiency of drug delivery².

Roopavathy et al. (2023) conducted a study on the effect of an educational programme on the knowledge and metered-dose inhaler technique among asthma patients in a tertiary care hospital. The study found that the average percentage score for asthma knowledge was 45.45% before the intervention, and it significantly increased to 88.63% after the educational intervention ($P < 0.0001$). The demonstration of the pressurised MDI improved significantly from 25% before the intervention to 62% after the intervention ($P < 0.0001$). A study has determined that educating individuals about the disease and regularly assessing their inhaler technique for asthma drugs can enhance asthma outcomes³.

A cross-sectional study examined Kathmandu Valley medical staff's meter dosage inhaler knowledge and skills. Medical staff had 42.8% knowledge and 59.18% technique, according to the report. Knowledge and technique were similar for men and women. There was a significant knowledge gap between those aged ≤ 30 years (48.3%) and those aged > 30 years (38.6%). The medical staff did not know how to appropriately count MDI doses. The study found that medical staff lack MDI knowledge and skill. Thus, training and workshops to improve their knowledge and technical abilities are recommended.

The recommended inhalation strategy for each puff of medication administered by an MDI is a deliberate and gradual inhalation lasting for 5 seconds, followed by a breath hold lasting for 5 to 10 seconds. Due to the inability of preschool children to execute this inhaling technique, MDI drugs are administered to this age group with the use of a spacer and mask, employing an alternative method. Each inhalation should be taken with consistent breathing for a duration of 30 seconds, or 5-10 breaths, while ensuring a secure seal is maintained. The correct utilisation of contemporary portable gadgets is not inherently obvious, necessitating frequent training for efficient usage. The clinical reactions of young children with acute lower airway blockage may be similar when low-cost plastic bottle spacers and commercial spacers are used correctly to provide bronchodilators.

Thus, considering the correct use of inhalers requires specific training, the researcher felt the need to conduct an evaluative study on assessing the effect of educational intervention on knowledge and practice regarding the use of metered dose inhaler among mothers.

Methodology

A Quasi experimental research approach with one group pretest - post-test research design was conducted after obtaining permission from selected hospitals in Chengalpattu. Around 40 caregivers those whose children are diagnosed with asthmatic child and having metered dosage inhaler as medication were samples. The study participants are selected by convenient sampling technique and on voluntary basis. Knowledge and practice level regarding metered dose inhaler usage were selected as variables under study.

The tool comprised of three sections Section 1 consists of Demographic data of the samples like Age, Gender, Educational Status, occupation, family income, family type, personal habits and associated disease and Previous Knowledge regarding metered dose inhaler usage. Section 2 consists of Structured questionnaire with multiple choice questions of total 15 helps to assess the knowledge level regarding metered dose inhaler usage among patients. Each correct answer carries one mark, and each wrong answer has zero mark. Total 15 marks. Section 3 consists of checklist containing 10 steps related to practice regarding metered dose inhaler usage. Each step is having three-point scale from 0 to 2 which has maximum of 20 point and minimum of 0 point according to the step. The questionnaire was administered to all the caregivers individually and the data were analysed by using descriptive statistics (frequency and percentage distribution, mean and standard deviation) and inferential statistics (chi-square test) for assessing effectiveness and association between knowledge and selected demographic variables.

Ethical Considerations

The study received formal written authorization from both the research committee and the ethical committee. The sheet contains essential information regarding both the findings and the paper that was sent to the participants to get

their consent. To safeguard the confidentiality of the participants, we refrained from requesting their names during the submission procedure.

Novelty of the Study

This study presents a novel contribution to the field of paediatric asthma management, centering on the comprehension and utilization of metered dose inhalers (MDIs) among caregivers of afflicted children. Employing an educational program and a quasi-experimental research design, the study not only evaluates the intervention's impact but also delves into the intricate relationship between caregiver knowledge, socio-demographic characteristics, and practical MDI application. Demonstrating enhancements in both knowledge and practice levels post-intervention underscores the efficacy of educational endeavours in bolstering caregiver proficiency in asthma management. Furthermore, the detailed analysis of socio-demographic factors such as age, educational attainment, and personal habits yields nuanced insights into the myriad influences shaping caregiver behaviour. The discernment of robust associations between these variables and caregiver outcomes underscores the necessity for tailored interventions to address specific demographic requisites. Overall, this study's comprehensive approach and pioneering findings furnish valuable evidence for optimizing asthma care in children, with broad-reaching implications for augmenting treatment adherence and health outcomes worldwide.

