Assessment of the Asthma Quality of Life Questionnaire (AQLQ): Serbian Translation

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Aim. To test the discriminative metric properties and specificity of the Serbian version of the Asthma Quality of Life Questionnaire (AQLQ) for assessment of the quality of life in asthma patients.

Method. We studied 100 atopic and 60 nonatopic adult asthma patients with different disease severity, who were consecutively recruited from the outpatient and inpatient departments of the Institute of Allergology and Immunology, University Center of Serbia, between March 2000 and June 2002. After linguistic validation, AQLQ was administered, as well as Paykel’s scale of stressful life events. Tests of statistical significance and General Linear Model were used to explore the correlation between characteristics of patients, disease, and environment, and AQLQ scores. Reliability of the questionnaire was evaluated by determining its internal consistency with Cronbach’s alpha coefficient.

Results. A more severe form of the disease ($F = 16.05; p < 0.001$), life in rural areas ($t = -2.67; p = 0.008$) and changes in weather conditions ($t = 3.05; p = 0.003$) were significantly associated with worse overall quality of life of the tested asthma patients. Older patients had poorer quality of life in domains of activity limitation ($B = -0.024; 95\% \text{ CI}, -0.036 \text{ to } -0.011; p < 0.001$) and exposure to environmental stimuli ($B = -0.022; 95\% \text{ CI}, -0.039 \text{ to } -0.006; p = 0.008$). Higher values of forced expiratory volume in one second (FEV$_1$, % predicted) were correlated with better quality of life in overall ($B = 0.017; 95\% \text{ CI}, 0.009 \text{ to } 0.025; p < 0.001$) and other questionnaire domains, except in domain of environmental stimuli. Poorer overall quality of life was recorded in atopic patients sensitive to house dust mites ($t = -2.60; p = 0.011$). Form (atopic and nonatopic) and duration of disease, as well as stressful life events were not significantly related to asthmatic patients’ quality of life. The Cronbach’s alpha ranged from 0.72 to 0.93.

Conclusion. Disease severity, place of residence, weather conditions, age, and FEV$_1$ (% predicted) were significantly related to quality of life in our patients. The Serbian version of AQLQ was highly reliable.

Key words: asthma; health status; hypersensitivity, immediate; quality of life; questionnaires; Serbia and Montenegro; translating

Bronchial asthma is a chronic inflammatory disease of lower airways, clinically characterized by attacks of breathlessness (dyspnea) with wheezing and chest tightness due to reversible airways obstruction. Heterogeneous etiology of bronchial asthma makes it impossible to provide a precise, uniform classification of the disease. Traditionally, asthma has been categorized as either atopic or nonatopic (1). Atopic asthma is associated with environmental antigens and specific immunoglobulin E antibodies (IgE), whereas nonatopic form is associated with no identifiable environmental factor or increased concentration of IgE antibodies (1).

Prevalence of asthma has been increasing over the last half a century. According to World Health Organization (WHO), 100-150 million people worldwide suffer from asthma, and their number is still increasing (2). Although asthma deaths are rare, mortality of this disease has also increased in the last few decades (3). Results from the study on the burden of disease recently conducted in Serbia (4) showed that asthma was responsible for 12,989 disability adjusted life years (DALY) in Serbia (without Kosovo and Metohija), and for 2,655 DALYs in its capital, Belgrade. In Serbia, the burden is higher for the male than for the female population (7,317 DALYs and 5,672 DALYs, respectively), and dominated by years lost due to disability (YLD) (58% in men and 68% in women).

Bronchial asthma is characterized by episodic improvements and impairments, which can lead to significant limitations in physical, emotional, and so-
The health-related quality of life is a component of overall quality of life, which is primarily determined by the health of an individual and influenced by various clinical interventions. In recent years, the focus of the investigations has also been on health-related quality of life in allergic (atopic) diseases of the airways, primarily asthma and rhinitis (5). The need for such studies was induced by the recognition of the significance of involving the patient's attitude in estimation of health condition. Besides, there is increasing evidence about the existence of poor correlation between the results of classic clinical measures and the quality of life of patients with asthma and rhinitis (6,7). To obtain a complete picture of a patient's health status, both the conventional clinical indices and the patient's health-related quality of life must be measured.

