

Original Research



Quality of care in the management of asthmatic children with regard to compliance with the guidelines in in-ward setting in a district of Sri Lanka: a descriptive study

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DOI: <https://doi.org/10.4038/jccpsl.v26i4.8296>

Received on 3 March 2020

Accepted on 19 November 2020

Abstract

Introduction: The quality of paediatric asthma management in the in-ward settings has not been assessed in Sri Lanka.

Objectives: To describe the quality of care in the management of asthmatic children with regard to compliance with the guidelines

Methods: A descriptive cross-sectional study was carried out in state hospitals with paediatric units in a district of Sri Lanka. A sample of 577 children diagnosed by a consultant paediatrician was selected. Eleven indicators were chosen by modified Delphi technique. Data collection instruments were an interviewer-administered questionnaire and a record sheet. Compliance with guidelines according to 11 indicators was expressed in percentages.

Results: The assessment of acute severity was 100%. The use of systemic corticosteroid at first prescription was 88.9% (n=513), whereas it was 69% (n=398) with oral steroid therapy and 54.5% (n=315) with long-term use of steroid inhaler. Assessment of chronic asthma severity was 31.2% (n=180). Caregivers who had received health education on triggering factors of asthma, on what to do during an asthma attack, and how to use the inhaler were 62.0% (n=358), 37.1% (n=214) and 68.8% (n=217), respectively. All patients have been issued a diagnosis card on discharge and among them, 74.4% (n=429) received a complete discharge summary and 90.6% (n=523) were scheduled for follow up appointments.

Conclusions: Assessment of acute severity of asthma and the provision of diagnosis card on discharge were exceptional. Assessment of the severity of chronic asthma and providing health education for caregivers should be improved. Prescribing long term use of a steroid inhaler is to be revised.

Key words: *children, clinical, indicators, medication, performance*

Introduction

Previously, asthma was considered a public health burden confined to high income countries but now it appears to be a burden to all countries, regardless of the level of economic development. Low- and lower-middle income countries account for 80% of asthma deaths in the world (1).

Asthma is the 5th highest cause of death among the Sri Lankan population with an increasing trend during the past decade (2). Despite this distressing situation, no clear national strategic plan is implemented for combatting this disease in the country. Asthma management guideline is an essential part of successfully managing the disease and promoting the delivery of quality asthma care (3). Therefore, proper management of asthma in children will enable the country to save the cost of treating recurrent attacks as well as bring up/raise a healthier nation.

Management of asthma is focused on controlling acute exacerbations and preventing recurrent attacks. To achieve this in all patients in a uniform manner, there is a felt need to develop the up-to-date evidence based clinical guideline. International and local guidelines are available for managing asthma (4-6). The quality of care in disease management is assessed with “process indicators” which are based on guidelines and they are linked to actions that could be pursued to improve quality. These comprise severity assessment, medications used, documented asthma management plan, and patient education which must be evaluated against country specific guidelines (7).

In Sri Lanka, the existing situation of the quality of paediatric asthma management in the hospitalised setting has not been assessed. Researchers in other localities have assessed their country's condition and have identified shortcomings of the health care delivery system (8-9). The results of a study done on the existing situation of the quality of paediatric asthma management will serve as a basic guide to identify the shortcomings of our health system. Furthermore, intervention may be planned out for improvements in asthma management. Therefore, the objective was to describe the quality of care in the

management of asthmatic children with regard to compliance with the guidelines.

Methods

A descriptive cross-sectional study was conducted in all paediatric wards of state hospitals in the district of Gampaha managed under a consultant paediatrician. In this district, there are four hospitals with such paediatric wards. The study population was children aged 2-12 years admitted to all paediatric wards of government hospitals in the district for the treatment of asthma. All children were diagnosed by the consultant paediatrician and were admitted due to acute exacerbation of asthma. Children with congenital heart or lung diseases were excluded from the study.

The calculated sample size was 576. In Sri Lanka, quality of asthma care at in-ward setting had not been studied, and therefore 50% was taken as the expected percentage of good compliance in order to obtain maximum sample size with 5% precision. As we recruited participants from four hospitals, the management in these wards may be different as they are under different consultants. Therefore, the sample size was adjusted for design effect and it was considered as 1.5.

