

## Research Article

### The Impact of Socio-Economical Status on the Quality of Life of Children with Asthma

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#### Abstract

Low socioeconomic level may contribute to the severity of asthma, frequency of exacerbation, and hospitalization and affects the quality of life. The aim of the study was to evaluate the impact of socioeconomic status (SES) on general score of quality of life (GSQL).

**Methods:** The study group included children aged between 8-16 years with persistent asthma, and we followed them up 12 months. We analyzed the location and the size of the household, educational level, and employment status of parents and family income. The GSQL was obtained based on the questionnaire of quality of life in children with asthma. According to the SES, we divided the study group into high income and low-income groups.

**Results:** Half of the patients belonged to families with low income. There were no significant differences in GSQL regarding the living area, educational level, and parents' employment status. The general score of quality of life was higher in patients from the high-income group than those with lower income at the beginning of the study ( $5.04 \pm 1.09$  versus  $4.43 \pm 0.97$ ;  $p=0.0101$ ). After 12 months GSQL increased significantly in both groups ( $6.57 \pm 0.57$  versus  $6.49 \pm 0.56$ ;  $p=0.3167$ ). The quality of life was not affected by atopic status.

**Conclusions:** The low income has a negative impact on children GSQL. The educational level and employment status of parents, rural area, and the association of other allergic diseases do not affect the quality of life.

**Keywords:** Allergic rhinitis; Asthma; Quality of life; Socio-economical status

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#### Abbreviations

GINA: Global Initiative for Asthma

GSQL: General Score of Quality of Life

p = The Index of the Statistic Probability

PAQLQ: Paediatric Asthma Quality of Life Questionnaire

SES: Socioeconomic Status

#### Introduction

Asthma is a multifactorial and heterogeneously disorder, the most frequent chronic disease in children. In developed countries, the incidence of the disease has an increasing trend in children. During the past two decades in Romania, asthma prevalence in children increased from 3.4% to 5-7% [1-4]. Due to the chronic course, asthma affects children from the physical point of view and psychological and social aspects. The chronic course implies a particular situation in an individual's life. The disease generates psychic stress through the problem created by the clinical features. The consequences of recurrent exacerbations and daily medication that is required may induce behavior changes or inferiority complex. There are different modalities in which the child reacts to chronic disease. They might present dependency, self-accusation, anxiety, depression, fear, regression, hostility, self-interest, or self-isolation [5]. When the parents find out that their child has a disorder with chronic evolution, a real shock may occur. The parents' attitude will be either hyper-protection of the child, isolation of the child, or embarrassment in the community. Often, they deprive the child of positive experiences. The child's siblings' reaction may be feelings of frustration and dissatisfaction, feelings of shame as a report to their school-mates and playmates, or "maternal" feelings. These health caregivers' concerns evolved towards the concept's appearance for evaluating a chronic disease called quality of life. This is a modern criterion of appreciation of the disease's impact on the patient's life that became a part of the monitoring plan during the past decade.

Quality of life represents "the impact of the disease and consequences of the therapy on the patient's activity and well-being as they are perceived by the patient himself" [6,7]. The subjective methods of evaluation represented by questionnaires are used on a large scale. For children, the development of specific evaluation instruments represented a real challenge because the children must be able to undertake the test by themselves, without their parents' help. The questionnaire implies a certain level of understanding and knowledge concerning the disease and the capacity of reading. The most frequently used questionnaire on the quality of life of the asthmatic child is "Paediatric Asthma Quality of Life Questionnaire" (PAQLQ) published by Juniper E. [7-9]. It contains 28 items (questions) from 3 domains: 10 items for symptoms, five items for activities, and eight items for emotions.

Published data concerning the relationship between socio-economical factors and asthma reveal a higher prevalence of asthma in subjects that belong to families with lower income [10]. Also,

studies showed that asthma is more severe in people with lower income [11-12]. The majority of these reports include adults with asthma or chronic obstructive pulmonary disease.

The authors assessed the impact of socio-economical status (SES) on children's quality of life with asthma. They analysed the relationship between atopy and asthma-related to the socioeconomic level.

## Materials and Methods

### Study design

We underwent a cohort, prospective, opened, an interventional study in which we evaluated the described parameters during 12 months of follow-up, with a total of three visits, at the beginning of the study, after three months, and after 12 months.