There are two types of health-related quality of life questionnaires: generic and specific. Generic instruments are designed to be applicable to patients in all health states. The Sickness Impact Profile (SIP), Nottingham Health Profile are the most commonly used questionnaires in adult asthma and rhinitis assessment (5,8-10).

Individual instruments can be specific for a group of patients, a certain function (pain or sexual functions), or a disease. Most commonly used questionnaires specific for asthma in adults are the Asthma Quality of Life Questionnaire (11), Living with Asthma Questionnaire (12), Chronic Obstructive Pulmonary Disease and Asthma St. George’s Respiratory Questionnaire (13), and Respiratory Illness Quality of Life Questionnaire (14).

Instruments for use in cross-sectional studies must have good discriminative properties. Measurement properties required for good discrimination are reliability (ability to measure differences between patients, ie, separation of different disease levels between patients at a single point of time) and cross-sectional construct validity (correlation with other indices of quality of life and clinical asthma) (5,15).

Most questionnaires for measuring quality of life were originally created in English and then translated and tested in many other languages (16,17). It was shown that different versions of a questionnaire had the same or similar measuring abilities as the original English version (18-20). In this respect, and in the light of the increasing need to combine health evaluation with the patient’s perception of the disease’s impact on their physical and working capacities, mental state, social life, and physical health, we decided to carry out a study in our community. We used Asthma Quality of Life Questionnaire, which has excellent responsiveness, reliability, and construct validity (11,15) – properties that are essential for use in clinical trials, clinical practice, and surveys. The aim of our study was to test reliability, cross-sectional construct validity, and specificity of the Serbian version of Asthma Quality of Life Questionnaire in the assessment of the quality of life of patients with atopic or nonatopic asthma.

### Patients and Methods

#### Patients

A total of 100 atopic and 60 nonatopic adult asthma patients visiting the respiratory outpatient and inpatient departments of the Institute of Allergology and Immunology, University Center of Serbia, were consecutively recruited for the study between March 2000 and June 2002 (Table 1). All were clinically diagnosed as having either asthma or asthma and atopy on the basis of their medical history, clinical presentation, physical examination results, determination of forced expiratory volume in one second (FEV₁), and other pulmonary function parameters determined by spirometry, non-specific bronchial challenge tests with metacholine, and in selected cases bronchial provocation tests with allergens, nasal provocation tests with allergens, skin prick testing with inhalant allergens, serum concentration of total IgE. Subjects were classified as having either atopic or nonatopic form of disease and grouped into four groups according to the disease severity (mild, moderate, severe, or intermittent) (21).

#### Table 1. Characteristics of 160 asthma patients included in the study

<table>
<thead>
<tr>
<th>Variable</th>
<th>Patients with asthma (n)</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>atopic (n = 100)</td>
<td>nonatopic (n = 60)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>men</td>
<td>42</td>
<td>18</td>
</tr>
<tr>
<td>women</td>
<td>58</td>
<td>42</td>
</tr>
<tr>
<td>Age (years; median, range)</td>
<td>35 (16-63)</td>
<td>49 (23-74)</td>
</tr>
<tr>
<td>Residence:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>urban</td>
<td>81</td>
<td>49</td>
</tr>
<tr>
<td>rural</td>
<td>19</td>
<td>11</td>
</tr>
<tr>
<td>Birthplace:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>urban</td>
<td>66</td>
<td>25</td>
</tr>
<tr>
<td>rural</td>
<td>34</td>
<td>35</td>
</tr>
<tr>
<td>Duration of disease (years; median, range)</td>
<td>11 (1-66)</td>
<td>10 (1-57)</td>
</tr>
<tr>
<td>Disease severity:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mild</td>
<td>38</td>
<td>16</td>
</tr>
<tr>
<td>moderate</td>
<td>32</td>
<td>27</td>
</tr>
<tr>
<td>severe</td>
<td>14</td>
<td>17</td>
</tr>
<tr>
<td>intermittent</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>FEV₁ (% predicted; mean±SD)*</td>
<td>78.88±18.95</td>
<td>68.21±16.76</td>
</tr>
</tbody>
</table>

*FEV₁ – forced expiratory volume in one second.