All children admitted for any respiratory tract infection were first identified from the ward admission register. Among them, children with acute episodes of asthma being diagnosed by consultant paediatrician or children whose diagnosis was made on the bed head ticket (BHT) were identified. All eligible children with the consent of caregivers were recruited consecutively from the commencement of the study until the sample size was fulfilled.

A set of indicators was developed to assess the compliance with the guidelines of the management of asthma patients. An extensive literature search was done to identify similar indicators used previously in other countries (7-8, 10-11). Modified Delphi technique was carried out to select a set of indicators, which is applicable to the management of paediatric asthma patients. A group of four paediatricians and three senior registrars were identified from the Lady

Ridgeway Hospital, Colombo as panel members. They were personally presented with a list of draft indicators and were requested to comment on each indicator, if necessary, with reasons for modifications. After the first round of comments by all the panel members, the indicators for which five or more agreed were included for the second round. The second round of indicators was circulated among the panel members to comment on the appropriateness as in the initial round. From the second round, indicators which five or more panel members agreed upon were selected to be used as indicators to measure the 'compliance with guidelines' in the management of asthma. The approved list of indicators was given in Table 1.

The pre-tested interviewer-administered questionnaire (IAQ) included demographic information current and past history of asthma with information regarding frequency and duration of signs and symptoms of the current episode, and treatment obtained. The questionnaire was administered on the day of discharge as health education and individual action plans are discussed by medical officers with the caregiver during the stay in the ward.

Record sheet I was used to extract data from the BHTs. This included the history of presenting complaint and details of symptoms, past history of illness, signs, prescribed medication with dosage, frequency, route, and duration, and whether a clinic visit is planned for long term management. Record sheet II extracted data from the diagnosis card or clinic book with discharge summary, provided to the caregiver on discharge. The face, content, and consensual validity was assessed for the record sheets. Pre-testing of the record sheets I and II was done by extracting data using the BHTs and from the diagnosis cards issued to them of the same group of children at a given hospital. To assess the reliability of the information on record sheets I and II, the inter-observer reliability method was used to examine the level of agreement between the first author and the four data collectors. For a sub-sample of 50, IAQ was re-administered to the same caregivers and extracted data for the record sheets I and II from the same BHTs and diagnosis cards. Good inter-observer reliability was observed among selected variables with a

minimum Kappa of 0.7.

Data collection was carried out by the first author and four trained pre-intern medical officers. A two-day training was given for the data collectors where at each hospital, a practical session was conducted. A single data collector was allocated to each hospital. Minimal disturbances were ensured toward staff and routine activities of the wards due to data collection procedures. Since the data collection was conducted at the day of the discharge, most caregivers were not burdened by the child's illness. To minimize recall bias, signs and symptoms of the child were inquired from the caregiver for the past one month. After extracting the data to record sheets I and II, five percent of the record sheets were rechecked with their relevant BHTs.

Data analysis

Data entry and analysis were done using Statistical Package for Social Sciences (SPSS) version 16. Discrepancies of data and missing entries were rectified by referring to the original questionnaire. Basic socio-demographic and characteristics of the study population were described using frequency distributions. Compliance with Guidelines using selected indicators was calculated as percentages.

Results

A total of 577 children with asthma and their caregivers were selected for the study. The response rate was 100%. The mean age of the children was 60.6 months (SD=28.7 months). Male and female proportions of the study participants were 49.7% and 50.3%, respectively. A vast majority of the caregivers were mothers of the children 513 (92.0%) followed by grandmothers 34 (5.9%) and others 12 (2.1%). According to the chronic asthma classification, majority of the children had mild persistent asthma (n=469; 81.3%), followed by moderate persistent asthma (n=65; 11.3%), mild intermittent asthma (n=28; 4.9%) and severe persistent asthma (n=6; 1.0%).

