PARENTAL COMPLIANCE: IMPLICATIONS FOR THE MANAGEMENT OF BRONCHIAL ASTHMA IN CHILDREN

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ABSTRACT
Modern treatment of bronchial asthma is focused on achieving and maintaining asthma control. Unfortunately, asthma is quite often poorly managed. Our survey’s objective was to analyse the collaboration of parents as the participants who are primarily responsible for day-to-day adherence to asthma treatment regimen. The questionnaire-based study was carried out among parents of paediatric patients with asthma divided in two age groups: 6-12 years and 13-16 years. The survey findings indicated poor parental compliance caused by parents’ misunderstanding of the therapeutic goals and their fear of drug-related side effects. Achieving optimal management of paediatric asthma necessitates additional training of parents to share the responsibility for the therapeutic outcome with their children, with the medical specialists, and with the pharmacists involved in the treatment.

KEYWORDS: bronchial asthma, children, compliance, parents, treatment.

INTRODUCTION
Over the past decades, bronchial asthma has become a serious social health problem throughout the world. Several hundred thousand people die from the disease every year. It has been estimated that by the year 2020, asthma will be permanently among the top five most prevalent diseases in the world.[7] According to GINA’s guidelines (Global Initiative for
Asthma), the primary aim of asthma treatment is to achieve and maintain control. Surveys in this field have established that asthma is poorly controlled and inefficiently managed in many regions around the globe. In Europe, only 5.3% of asthma patients (5.1% of adults and 5.8% of children) meet all the requirements for well-controlled asthma.\[15\] Data provided by the Association of Bulgarians with Bronchial Asthma (ABBA) show that asthma is poorly managed or untreated more often than any other chronic disease.\[18\] The issue of untreated bronchial asthma is closely related to the quality of healthcare provided in the country, as well as to public health literacy and cultural awareness.\[5\]

Parents are considered to be primarily responsible for poorly controlled paediatric asthma. Poor adherence to prescribed treatment regimen with inhaled medications reflects patients’ misjudgement of the benefits of asthma therapy and their recurrent misunderstanding of the therapeutic goals.

Patients’ active collaboration in disease management is an essential component of the contemporary approach to asthma treatment. Self-monitoring and parental monitoring, strict adherence to the treatment plan, adequate home-management, and avoidance of asthma triggers are imperative for achieving good therapeutic outcome.\[7\]

Adequate asthma management based on collaboration between patients, parents and healthcare professionals can significantly improve the therapeutic outcome and patient quality of life.

**Objective:** To examine the adherence to the prescribed treatment regimen and the compliance of parents who have the primary responsibility for the management of paediatric asthma.

**METHODS AND MATERIALS**

The questionnaire-based survey encompassed the period from June 2014 till December 2014. Respondents in the survey were parents of children with asthma. They were separated in two groups according to the age of their children: 6-12 years and 13-16 years of age. Respondents were randomly approached while purchasing prescribed asthma drugs in community pharmacies in Varna.

We determined the minimum sample size on the basis of data collection regarding the health of school-age children in Varna for the school year 2012-2013. Data was provided by the
Regional Health Inspectorate - Varna (RHI). The minimum sample size required for medical researches was determined with a sample size calculator.\[^3\]

**RESULTS AND DISCUSSION**

According to the data provided by the RHI-Varna, 24,569 out of 35,535 students (69\%) attended medical examination during the school year 2012/13. Of all the students, 527 were diagnosed with asthma. The share of school-age children with asthma was 2\%.

The sample size was calculated using the following formula

$$n = \frac{z^2 \cdot p \cdot (1-p)}{d^2}$$

**Description**

- \(n\) – required sample size
- \(z\) – confidence coefficient, \(\alpha=0.05\; z=1.96\)
- \(p\) – estimated prevalence of asthma, based on previous surveys
- \(d\) – margin of error, determined by the researcher

Our aim was 5\% statistical precision, i.e. \(d=0.05\).

The use of the standard values listed above provided the following calculation, which defined the minimum sample size:

$$n = \frac{1.96^2 \cdot 0.02 \cdot (1-0.02)}{0.05^2} \quad n=33 \text{ children}$$

Wheezing and coughing are some of the most common symptoms of infections of the respiratory system in childhood. Pulmonary function testing is applicable to children aged 5 years and over who can actively cooperate. Therefore, we focused our survey on children in the above mentioned age groups: 6-12 years and 13-16 years.