**Chi-square test.

Patients with other causes of airflow limitation not associated with asthma (chronic bronchitis and emphysema), asthma patients in asthmatic state, patients younger than 16, and those suffering from severe chronic, malignant, and other fatal diseases were not eligible for the study.

#### Questionnaires

The specific questionnaire, Asthma Quality of Life Questionnaire by Juniper et al (16), was administered to evaluate the quality of life in asthma patients. Asthma Quality of Life Questionnaire includes 32 items that measure four dimensions of health: 12 items assess symptoms, 5 items measure emotional function, 4 items assess exposure to environmental stimuli, and 11 items focus on activity limitation. Five of the items dealing with the limitation of customary activities are individualized, ie, the patient chooses the five most important activities in his/her daily life among 27 offered, which are subject to limitation due to asthma. The patient scores the items on an ordinal 7-point scale. Answers to the questions reflect the subjective evaluation of limitations in listed domains. All these items refer to the state of health over the two weeks before the study.

The original English version of the Asthma Quality of Life Questionnaire of the questionnaire was translated into Serbian by two translators (forward translation). Thereafter, the final version of the Serbian translation was agreed upon, subsequently translated into English by two other translators (back translation) who were not allowed to see the original. The English back-translation was sent to the author of the original questionnaire (E. Juniper), who gave us permission to use the Serbian version of the Asthma Quality of Life Questionnaire in the study. After the linguistic val-
Evaluation of the questionnaire was done, all patients were interviewed under the same conditions. Patients were explained the aim and method of filling out the questionnaire. Thereafter, the questionnaire designed to be filled out by the interviewer was administered to patients after their consent. Respiratory function (FEV1, % predicted) was performed immediately after the patients were treated, and the questionnaire designed to be filled out by the interviewer was administered to patients after their consent. Respiratory function (FEV1, % predicted) was performed immediately after the questionnaire was filled out, all patients were interviewed under the same conditions. Patients were explained the aim and method of filling out the questionnaire. Thereafter, the questionnaire was filled out by the subjects assisted by the interviewer. Other data (demographic and data related to disease and environmental stimuli) were obtained using a separate questionnaire.

Statistical Analysis

Characteristics of the asthma patients (age and disease duration) were presented as median with range, or as mean with standard deviation (FEV1, % predicted). Results of the Asthma Quality of Life Questionnaire were presented as questionnaire scores. The overall score was defined as the mean for all answers. The score for each of the four domains, as well as the global score, ranged from 7 (no impairment in quality of life) to 1 (maximum impairment). The questionnaire results were expressed as the mean score per item for each of the domains, as well as for the overall quality of life. Tests of statistical significance (t-test, chi-square test, and Mann Whitney test) and General Linear Model (GLM) were used in the analysis of data. Dependent variables were Asthma Quality of Life Questionnaire scores, whereas independent variables were selected characteristics of patients, disease, and environment.

The reliability of the questionnaire was evaluated by determining its internal consistency using Cronbach's alpha coefficient. The following statistical packages were used in statistical analysis of data: STATISTIKA (Version 6. StatSoft Inc. Tulsa, OK, USA), DISMOD II (version 1.01, World Health Organization, USA), DISMOD II (version 1.01, World Health Organization, USA), Microsoft® Excel 2002 (Microsoft Corporation, Redmond, WA, USA) and ®Risk (Palisade, New York, NY, USA).