The duration of presenting complaint was documented on 96.7% of the BHTs. Yet, documenting

the daytime frequency and night-time frequency of symptoms were 67.6% and 59.6%, respectively (Table 2). The past medical history and duration were documented on 95.03% of the BHTs. Daytime frequency and night-time frequency for past history were documented only on 31.88% and 31.19% of BHTs, respectively. Usage of prophylactic medication was only available in 66.9% of BHTs (Table 2). Respiratory rate was recorded on all the BHTs. Pulse rate, cyanosis and air entry (98.8%, 96.4% and 90.3%, respectively) were the highest recorded clinical signs. Chest in-drawing and feeding were the least recorded clinical signs and was documented only on 14.6% of the BHTs (Table 2).

The proportion of children with the assessment of acute severity of asthma was 100%. Of the 577 BHTs, 88.9% had documented systemic corticosteroid therapy at first prescription by means of either oral or intravenous route. Furthermore, the proportion of children with oral steroid therapy at first prescription

was 69.0%. The proportion of children with chronic asthma severity assessment was 31.2%. With regard to indicators referring to health education, the proportion of caregivers who had received health education on triggering factors of asthma was 62.0%, proportion which had received health education information on what to do during an asthma attack during the current stay at the hospital in 37.1%. The proportion of caregivers who had received health education on how to use the inhaler correctly was 68.8%. Therefore, the proportion with scheduled follow-up appointments was 90.6%. All of the 577 caregivers had received a diagnosis card, or a discharge summary written in the clinic book. (Table 3). However, 429 BHTs had the seven individual items considered as the complete discharge summary and the proportion was 74.4%. Furthermore, six items were documented in 129 (22.4%) summaries, five items in 17 (2.9%) and four items in two (0.3%) discharge summaries. The distribution of individual items documentation is presented in Table 4.

Table 1: List of clinical indicators to determine quality of managing childhood asthma

Indicator	Description
1	Proportion of children with assessment of acute severity of asthma *
2	Proportion of children with systemic corticosteroid therapy at first prescription
3	Proportion of children with oral steroid therapy at first prescription
4	Proportion of BHTs with documented assessment of chronic asthma severity
5	Proportion of caregivers who had received health education on triggering factors of asthma **
6	Proportion of caregivers who had received health education on what to do during an asthma attack ***
7	Proportion of children who had been prescribed a long-term use of a steroid inhaler
8	Proportion of caregivers who had received health education on how to use the inhaler #
9	Proportion of children with asthma with scheduled follow up appointment with the paediatric clinic
10	Proportion of caregivers who had received a diagnosis card at discharge
11	Proportion with complete diagnosis cards ##

For the calculation of proportions for all indicators, the denominator was the total number of children participated except the indicator 8, which was the total number of children prescribed with an inhaler.

* Indicator 1: The categorization of the severity of the asthma was decided based on 13 clinical signs and symptoms⁵; ** Indicator 5: The caregiver should be able to mention at least one triggering factor correctly; *** Indicator 6: The caregiver should be able to mention at least one action correctly; # Indicator 8: A medical officer in the ward should have taught the first-time users the method of using the inhaler or should have checked if the long-term users were using the inhaler correctly; ## Indicator 11: Completeness was assessed on seven items as follows: date of admission, date of discharge, diagnosis, basic clinical examination results, results of investigations, management of the patient, and discharge plan. If any of the above-mentioned components are missing it was considered as 'incomplete'.

Table 2: Distribution of the study population by completeness of information on BHT (N=577)

Documentation	Yes		No	
	No.	%	No.	%
Presenting complaint				
Duration documented	558	96.7	19	3.3
Daytime frequency documented	390	67.6	187	32.4
Night -time frequency documented	344	59.6	233	40.0
Past history of the patient				
Past history documented	559	95.03	18	4.97
Duration of past history documented	559	95.03	18	4.97
Daytime frequency of symptoms documented	184	31.88	393	68.12
Night -time frequency of symptoms documented	180	31.19	397	68.81
Prophylactic drug history documented	386	66.89	191	33.11
Names of drugs mentioned	354	61.36	223	38.64
The main clinical signs				
Activity level	450	78.0	127	22.0
Feeding	84	14.6	493	85.4
Speech	153	26.5	424	73.5
Audible wheeze	143	24.8	434	75.2
Cyanosis	556	96.4	21	3.6
Respiratory rate	577	100.0	0	0.0
Use of accessory muscles	108	18.7	469	81.3
Chest in -drawing	84	14.6	493	85.4
Air entry	521	90.3	56	9.7
Lung signs	577	100.0	0	0.0
Pulse	570	98.8	7	1.2

