The Gaps Between the Guidelines & Practices of Pediatricians for Managing Asthma at Tertiary Care Centers in Pakistan.

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Abstract

Objectives: We wanted to find out the practices of pediatricians in tertiary care hospitals regarding the management of asthma in children and compare them with evidence-based, best-standard practice guidelines. This was necessary because only a few studies have focused on the huge gap between evidence-based guidelines and practices of pediatricians for managing asthma in children. **Methods:** The parents of 234 children (4-18 years), accompanying the asthmatic children were asked questions regarding the management of their children on a prescribed performa. The validated performa included questions regarding the epidemiology, various management options, pharmacotherapy, and about follow-up. The study venues were tertiary care hospitals. It was convenient sampling with a sample size calculated as 196 using OpenEpi version 3. The data was entered in SPSS-27 and analyzed by measuring frequencies of various parameters against the evidence-based recommendations, expressed in percentages. **Results:** Of the 234 children, 2/3 (67.5%) were males. The (81.2%) were prescribed oral reliever drugs in acute attacks. Only 19.7% of children were advised of any controller medicine. The doctors assessed the level of asthma control mainly by symptoms (94%) while objective/structured assessment with peak flow metery/spirometry or asthma control test was done only in 4% and 2% of children, respectively. The doctors provided minimal education to the parents regarding the Inhaler/spacer technique (6.5%), care of the equipment (7.5%), use of peak flow meter/recording the results (7.5%), or a written asthma action plan for emergency (2.1%). Almost all children (90%) were instructed to avoid triggers. The chronicity of the disease and the need for prolonged treatment were explained to 57% and 50% of parents, respectively. **Conclusions:** The management of asthma in children is far from the evidence-based best standard practices.

Keywords: Asthma, children, pediatrician, Peak Flow meter, Pakistan, spirometry, asthma control test, steroids, asthma education.

1. Introduction

There are no studies in Pakistan and very few in the world that have focused on the compliance of pediatricians to follow the guidelines or evidence-based best standard practices for managing asthma in children.

The guidelines for the long-term management of asthma in children are reasonably uniform around the world [1-12]. These guidelines recommend assessing the level of asthma control of the patients with a history and objective lung function tests [1,2,9,10]. These guidelines also advocate parent education about the chronicity of the disease, the need for prolonged treatment, teaching correct inhaler techniques, use of peak flow meter, recording the results of the peak flow metery, care of the inhalers/peak flow meters at home and provision of the written asthma action plan for dealing any emergency situation [1,7,12]. These guidelines endorse the use of anti-inflammatory drugs, preferably in inhaler form, along with bronchodilators or leukotriene receptor agonists at various levels of severity [1,3]. Anti-inflammatory drugs are commonly known as controller/preventer drugs. These are necessary to address the main cause of asthma i.e., chronic inflammation.

In actuality, there are large gaps between the assertions made by the guidelines and the practices of health care providers. A survey, conducted by door-to-door recruitment of over 15000 households involving 7 major cities of Pakistan that comprise 52% of the population, showed that only 15% of the patients have had a lung function test for diagnosis or monitoring of their asthma [13]. The important point to ponder is that these lung function tests were performed in adults only. In an American study, it was observed that primary care physicians are less likely to adhere to the asthma management guidelines than asthma specialists though both groups followed guidelines in less than 50% of cases [14]. The figures are similar to Nigeria where only 15.4% of doctors gave written asthma action plans to the patients, routinely [15]. As the data is scarce about the practices of pediatricians regarding their adherence to the guidelines for managing asthma in children so there was a need to explore the practices of pediatricians in tertiary care hospitals.

Our study aimed to identify the gaps between the practices of the pediatricians and the guidelines recommended, evidence-based, best-standard practices regarding the management of asthma in children at tertiary care centers in Pakistan.

2. Materials and Methods

This study was performed at the emergency and outpatient departments (OPDs) of two tertiary care hospitals of south Punjab namely, the Children's Hospital & the Institute of Child Health (CH & ICH),

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Multan, and the Nishtar Medical University & Hospital (NMU & H), Multan. The children from the age of 4 years to 18 years, who came for the first time to the emergency or OPDs, with a prior diagnosis of asthma were included. The children coming for follow-up were excluded from the study.

The children were sampled with the convenient sampling technique. The sample size was calculated by OpenEpi version 3.0. The sample size was calculated as 196 keeping a Confidence level of 95% with a likely positive outcome factor of 15% and a margin of error of 5%. The population size (75000) was based on the 5% asthma prevalence in our population of 1.5 million [13].