Results

Patients with nonatopic asthma were older (t = 7.06; p < 0.001) and more often came from rural areas (chi-square = 9.05; p = 0.003; Table 1). To overcome the age difference between these two patient groups, an age adjustment was made. There were more patients with moderate and severe form of disease in the group of patients with nonatopic asthma than in the group of patients with atopic asthma, who mostly suffered from a mild form of disease (chi-square = 16.72; p = 0.001; Table 1). The average value of the pulmonary function parameter FEV1 (% predicted) was significantly higher in atopic than in nonatopic asthma patients (t = 3.59; p < 0.001; Table 1). Studied groups did not differ significantly in sex distribution (chi-square = 2.30; p = 0.129), place of residence (chi-square = 0.011; p = 0.917), or average duration of the disease (t = 0.52; p = 0.422; Table 1).

Disease severity, place of residence, and weather conditions significantly influenced the quality of life in asthma patients (Table 2). Patients suffering from two different forms of asthma (atopic or nonatopic) showed a significant difference only in the symptom domain (t = 2.22; p = 0.028), before the adjustment for age as possible confounder was done (p = 0.506).

Patients with a severe form of disease had the lowest mean scores in all Asthma Quality of Life Questionnaire domains. Disease severity had a significant impact on the quality of life in each of the domains and overall (F = 16.05; p < 0.001; Table 2). Life in rural areas (t = −2.67; p = 0.008) and weather condi-

Table 2. Mean scores of 160 asthma patients on the Serbian version of the Asthma Quality of Life Questionnaire (AQLQ) domains according to their characteristics, and characteristics of their disease and living environment

<table>
<thead>
<tr>
<th>Variable</th>
<th>Form of disease</th>
<th>activities</th>
<th>symptoms</th>
<th>emotions</th>
<th>environment</th>
<th>overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>atopic (n=100)</td>
<td>3.97 ±0.94</td>
<td>4.36 ±1.14</td>
<td>4.43 ±1.52</td>
<td>4.02 ±1.32</td>
<td>4.19 ±0.96</td>
</tr>
<tr>
<td></td>
<td>nonatopic (n=60)</td>
<td>3.72 ±1.01</td>
<td>3.94 ±1.18</td>
<td>4.39 ±1.95</td>
<td>3.72 ±1.02</td>
<td>3.91 ±1.01</td>
</tr>
<tr>
<td></td>
<td>p*</td>
<td>0.120</td>
<td>0.028 (0.506)</td>
<td>0.085</td>
<td>0.131</td>
<td>0.875</td>
</tr>
<tr>
<td>Disease severity:</td>
<td>mild (n=54)</td>
<td>4.15 ±0.94</td>
<td>4.49 ±1.05</td>
<td>5.01 ±1.68</td>
<td>4.09 ±1.20</td>
<td>4.40 ±0.89</td>
</tr>
<tr>
<td></td>
<td>moderate (n=59)</td>
<td>3.83 ±0.72</td>
<td>4.10 ±1.00</td>
<td>4.13 ±1.55</td>
<td>3.82 ±1.17</td>
<td>3.98 ±0.78</td>
</tr>
<tr>
<td></td>
<td>severe (n=31)</td>
<td>3.13 ±0.99</td>
<td>3.28 ±1.08</td>
<td>3.66 ±1.61</td>
<td>3.43 ±0.95</td>
<td>3.31 ±0.94</td>
</tr>
<tr>
<td></td>
<td>interminent (n=16)</td>
<td>4.53 ±1.02</td>
<td>5.43 ±0.81</td>
<td>4.91 ±1.66</td>
<td>4.55 ±1.62</td>
<td>4.93 ±0.91</td>
</tr>
<tr>
<td>pF</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>0.001</td>
<td>0.014</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Sex:</td>
<td>men (n=60)</td>
<td>3.96 ±1.10</td>
<td>4.23 ±1.34</td>
<td>4.65 ±1.57</td>
<td>4.06 ±1.39</td>
<td>4.18 ±1.11</td>
</tr>
<tr>
<td></td>
<td>women (n=100)</td>
<td>3.82 ±0.88</td>
<td>4.19 ±1.06</td>
<td>4.27 ±1.75</td>
<td>3.82 ±1.11</td>
<td>4.03 ±0.90</td>
</tr>
<tr>
<td>p*</td>
<td>0.409</td>
<td>0.853</td>
<td>0.168</td>
<td>0.221</td>
<td>0.356</td>
<td></td>
</tr>
<tr>
<td>Residence:</td>
<td>rural (n=30)</td>
<td>3.49 ±0.84</td>
<td>3.80 ±1.19</td>
<td>4.01 ±1.74</td>
<td>3.31 ±1.00</td>
<td>3.66 ±0.95</td>
</tr>
<tr>
<td></td>
<td>urban (n=130)</td>
<td>3.96 ±0.98</td>
<td>4.30 ±1.15</td>
<td>4.51 ±1.67</td>
<td>4.05 ±1.23</td>
<td>4.18 ±0.97</td>
</tr>
<tr>
<td>p*</td>
<td>0.015</td>
<td>0.034</td>
<td>0.149</td>
<td>0.003</td>
<td>0.008</td>
<td></td>
</tr>
<tr>
<td>Air pollution:</td>
<td>yes (n=61)</td>
<td>3.77 ±0.93</td>
<td>4.18 ±1.16</td>
<td>4.45 ±1.61</td>
<td>3.81 ±1.31</td>
<td>4.03 ±0.99</td>
</tr>
<tr>
<td></td>
<td>no (n=86)</td>
<td>3.94 ±0.98</td>
<td>4.23 ±1.14</td>
<td>4.34 ±1.75</td>
<td>3.96 ±1.16</td>
<td>4.17 ±0.96</td>
</tr>
<tr>
<td>p*</td>
<td>0.294</td>
<td>0.789</td>
<td>0.665</td>
<td>0.466</td>
<td>0.632</td>
<td></td>
</tr>
<tr>
<td>Weather conditions:</td>
<td>yes (n=112)</td>
<td>3.68 ±0.96</td>
<td>4.04 ±1.16</td>
<td>4.27 ±1.72</td>
<td>3.75 ±1.22</td>
<td>3.92 ±0.97</td>
</tr>
<tr>
<td></td>
<td>no (n=42)</td>
<td>4.27 ±0.85</td>
<td>4.52 ±1.11</td>
<td>4.73 ±1.60</td>
<td>4.33 ±1.14</td>
<td>4.44 ±0.90</td>
</tr>
<tr>
<td>p*</td>
<td>0.001</td>
<td>0.021</td>
<td>0.132</td>
<td>0.008</td>
<td>0.003</td>
<td></td>
</tr>
</tbody>
</table>