Table 3: Clinical indicators for assessing the quality of management among children with asthma (N=577)

Clinical Indicators	Yes	No
	No. (%)	No. (%)
Children with assessment of acute severity of asthma	577 (100.0)	0 (0.0)
Children with systemic corticosteroid therapy at first prescription	513 (88.9)	64 (11.1)
Children with oral steroid therapy at first prescription	398 (69.0)	179 (31.0)
BHTs with documented assessment of chronic asthma severity	180 (31.19)	397 (68.8)
Caregivers who had received health education on triggering factors of asthma	358 (62.0)	219 (38.0)
Caregivers who had received health education on what to do during an asthma attack	214 (37.1)	363 (62.9)
Children who had been prescribed a long-term use of a steroid inhaler	315 (54.5)	262 (45.5)
Caregivers who had received health education on how to use the inhaler	217 (68.8)	98 (31.2)
Children with asthma with scheduled follow up appointment with the paediatric clinic	523 (90.6)	54 (9.4)
Caregivers who had received a diagnosis card at discharge	577 (100.0)	0 (0.0)
Proportion with complete diagnosis cards	429 (74.4)	148 (25.6)

Table 4: Distribution of the information on the diagnosis card (N=577)

Details on the diagnosis card	Yes		No	
	No.	%	No.	%
Date of admission	558	96.7	19	3.3
Date of discharge	542	93.9	35	6.1
Diagnosis	575	99.7	2	0.3
Presenting complaint	557	96.5	20	3.5
Examination and investigations	544	94.3	33	5.7
Management of patient	570	98.8	7	1.2
Discharge plan	524	90.8	53	9.2

Discussion

We found that the proportion of children with the assessment of acute severity of asthma was 100%. According to the guideline, acute asthma exacerbations are managed based on the severity of the episode (6). Since the study sample was recruited from the in-patients, no 'mild' asthma cases were observed as 'mild' asthma patients are normally treated elsewhere. One study found acute asthma

severity assessment at admission was 39% at a ward setting (10). A study conducted in the USA found that the proportions vary from 45% to 78% (7). On the other hand, a more recently published study in the USA found that severity assessment was 100% at the time of admission (12) Another study (13) revealed that the physicians were not recording sufficient data to classify acute severity assessment and they had only recorded the frequency of daytime symptoms (54%) and night-time symptoms (33%). However, in

the current study daytime symptoms and night-time symptoms were recorded in 67.6% and 59.6% of the BHTs, respectively.

The current study found the proportion of children with asthma treated with systemic steroid to be 88.9% and the proportion with oral steroid therapy at first prescription to be 69.0%. A slightly higher result was observed with the use of systemic corticosteroid therapy (98%) and the use of oral corticosteroid therapy (87%) among asthmatic children in a similar study setting (10). In a Saudi Arabian study (14), it was found that the steroids were given only to 46% for acute asthma episodes. The lower proportion may be due to the fact that all emergency room admissions were examined by the above study (14) in comparison to our study where only hospital admissions were investigated. One study (12) found that systemic steroid therapy was given to 82% of the patients, and this included mild, moderate and severe asthma patients. Another study (15) in the USA found that systemic corticosteroid therapy given for acute asthma episodes was 100%. The discrepancies may be due to the fact that the above study (15) assessed corticosteroid prescription at any point after admission, whereas the current study examined the first prescription.

In the current study, documented chronic asthma severity assessment was 31.2%, whereas in a study conducted in the USA (10), the documented chronic asthma severity assessment was 22%. In a study in Saudi Arabia (14), it was documented as 48% of the patients. An initial assessment of chronic asthma severity is essential in deciding correct treatment plans and for prescribing appropriate medication for long-term control of asthma.