### Population

Our study group consisted of children with the following inclusion criteria:

1. Diagnosis of asthma at least six months before inclusion in concordance with current guidelines [13];
2. The age of the patients between 8 and 16 years old;
3. The consent of the child to fill in the questionnaire;
4. The agreement of parents to participate to the study and to offer specific data regarding their SES. We excluded from the study group patients associated with other diseases except for allergic rhinitis and/ or eczema or atopic dermatitis.

The exclusion criteria were:

1. Symptoms consistent with asthma (recurrent wheezing, persistent cough, e.g.) without a confirmed diagnosis of asthma;
2. Patients younger than eight years or older than 16 years old;
3. Association of other chronic diseases, except for allergic rhinitis, atopic dermatitis or eczema, that may influence the quality of life (gastroesophageal reflux, heart abnormalities, e.g.);
4. Lack of compliance.

All patients underwent spirometry at the time of each visit. The atopic status was assessed by allergic skin prick tests that performed at the first visit. We used the Halcis case from S.C.Diagnosis and Therapy Halcis Allergy Romania. We tested both indoor allergens: house dust mites (*Dermatophgoides pteronyssinus* and *Dermatophgoides farinae*), molds (*Cladosporium herbarum*, *Aspergillus fumigatus*, *Alternaria alternata*), and outdoor allergens: grass or trees pollens (e.g., Ragweed, *Artemisia vulgaris*, *Parietaria judaica*) and pets (cat and dog). We measured the skin reaction, reported the wheal's size, and interpreted it as a positive reaction if the diameter was  $> 3$  mm. The same investigator on each patient performed the skin prick tests.

The study group was divided into two subgroups according to the average income in the family. By the time of the study, during the early 2000s, the minimum gross income in the Romanian economy presented by the state agencies varied according to the exchange rate and according to the economic performance between 22 and 37 Euros. We used a 26 Euro cut-off split between group A, with a low income, below 26 Euro and group B, with an income higher than 26 Euro.

During the selection phase, we used the following parameters to assess the socioeconomic status: rural or urban location of child's home, crowding of the house, the monthly income per family member as described above, the educational level, and the profession of both parents.

### Method

The quality of life was assessed using the questionnaire "Pediatric Asthma Quality of Life Questionnaire" (PAQLO). The questionnaire was translated into Romanian and adapted than validated [14]. For each of the 23 items, there is a scale between 1 and 7. A lower score of 1 means a lower quality of life, and 7 represents a good perception of life. The general score is calculated during the three visits based on the three domains: symptoms, activities, and emotions (the arithmetic mean of each domain). A difference of a minimum of 0.5 in the general score of quality of life (GSQL) or the scores for each domain means a significant change in life quality from a visit to the next [8].

### Ethics

According to the local hospital policy, all parents/legal guardians consented to participation in the study by providing informed written consent. The study protocol was approved by both the ethical committee of "Iuliu Hatieganu" University of Medicine and Pharmacy and Children's Emergency Hospital Cluj-Napoca.

### Statistical analysis

We used SPC for Excel Software for data analysis. The chi-square test and Fisher test was used to compare proportions, and results are presented as percentages with  $p$  values and, when appropriate. We considered a significant change when  $p$  values were  $< 0.05$ . Nominal data were reported as the frequency, percentage ( $n$ , %), and median.

### Results

Seventy-four children with persistent asthma fulfilled the inclusion criteria for the study group. After three months, 10 of them were excluded, so that 64 patients were evaluated for 12 months of the study. The exclusion was due to either withdrawal of the consent (2 cases) or poor compliance (8 cases).

The patients' mean age was  $11.0 \pm 2.60$  years (range 8 to 16 years old), the majority being males (36 patients, 66.6%). Demographic characteristics are summarized in table 1.

Concerning the site of their homes, 72% of the subjects (46 out of 64 patients) lived in cities. The proportion of patients from rural areas is significantly higher in the low-income group than in the high-income group (14 cases, *versus* 4 cases). Positive skin prick tests occurred in 42 cases (65.6%), more frequent in patients with higher income (21 patients, 70%) than in patients from group B (21 patients, 61.7%). Analyzing the hypersensitivity, we noticed that most patients presented positive reactions for indoor allergens (59.5%). The positive reaction of skin tests was more frequent in patients living in cities than in rural areas. Only ten from 18 patients living in countryside areas presented a positive reaction when tested by skin prick tests.