The attending doctor asked specific questions from the parents (who consented) regarding the way their child was being managed for his/her asthma. The responses were recorded on a specified proforma. Apart from the epidemiological information, the performa included questions to ascertain the method/s by which the degree of asthma control was classified in the child. There were 3 options; 1) was the asthma control assessed by symptom/signs, 2) was the peak flow metery record seen/demanded, and 3) was Asthma Control Test (ACT) administered to the parents/patient. The subsequent questions were 2 pronged; one was to assess the guidance/education provided to the parents for the management of their child's asthma and the 2nd to assess the type of pharmacotherapy provided. Considering the parent guidance/education, the questions included if the parents were apprised of the chronic nature of the disease, was the need for prolonged treatment stressed, was the technique for inhaler use was taught, was a written asthma action plan provided, was the use of peak flow meter/recording explained and was the home care of the inhaler/spacers/peak flow meter taught. Considering the pharmacotherapy, the questions included comprehending what type of medications were prescribed (Relievers or Controllers), and then these medications were in the oral or inhaler form. Other details sought were about the nature of medications prescribed like steroids, short-acting beta-agonists/bronchodilators (SABA), long-acting beta-agonists/bronchodilators (LABA), anti-muscarinic or leukotriene receptor agonists (Montelukast).

The study was approved by the Institutional Review Board (IRB) of the Nishtar Medical University, Multan vides letter number 15501 dated 07-08-2021. The data was entered in SPSS-27 and analyzed by measuring frequencies of various parameters against the evidence-based recommendations for the management of asthma in children.

3. Results

Table 1: The Characteristics of Asthmatic Children and the use of drugs in an emergency.

Total population (n)	234	n (%)
	male	158 (67.5)
	female	76 (32.5)
Less than 5 years	44 (18.8%)	
	male	38 (86.4)
	female	6 (13.6)
5-12 yeas	166 (70.9%)	
	male	108 (65.1)
	female	58 (34.9)
12-18 years	24(10.3%)	
	male	12 (50)
	female	12 (50)
Mode of presentation	Emergency	50 (21.4)
	OPD	184 (78.6)
Routes of drug administration in Acute attacks	Oral	190 (81.2)
	Inhaled	20 (8.5)
	Both	24 (10.3)
Oral drugs used in Acute attacks	Bronchodilator	66 (28.2)
	Improved	56/66 (84.8)
	Corticosteroids	3 (1.3)
	Improved	1/3 (33.3)
	Both	145 (62)
	Improved	141/145 (97.2)
	No Oral Drugs	20 (8.5)
Acute attacks improved after oral drugs	Not improved	16/214 (7.5)
	Improved	198/214 (92.5)
Inhaled drugs used in Acute attacks	Bronchodilators	24 (10.3)
	Improved	20/24 (83.3)
	Steroids & bronchodilators	20 (8.5)
	Improved	20/20 (100)
	No Inhaled drugs used	190 (81.2)
Reliever Drugs-Routes	Oral	190(81.2)
	Inhalers	20 (8.5)
	Both	24 (10.3)
Inhaler Reliever Drugs	SABA	37 (15.8)
	Ipratropium	5 (2.1)
	Both (SABA + Ipratropium)	2 (0.9)
	Nil	190 (81.2)
Controller Drugs-Route	Oral	34 (14.5)
	Inhaler	10 (4.3)
	Both	2 (0.9)
	Nil	188 (80.3)
Oral Controller Drugs	Steroids	21 (9.0)
	Montelukast	6 (2.6)
	CST & Montelukast	9 (3.8)
	No Oral Drugs	10 (4.3)
	Nil	188 (80.3)
Inhaler- Controller Drugs	Steroids	10 (4.3)
	Steroids + LABA	2 (0.9)
	No Inhaler Drugs	34 (14.5)
	Nil	188 (80.3)

Of the 234 children, 2/3 (67.5%) were males. The majority (70.9%) of children were in the 5–12-year

age group with a mean age of 104.87 ± 36.55 months (mode 84 months) and presented in OPD (78.6%). The baseline parameters of the participants and the use of drugs in acute attacks or for long-term management are shown in Table 1.

Of note is that children, overwhelmingly (81.2%) were prescribed oral reliever drugs in acute attacks or exacerbations with improvement observed in 92.5%. Mostly it was a combination of short-acting beta-agonists (SABA) and steroids (62%) while only SABA was advised in 28.2% of children. The controller drugs were not advised to 80.3% of children. The controller medicines (anti-inflammatory) were prescribed to 19.7% of children majority of which (14.5%) were in the oral form. The doctors based their assessment of the level of asthma control mainly on symptoms (94%) while objective/structured assessment with peak flow metery/spirometry or asthma control test was done only in 4% and 2% of children, respectively (Fig. 1).