Of the 116 respondents who consented, 77 were parents of children aged 6-12 years, and 39 were parents of Children aged 13-16 years. In the group of 6-to-12-year olds, boys were the majority – 59.7\%, and the girls comprised 40.3\% of the sample. In the group of 13-to-16-year olds, the ratio was 51.3\% to 48.7\% in favour of the girls. Survey data on the gender distribution in both age groups corresponded to previously published survey findings. It confirmed the fact that, for yet unknown reasons, boys suffer from asthma more often than girls, while in adults the gender ratio is reversed.\[^{1,10}\]
Asthma management in all surveyed children followed a tailor-made treatment regimen in accordance with the international therapeutic guidelines. Individualized medication regimens were tailored to each child's health condition by healthcare professionals (either allergists, or pulmonologists). The tailor-made approach in asthma management was likely to have better impact on the therapeutic outcome.

The majority of surveyed participants (67.5% in the age group 6-12 years, and 53.8% in the age group 13-16 years) declared strict adherence to the prescribed treatment regimen. Survey results indicated partial parental adherence in 28.6% in the group of younger children and 38.5% in the group of adolescents. Non-adherence to the treatment plan was confirmed by 3.9% and 7.7% of the parents in the respective groups. (Figure 1)

![Figure 1. Do you adhere to the prescribed treatment regimen?](image)

Irrespective of the tailor-made approach in asthma management, good asthma control is hardly to be achieved when there is parental non-adherence or partial adherence to the treatment regimen.

Patient’s participation in disease management is an essential component of contemporary asthma treatment. Regular self-monitoring of peak expiratory flow with PEF meter at home improves disease management and regimen adherence.\(^7\) Measuring the PEF rate is the most appropriate method for disease monitoring and management in children with persistent asthma (GINA). Self-monitoring with PEF meter is recommended for children aged 5 years and over, for they can actively cooperate under parental supervision.
According to the measured PEF rate, patient’s condition can be classified into the following peak flow zones: yellow, green, and red. This traffic light scheme enables parents and physicians to monitor patient’s condition.

The results of our survey showed that PEF meter was used in just 10.3% of respondents’ households with children aged 13-16 years, and with children aged 6-12 years this percentage was 18.2%.

PEF meter was prevalently used by the parents of younger children (6-12 years) – 40% of them said they used it often, and 21% of them responded “very often”. The majority of parents of adolescents stated they rarely used PEF meter (49%), and 26% of the respondents in this group declared irregular use of PEF meter in the management of asthma. A very small share of the respondents stated they used PEF meter on a regular basis – 2.6% in the age group of 6-to-12-year olds and 5.1% in the age group of 13-to-16-year olds.

The majority of parents in both groups admitted PEF measurements records were irregular. The irregular recording was prevalent in the age group of adolescents (76.9%), and in the age group 6-12 years their share was 55.8%.

We established lower levels of parental adherence to disease monitoring in the group of adolescent patients. The probable reason was adolescents’ desire for greater autonomy in their decision making, which diminished the extent of parental involvement in the management of asthma. On the other hand, adolescents’ poor cooperation was associated with the specificity of their psychological development and emotional vulnerability.

Peak flow meters are available in community pharmacies. Physicians and pharmacists should encourage parents to monitor and record the PEF rate on a regular basis, hence to improve the regimen adherence and the therapeutic outcome.

Given GINA’s classification of asthma control – well-controlled, partially controlled and uncontrolled, respondents were asked to define the level of asthma control in their children.

Most of the parents considered their children’s asthma “partially controlled” – 70.1% of respondents in the age group 6-12 years and 64.1% in the age group 13-16 years.

Parents’ assessment of achieved asthma control made us infer that asthma in younger children was better controlled: 20.8% of children in this group had well-controlled asthma.
and only 9.1% of them had uncontrolled asthma. In the age group of 13-16 years, 15.4% of patients had well-controlled asthma, whereas those with uncontrolled asthma comprised 20.5% of the sample.

Parents are considered primarily responsible for poorly controlled paediatric asthma. Data provided by the Association of Bulgarians with Bronchial Asthma (ABBA) show that asthma is poorly managed or untreated more often than any other chronic disease. A survey conducted in the USA among parents of children with asthma has found poor correlation between parents’ assessment of asthma control and children’s actual health status. Though 78% of the parents have evaluated asthma as “well-controlled” or “partially controlled”, nearly one half of the children have reported day symptoms or exercise-induced symptoms.

Daily adherence to medication regimen on a long-term basis is imperative for achieving long-term asthma control. The majority of interviewed parents of paediatric patients aged 6-12 years (63.6%) said they had never failed to administer a dose of the controller medication, whereas 56.4% of the parents of adolescents admitted they had occasionally missed the prescribed dose.