We analyzed the living site as an independent factor for the quality of life. In children that lived in a rural area, GSQL was  $4.77 \pm 0.98$  at the beginning of the assessment and increased to  $6.43 \pm 0.52$  after 12 months, while in patients living in cities, the initial GSQL was

4.69±1.11 and increased up to 6.58±0.58. No significant differences were noticed concerning the living area, regardless of the two groups' income levels.

	Group A low income	Group B high income	P
No. cases	34 cases	30 cases	
Gender - males - females	21 cases (61.8%) 13 cases (38.2%)	19 cases (63.3%) 11 cases (36.7%)	p>0.05
Age of patients Mean±SD Median	8-16 years 10.97±2.04 10.5 years	8-15 years 11.03±1.97 11.0 years	p>0.05
Living area - Cities - Rural area	20 cases (58.8%) 14 cases (41.2%)	26 cases (86.7%) 4 cases (13.3%)	0.0051
Association with other allergic diseases, no cases - isolated asthma - associated with AR and/or AD	12 cases (35%) 22 cases (65%)	3 cases (10%) 27 cases (90%)	0.0002***
Positive skin prick tests for one or more allergens - for outdoor allergens - for indoor allergens - for both outdoor and indoor allergens	21 cases (61.7%) 0 cases 15 cases 6 cases	21 cases (70.0%) 2 cases 10 cases 9 cases	p>0.05

**Table 1:** Characteristics of the study group.

\* AR: Allergic Rhinitis; \*\*AD - Atopic Dermatitis or Eczema; \*\*\* Differences between the two groups regarding the association of other allergic diseases

Regarding the house's crowding, 41 subjects belonged to a family where the home was not crowded (less than two persons living in a room). Most of the patients had both parents with a medium level of education, 63% of mothers, and 62% of fathers.

The relation between the general score of quality of life and the income level is presented in table 2. At the beginning of the study, there was a significant statistical difference (p=0.0101) between group A and group B concerning the GSQL. After 12 months, the GSQL for both groups increased significantly (p=0.0001 and p=0.0009). There were no significant differences between group A and group B regarding the evolution of GSQL (p=0.3167).

	Group A low income (n=34 cases)	Group B high income (n=30 cases)	P
initial GSQL (MA ± DS) (Median)	4.43±0.97 4.17	5.04±1.09 5.05	0.0101
final GSQL (MA ± DS) (Median)	6.49±0.56 6.73	6.57±0.57 6.75	0.3167
p	0.0001	0.0009	

**Table 2:** The evolution of GSQL related to the level of income per family member.

The relationship between GSQL and the parents' educational level was evaluated only for 54 patients from the initial study group. The results suggest that GSQL improved regardless of the educational level of the parents. There were significant differences between initial and after 12 months GSQL values only for cases in which parents had a medium level of education.

The evolution of GSQL related to the parent's profession was as follows: in children of mothers without a job or a low hierarchy job, the GSQL increased from was from 4.58 to 6.27 (p=0.0516). Concerning the father, there was a significant increase only in unemployed fathers (p=0.0213).

There are no significant differences in GSQL between patients with the positive and negative reaction of allergic skin prick tests at the beginning of the study (p=0.36) and the endpoint of research (p=0.31).

## Discussions

The causes and the intensity of the low socio-economical level are different from a society to another. Various published studies suggest that the lower socio-economical level represents a restriction from medical care at high quality and adequate medication [6,15-17]. Other published studies confirm the link between asthma and a low socio-economical level [6,12,18,19]. At the beginning of our research, there was a noteworthy difference concerning the GSQL (p=0.0101) between the two groups of patients with a low and high-income level. After 12 months, there were no significant differences concerning the GSQL (p=0.3167) between these two groups of patients with varying income levels. The increase of GSQL in patients from both income groups could be explained by applying GINA's therapy.

In our study group, most high-income group children lived in cities, whereas 42% of those in the low-income group lived in rural areas (p=0.0051). In adults with obstructive airway disease, this factor was correlated with a lower quality of life. Our data did not prove a significant difference in the GSQL according to the living site at the beginning of the study or the end of the follow-up period.