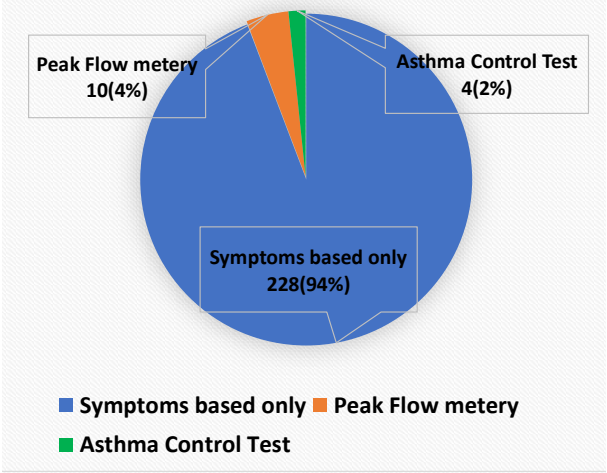

FIGURE 1: Methods used by pediatricians to Assess Asthma Control Levels in Children

This is evident that the practices of pediatricians for assessment of the level of asthma control are far from the recommended guidelines. The pediatricians provided minimal education to the parents regarding the Inhaler/spacer technique (6.5%), care of the equipment (7.5%), use of peak flow meter/recording the results (7.5%), or a written asthma action plan for emergency (2.1%). Almost all children (90%) were instructed to avoid triggers while the chronicity of the disease and the need for prolonged treatment were explained to 57% and 50% of parents, respectively (Fig.2).

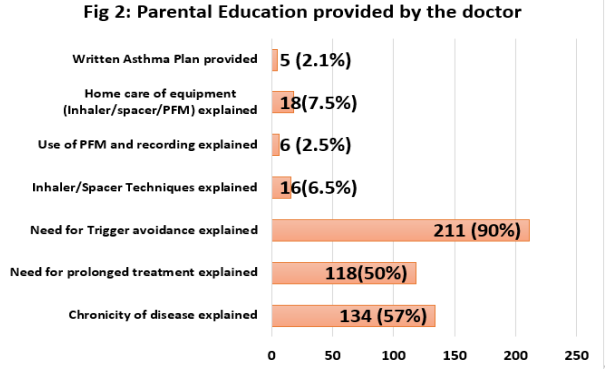

FIGURE 2: Parental Education as provided by the pediatricians

4. Discussion

Our study has highlighted the fact that the practices of pediatricians regarding the management of asthma in children do not conform to evidence-based best-standard practices. There is a considerable gap between the guidelines and the practices of the clinicians. Only a minor chunk of the clinicians assessed the level of asthma control and severity of asthma in children with objective methods like peak flow meter or spirometry (4%). Similarly, Asthma Control Test (ACT) which is a validated test to assess asthma control in children is used merely by 2% of doctors. There are a couple of good indicators, too. Almost all clinicians (90%) advised to avoid the allergens and at least 57% informed the parents about the chronic nature of the disease. Keeping in view the inflammatory basis of asthma, it is a matter of great concern that 80.3% of the children were not advised anti-inflammatory controller medicines.

The American Academy of Pediatrics endorsed NAEPP (National Asthma Education and Prevention Program) guidelines that define asthma as a "chronic disorder of the airways that is complex and characterized by variable and recurring symptoms, airflow obstruction, bronchial hyperresponsiveness, and an underlying inflammation" [10]. Considering the above facts, various guidelines around the world, have recommended best standard practices to manage children (age 5-16 years) with asthma [1,11,16].

There are mainly 3 issues that surround the management of asthma in children. First of all, assessing the level of asthma control, then parent education regarding the management of asthma in their children, and finally the pharmacotherapy including anti-inflammatory medicines, preferably in inhalation form, to address the underlying inflammation of the airways as per the definition above.

For assessing/monitoring the level of asthma control, the best standard practice, according to the latest guidelines issued by the UK National Institute for Health and Care Excellence (NICE) includes the following points. At every visit, a consideration is made to use a validated questionnaire like Asthma Control Test (Child-ACT) or Asthma Control Questionnaire to monitor asthma control [1,11]. The objective assessment of asthma control also requires using spirometry or peak flow variability testing [9,10]. For an objective evaluation of the child's adherence to the pharmacotherapy, the assessment of the level of fractional excretion of Nitrogen(FeNO) in the exhaled breath is an appropriate tool [1,10].