![Figure 2](image)

**Figure 2.** Do you let your child miss a controller medication dose when he or she feels well?

As we can see in the table above, the affirmative responses did not prevail. However, many parents did not comply strictly with the recommendations of the treating physician. Asthma daily controller medication doses were missed more often by the parents of adolescents.
Previously published data show that disease-related discomforts and social limitations in an adolescent with asthma suggest a high probability of noncompliance with the therapy regimen.\[^{[9]}\]

Poor compliance amongst patients has been proved to be the major factor for poor asthma control – 80% of patients with refractory asthma do not regularly adhere to the treatment with inhaled medications. We identified that poor compliance, along with parental and patient poor understanding of the nature of asthma and asthma medications, were the prevalent causes for poor asthma control in most of the children surveyed. Optimal therapeutic outcome could be achieved through strict adherence to medication regimen on a long-term basis irrespective of any health improvements.

We inquired of our respondents to give us the most common reasons for missed medication doses. The responses strengthened our belief that parents needed additional counselling and health education.

There were similar results in both groups. (Figure 3) The most common and most acknowledged type of parental non-adherence was parental forgetfulness. The respondents pointing out this factor were 62.3% in the age group 6-12 years, and 61.5% in the age group 13-16 years.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{reasons.png}
\caption{Which are the reasons for missed medication doses?}
\end{figure}

Fear of perceived short- or long-term side-effects was the second most common reason, indicated by 18.2% and 17.9% of the respondents in the respective groups. “Complex method of drug administration” was the third most common reason for missed drug doses, specified
by 14.3% and 15.4%, respectively. The complexity of the therapeutic regimen was pointed out by 2.6% of the respondents in both age groups, while “for other reasons” was the answer of 2.6% of the respondents.

Some authors believe that poor compliance in the treatment of chronic diseases is a common issue as a result of underestimated significance of the treatment, patient’s concerns about adverse side effects and lack of collaboration between the patient and the physician. Other surveys emphasize on the complexity of the therapeutic regimen, the socioeconomic factors, and the misunderstanding of dosage regimen instructions.\[^5\] Another treatment issue is patient’s lack of skills to coordinate activation of the inhaler and the inhalation. Evidence shows that most patients prefer the oral route of drug administration.\[^2\]

Individual and public cost of asthma includes both direct costs (those associated with medications and hospitalizations) and indirect costs. On the one hand, indirect costs are associated with parental sickness absence and reduced productivity, and on the other hand, with school absenteeism and children’s poor academic performance.\[^17\] Asthma is considered the #1 cause of school absenteeism due to chronic illness.\[^4\]

The majority of the interviewed parents confirmed that their children’s asthma accounted for the highest number of days absent from work.

![Figure 4](image.png)

**Figure 4. How many of your last year leaves of absence from work have been associated with your child’s asthma?**

More than one fifth of our respondents (22.58%) confirmed they had been absent from work for more than 10 days in the preceding year. Asthma-related leaves of absence had varied
between 6 and 10 days for 35.48% of the respondents, and between 1 and 5 days for 34.41% of them. Only 7.53% of our respondents said their absence from work had not been asthma-related.

There is not yet a total cure for asthma. Still, with effective asthma management and collaboration between patients/parents and health professionals, good asthma control can be achieved and maintained. Thus, well-controlled asthma enables paediatric patients to enjoy healthy lifestyle. Providing specific training for patients and their parents can significantly contribute to good treatment outcome. Adequate training comprises activities which enable patients and their caregivers to understand the basics of asthma, to gain knowledge of asthma medications and methods of administration, to acquire skills necessary for symptom monitoring and asthma self-management.[7] In modern healthcare delivery systems, pharmacists have to meet constantly increasing requirements and expectation, since they are the most easily accessible health professionals recognized by the public as a reliable source of health-related information and medical advice.

Most patients experience various difficulties in following the treatment plan. The responsibility of the pharmacy practitioner is to verify the adequacy of the prescribed treatment plan, to make sure that the drugs used are the safest and the most appropriate, and to supervise the correct manner of administration as prescribed by the physician.(11,12) The communication and collaboration between the patient and the pharmacy practitioner have a crucial impact on the level of compliance.[13]

Pharmacists can significantly contribute to the improvement of asthma management and patient adherence to a tailor-made treatment regimen. They should provide information on the effects of the medicines prescribed, clarify the concept of patient compliance with the treatment regimen, explain the purpose of the therapy, and emphasize on the importance of regular disease home-monitoring.

In contemporary society, pharmacists’ skills and competence can optimise the drug use, enhance the effectiveness of pharmacotherapy, and decrease healthcare costs.[14]

Conclusion: The questionnaire-based survey found that the main factor associated with asthma treatment failure was poor compliance with the tailor-made treatment regimen and prescribed pharmacotherapy. Poor compliance was caused by parents’ misunderstanding of
the therapeutic goals and their fear of potential drug-related adverse side effects. Parental collaboration can be enhanced through educational programmes for optimising paediatric asthma treatment. Good compliance culture is a prerequisite for well-controlled asthma and decreased direct and indirect costs of asthma.

The key component of successful disease control and effective management of respiratory allergies is the collaboration between patients, pharmacists and health professionals.

REFERENCES