The GSQL evolution related to the allergic skin prick tests demonstrated no differences, during the research period, between patients with the positive and negative reaction of skin tests. Several prior studies [11,20] revealed that skin hypersensitivity is more frequent in low socio-economical persons. This research showed that skin hypersensitivity is more frequent in patients with high-income levels (21 from 30 patients, 70%) than in patients with low-income levels (21 from 34 patients, 61%).

The educational level of parents and employment status was a factor that showed no differences between the two groups in our study group. Chellammal HSJ, et al. recently published a paper in which they found that a higher educational level in adults with asthma is an important factor that correlates with a higher quality of life [21].

There is some limitation of our study that may interfere with our conclusions. We omitted in this study the analysis of the impact of comorbidities, mainly allergic rhinitis. Another bias could be the therapeutic approach, neither the long-term medication nor the adherence to therapy and the educational measures being evaluated. These data were previously published in independent reports [22-24]. Allergic rhinitis was recognized by several other authors [25-28] as risk factors for a lower quality of life.

Regarding the treatment, the therapy step is relevant and adherence to the therapeutic plan [29,30]. The patients in both study groups that we analysed had a daily journal for the entire study period. They recorded both clinical data and medication daily. More recent studies were undergoing in adults and showed that poor adherence

to treatment is a factor that correlates with a lower quality of life. In contrast, educational measures may improve both GSQL and compliance with treatment [31,32]. The same authors showed that educational level, professional activity, or living area does not correlate with GSQL in adults with asthma [32]. This data is similar to our current results.

In conclusion, the general score of quality of life in our study group was lower for children with asthma that belongs to families with lower income. It was not affected by the living area or by the presence of evidence of atopic status.

## Consent for Publication

All co-authors have agreed to the submission and publication of this manuscript. Authors can provide signed consent if required by the Journal Editor.

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There were no other contributors to the article than the authors.

## Disclosure

All authors report no conflicts of interest in this work.