Results

Table 1: Frequency and percentage distribution of pre-test and post-test knowledge scores of caregivers N =40

Level of knowledge	Pre-test Knowledge score		Post-test Knowledge score	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Poor	9	15	0	0
Average	28	80	2	3.3
Good	3	5	8	13.3
Very good	0	0	30	83.4

The data presented in table 1 shows that in the pre-test majority (80%) of the childhood asthma caregivers had average knowledge, 15% had poor knowledge and 5% had good knowledge regarding MDI whereas in the post-test majority (83.4%) of childhood asthma caregivers acquired very good knowledge, 13.3% acquired good knowledge and 3.3% acquired average knowledge regarding MDI.

Table 2: Frequency and percentage distribution of pre-test and post-test technique scores of caregivers N=40

Level of technique	Pre-test technique score		Post-test technique score	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Poor	0	0	0	0
Average	28	80	9	15
Good	12	20	31	85

The data presented in table 2 shows that in the pre-test 80% of childhood asthma caregivers had average technique and 20% had good technique regarding MDI whereas in the post-test 31 (85%) childhood asthma patients acquired good technique and 15% of childhood asthma caregivers acquired average technique regarding MDI.

Table 3: Relationship between Overall Knowledge Score and Overall Practice Score regarding metered dose inhaler usage among caregivers. N=40

Test	Knowledge		Practice		r value
	mean	SD	mean	SD	
Post test	15.2	3.62	14.6	4.7	r=0.52

Note: * - P<0.05 Level significant, N.S. – Not significant

Table 3 represents the r value for post-test level of knowledge and practice regarding use of metered dose inhaler among caregivers is 0.52. There is positive correlation between the knowledge and practice level regarding metered dose inhaler usage among caregivers.

Discussion

Metered Dose Inhaler is a relatively simple device that delivers the drug directly to the lungs and acts very fast in relieving asthma symptoms, but successful use of Metered Dose Inhaler is dependent on several important issues. The medical practitioner especially staff nurses who constantly coming across the children with childhood asthma using Metered Dose Inhaler need to know how to use the MDI effectively and need to teach caregivers regarding recommended technique of Metered Dose Inhaler usage.

The preliminary test findings indicate that a substantial majority of carers (80%) possessed just an average understanding of MDIs, while 15% had

inadequate knowledge. This emphasizes the imperative requirement for comprehensive education programmes aimed at augmenting carers' comprehension of MDIs. Healthcare personnel, being the main interface with patients, have a crucial role in this educational process. Their proficiency in conveying the significance and the utilization of MDIs might greatly influence the control of childhood asthma.

A hospital-based cross-sectional study was undertaken by Worku et al. in 2023. The study included all carers of asthmatic children in the SPHMMC chest clinic from April 2021 to August 2021. The findings of this study indicate that carers of pediatric asthma patients have a limited understanding and application of inhalational medication. Furthermore, it was seen that a longer time of inhalation use was associated with a higher likelihood of accurate practice. Healthcare practitioners specializing in the treatment of children with asthma should prioritize the enhancement of carers' inhalation skills to maximize the effectiveness of asthma drugs in the study environment.

The post-test results indicate that carers' knowledge has significantly improved, with 83.4% of them gaining very good understanding. This implies that the programme, which was probably instructional in nature, was successful in improving carers' comprehension of MDIs. Other research has revealed similar effects, highlighting the importance of focused educational interventions. These therapies give carers the knowledge and skills they need to better manage their child's asthma.

The technique of using MDIs is as crucial as knowledge about them. The pre-test results showed that 80% of caregivers had an average technique, while 20% had a good technique. However, post-test results showed a significant improvement, with 85% of caregivers acquiring a good technique. This highlights the effectiveness of hands-on training in mastering the MDI technique. It also underscores the importance of practical demonstrations and practice sessions in ensuring the correct usage of MDIs.

The study's findings have important implications for the management of childhood asthma. They underscore the need for ongoing education and training programs for caregivers. Future research could explore the long-term impact of these interventions on asthma control and quality of life among children. Additionally, studies could also investigate the barriers to effective MDI usage and develop strategies to overcome them.

Conclusion

The educational intervention significantly improved both asthma knowledge and proficiency with MDIs. Educating caregivers about asthma and demonstrating proper inhaler usage by research experts before discharge from the hospital will enhance asthma management in alignment with the prescribed

treatment plan. Therefore, this enhancement in asthma control leads to improved results in managing asthma and a higher quality of life.

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Conflict of Interest

The author declares no competing financial interests.

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