For managing children with asthma, parental education is another important component. This encompasses instructing the parents to avoid such factors that can trigger or precipitate the asthma attack in their children, informing them that asthma is a long-term condition that would require a consistently prolonged follow-up, teaching the

use/care of inhalers/spacers/nebulizers, motivating/training to use the peak flow meter with documentation of the results and provide the written asthma action plan that includes what to do in an emergency situation [1,7,10].

Finally, the mainstay of pharmacotherapy, according to guidelines, is severity based. But involves, uniformly, the use of anti-inflammatory drugs, to address the root cause of asthma, preferably in the inhaler form [1,3,9,10].

The guidelines say what they have to say but the bitter fact is that there is a great gap between the recommended best standard practices and the practices of the physicians, clinicians, or pediatricians, around the world, for managing asthma in children. A study involving 816 internal medicine doctors, general physicians, chest physicians, and pediatricians from five countries (Morocco, Lebanon, Nepal, Malaysia, and Myanmar) showed that only 12% of the patients always used peak flow meter at home to monitor their asthma [17]. In the same study, only 30% of patients were advised inhaler therapy while only 47% were always evaluated for the correctness of the inhaler technique by the physicians [17].

In a national survey of primary care clinicians/physicians in America, the overall agreement with the guidelines for the proper management of asthma was only 11.6% [18]. Regarding the objective assessment of the level of asthma control, in the same survey, only 5.7-12.2% of the doctors always asked about peak flow metery results & only 6.8-16.8% always performed spirometry to assess control [18]. And 13.6% of general physicians (GP) while 23% of pediatricians assessed the inhaler technique. The written Asthma Action Plan was provided by only 11.9% GP and 26.8% of pediatricians [18].

In another nationwide survey of American pulmonologists and allergists, inhaler technique assessment, provision of a written asthma action plan, and spirometry were performed by only 39.7%, 30.6% and 44.7%, respectively [14]. In a UK study, 54% of children, who reported good asthma control, had abnormal spirometry and/or FeNO. It determined that a symptom-based approach, without objective testing, to monitor asthma will likely miss the children that are at high risk of severe asthma attacks [19].

The situation is not different in Pakistan. A nationwide survey, involving over 15000 households from seven major cities (almost one-third were children), showed that only 15% of the patients had lung function tests done and 87% were not familiar with the inhaled steroids i.e., the controller medicines [13]. On the other hand, it has been seen that by following the guidelines, the precision of asthma severity classification and the use of anti-inflammatory controller drugs improves, substantially [20].

Our results are quite similar to the other regional & international studies. Similar to our results (80.3%), the Kuwaiti study showed that 81% of children were not advised any anti-inflammatory controller medicine at the time of discharge from the hospital [21]. The physicians belonging to Canada, Australia, China, France, Germany, and Japan rarely used asthma control test for assessing asthma control(10%) or provided written asthma action plan(37%) but our physicians used these modalities with much lesser frequency i.e., around 2% only [22]. The Cloutier from America reported that only 16.8% of asthma specialists assessed the inhaler techniques of their patients and only 11.2% used peak flow meters for monitoring asthma control [23]. It is clear that, around the world, very few doctors and clinicians are following the evidence-based guidelines but the percentage of doctors/pediatricians in our study not following the evidence-based guidelines is even lower than that i.e., 7.5% and 2% for inhaler techniques and peak flow monitoring.

There were a couple of limitations in our study. We did not look into the factors that were associated with the non-compliance of the pediatricians/clinicians with the evidence-based best standard practices. Also, we only included children from the public sector hospitals and not from the private hospitals of the region though that is not likely to affect the results. That is because tertiary care hospitals are much more resourceful, technically and financially than private sector hospitals for monitoring and managing asthma in children.

Conclusions: We determined that the management of asthma in children is not optimal in our tertiary care hospitals, as compared to the evidence-based, best-standard practices. This means that the classification of asthma severity is not correct in our children. The wrong classification of asthma severity in turn would lead to the over-prescription or under-prescription of the children. This entails the inapt loss of resources of the hospital and huge financial losses to the patients for managing this chronic disease of the children.

Obviously, there is a great need to train doctors, programmatically, regarding the best standard practices for monitoring and managing asthma in children aged 5-18 years. They also need to be motivated to follow the guidelines to avoid inappropriate classification of asthma severity and thus inappropriate therapy. An important aspect is to provide Peak Flow Meters, Spirometry, and FeNO assessment devices at all healthcare facilities.

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6. Conflict of Interest:

The author declares no conflict of interest in this paper.

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