## References

1. International Study of Asthma and Allergies in Childhood (ISAAC) Steering Committee (1998) Worldwide variations in the prevalence of asthma symptoms: the International Study of Asthma and Allergies in Childhood (ISAAC). *Eur Respir J* 12: 315-335.
2. Cherecheș-Panța P, Popa M, Iacob D, Mureșan M, Dumitrașcu D, et al. (2003) Prevalence of asthma in children aged 7 years from the city of Cluj-Napoca, ISAAC study. *Pneumologia* 52: 134-140.
3. Gherghie S, Nanulescu MV, Cherecheș-Panța P, Popa M (2000) Prevalence of asthma in schoolchildren aged 13 to 14 years from the city of Bistrita. *Pneumologia* 49: 95-99.
4. Cherecheș-Panța P, Man SC, Deleanu D, Marshall M, et al. (2011) Epidemiological survey six years apart: increased prevalence of asthma and other allergic diseases in schoolchildren aged 13-14 years in Cluj-Napoca, Romania (based on ISAAC questionnaire). *Maedica (Buchar)* 6: 10-16.
5. Ellis JR, Nowlis EA (1989) *Nursing – A Human Needs Approach*. (4<sup>th</sup> edn.), Houghton Mifflin Company, Boston.
6. Rutishauser C, Sawyer S, Bowes G (1998) Quality-of-life assessment in children and adolescents with asthma. *Eur Respir J* 12: 486-494.
7. Juniper EF, Guyatt GH, Willam A, Griffith LE (1994) Determining a minimal important change in a disease-specific quality of life instrument. *J Clin Epidemiol* 47: 81-87.
8. Juniper EF, Guyatt GH, Feeny DH, Ferrie PJ, Griffith LE, et al. (1996) Measuring quality of life in children with asthma. *Qual Life Res* 5: 35-46.
9. Juniper EF (1997) How Important Is Quality of Life in Pediatric Asthma? *Pediatr Pulmonol Suppl* 15: 17-21.
10. Rona RJ (2000) Asthma and poverty. *Thorax* 55: 239-244.
11. Kumar P, Arora A (1999) Socioeconomic Status and Skin Test Reactivity to Inhaled Allergens in Adults with Asthma and Allergic Rhinitis. *ACI International* 11: 69-72.
12. Rosinczuk J, Pryszlak M, Uchmanowicz I (2018) Sociodemographic and clinical factors affecting the quality of life of patients with chronic obstructive pulmonary disease. *Int J Chron Obstruct Pulmon Dis* 13: 2869-2882.
13. Global Initiative for Asthma: Asthma Management and Prevention, 2019.
14. David L, Nanulescu M, Popa M (2001) Quality of life-questionnaire validation. *Natl Conf Allerg Clin Immunol* pp. 26-28.
15. Acheson D (1998) Independent inquiry into inequalities in health. Department of Health, Stationery Office, London.
16. Duran-Tauleria E, Rona RJ (1999) Geographical and socioeconomic variation in the prevalence of asthma symptoms in English and Scottish children. *Thorax* 54: 476-481.
17. Rona RJ, Hughes JM, Chinn S (1999) Association between asthma and family size between 1977 and 1994. *J Epidemiol Community Health* 53: 15-19.
18. Garcia DP, Corbett ML, Sublett JL, Pollard SJ, Meiners JF, et al. (1994) Cockroach allergy in Kentucky: a comparison of inner-city, suburban, and rural small town. *Ann Allergy* 72: 203-208.
19. Ernst P, Demissie K, Joseph L, Locher U, Becklake MR (1995) Socioeconomic status and indicators of asthma in children. *Am J Respir Crit Care Med* 152: 570-575.
20. Sarpong SB, Hamilton RG, Eggleston PA, Adkinson NF (1996) Socioeconomic status and race as risk factors for cockroach allergen exposure and sensitization in children with asthma. *J Allergy Clin Immunol* 97: 1397-1401.
21. Chellammal HSJ, Arumugam D, Menon BVV, Menon SMM, Menon M, et al. (2019) Sociodemographic Factors and its Impact on Health-Related Quality of Life (HRQoL) among Adult Asthma Patients in a Private Specialist Hospital in Malaysia. *J Young Pharm* 11: 404-409.
22. Indolean C, David L, Cherecheș-Panța P, Nanulescu M (2003) Comparison of subjective and objective methods to assess asthma in children. *Rev Econom Admin Sanitară, Editura Mediamira, Cluj-Napoca* pp. 34-35, 3-4, 92-95.
23. Pop CF, Cherecheș-Panța P, Nanulescu MV (2005) The evaluation of quality of life in children with asthma. *Pneumologia* 54: 99-103.
24. Pop CF, Cherecheș-Panța P, Nanulescu M (2006) The quality of life in children with asthma and allergic rhinitis. *Pneumologia* 55: 74-79.
25. Yann BP, Yunginger JW, Wollan PC, Reed CE, Silverstein MD, et al. (1999) Allergic rhinitis in Rochester, Minnesota residents with asthma: frequency and impact on health care charges. *J Allergy Clin Immunol* 103: 54-59.
26. Tripathi A, Patterson R (2001) Impact of allergic rhinitis treatment on quality of life. *Pharmacoeconomics* 19: 891-899.
27. Meltzer EO (1997) The prevalence and medical and economic impact of allergic rhinitis in the United States. *J Allergy Clin Immunol* 99: 805-828.
28. Yasamin Torfi Y, Bitarafan N, Rajabi M (2015) Impact of socioeconomic and environmental factors on atopic eczema and allergic rhinitis: A cross-sectional study. *EXCLI J* 14: 1040-1048.
29. Celano M, Geller RJ, Phillips KM, Ziman R (1998) Treatment adherence among low-income children with asthma. *J Pediatr Psychol* 23: 345-349.
30. Christiansen SC, Martin SB, Schleicher NC, Koziol JA, Mathews KP, et al. (1997) Evaluation of school-based asthma education program for inner-city children. *J Allergy Clin Immunol* 100: 613-617.
31. Bartosz Uchmanowicz B, Panaszek B, Uchmanowicz I, Rosińczuk J (2016) Clinical factors affecting quality of life of patients with asthma. *Patient Preference and Adherence* 10: 579-589.
32. Bartosz Uchmanowicz B, Panaszek B, Uchmanowicz I, Rosińczuk J (2016) Sociodemographic factors affecting the quality of life of patients with asthma. *Patient Preference and Adherence* 10: 345-354.





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