Even though acute asthma episode is managed in medical institutions, long-term management of children with asthma occurs at home. It is essential that children and their caregivers are educated about asthma. Caregivers should be able to identify symptoms of exacerbations, avoid triggering factors, use asthma medication, and to use inhaler devices. It is the responsibility of the physicians to ensure that the caregivers are provided with accurate information on the areas mentioned above. We found

that the indicators with regard to health education on “triggering factors of asthma”, “what to do during an asthma attack”, and “how to use the inhaler” were 62%, 37.1%, and 68.8%, respectively. Since the study included a sample of hospital admissions, physicians have time to give health education to caregivers.

According to our study, the proportion of children who was prescribed long-term use of steroid inhaler was 54.5%. On par with the guidelines, moderate and severe persistent asthma patients should definitely be treated, while mild persistent asthma patients may preferably be on prophylactic inhaler steroid therapy (16). According to our study, only 12.3% children had moderate and severe persistent asthma and 81.3% had mild persistent asthma. This indicates that about half of mild intermittent asthma patients and all moderate and severe persistent asthma patients were prescribed prophylactic inhaler steroid therapy. A similar study (17) conducted at a hospital in Gampaha District also found that 55.5% newly diagnosed children with asthma were prescribed inhaled steroids.

It is recommended that patients with asthma should follow up with physician care at least every 1-3 months (7). This is due to the change in the nature of symptoms with the initiation of treatment. Also, due to variable exposure to allergens and irritants or poor compliance to a medication regimen, regular follow up is recommended (18). In the current study, 90.6% of the children were given appointments for follow up clinic visits.

All the children admitted to the ward were given a diagnosis card or provided a discharge summary in their clinic book. This enables the caregiver to take the child to any hospital or physician in an emergency. Among the information on the diagnosis cards, 90.8% had a plan of discharge. One study (10) had written asthma action plans only for 5% of the admissions. Two more studies found that home management plan of care at discharge was given to 72.9% (19) and 52% (12) of patients.

Similar to the current study, the hospital paediatric units were the study setting of some studies, (10, 13, 19), whereas other studies (12, 14, 20) were conducted in emergency departments. Selecting the

patients from hospitalised patients enabled to collect more extensive data on quality indicators. Furthermore, it would have been difficult if the setting were in emergency departments, where patients are only kept for short durations and patient evaluation data would have been more concise. The study was carried out in state hospitals in the district. There might be a considerable percentage of admissions at private sector hospitals with acute asthma exacerbations. The quality of care with relevant to the extent of compliance with guidelines might differ at private sector hospitals. This would affect the generalizability of the results.

The diagnosis of asthma is mainly based on signs and symptoms. Peak expiratory flow measurement and spirometry could be done only on children five years and above. Furthermore, the above assessment was not routinely conducted in hospitalised patients. Since the study was aimed to assess the quality of management of asthma, it was necessary to include all patients diagnosed by consultant paediatricians. This may be a limitation of the current study.

Conclusions & Recommendations

Documentation of the required information of the BHTs was incomplete. Assessment of acute severity of asthma and the provision of diagnosis cards at discharge were excellent. Chronic asthma severity assessment of the children and providing health education for the caregivers should be improved. Prescription of long-term use of steroid inhaler is to be revised.

Author Declarations

Competing interests: The authors declare that they have no competing interests.

Ethics approval and consent to participate: The Ethics Review Committee of the Faculty of Medicine, University of Kelaniya granted ethical clearance. Informed written consent was obtained from the parents prior to data collection. Administrative clearance for the data collection was obtained from Regional Director of Health Services of the Gampaha District.

Funding: None

Acknowledgements: We are grateful to the Postgraduate Institute of Medicine, University of Colombo, and the data collectors for the study.

Author contributions: NP participated in the design of the study, coordinated data collection, performed the statistical analysis, and helped to draft the manuscript. CA participated in the design of the study, performed the statistical analysis, interpreted the data, and drafted the first version of the manuscript. All authors read and approved the final manuscript.

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