* T-test.
† Adjustment for age.
‡ F-test.
tions (t = 3.05; p = 0.003) influenced the overall quality of life and quality of life regarding activities, symptoms, and environment, whereas sex (t = 0.93; p = 0.356) and presence of air pollutants in the place of residence (t = 0.48; p = 0.632) did not affect the quality of life (Table 2).

Variables significantly related to Asthma Quality of Life Questionnaire scores according to univariate regression analysis (age, FEV1, and disease duration) were entered into the model of multivariate regression analysis as independent variables, together with the form of disease (Table 3). Age and FEV1 (% predicted) significantly influenced the quality of life. The coefficients for age were negative, indicating that older age was associated with greater impairment, ie, worse quality of life regarding activity limitation (p < 0.001) and exposure to environmental stimuli (p = 0.008). FEV1 (% predicted) influenced all domains covered by the Asthma Quality of Life Questionnaire except the domain of environmental stimuli (p = 0.450), indicating that higher values of FEV1 (% predicted) were associated with better quality of life in asthma patients. Form and duration of disease were not significantly associated with quality of life of our patients. The value of coefficient of determination (R2) < 1 indicated that factors other than those included in the model also played a role in patient’s quality of life (Table 3).

The analysis of influence of allergens and some allergic diseases on the quality of life of patients with atopic asthma showed that atopic patients sensitive to house dust mite (Dermatophagoides pteronyssinus) had significantly lower quality of life in all domains except for the symptom domain that was not affected by the type of allergens (Table 4). Their overall score was also significantly lower (t = 2.60; p = 0.011).

The accompanying allergic rhinitis had no significant influence on the quality of life either overall (t = 0.08; p = 0.940) or in the individual domains. The same was found for other accompanying allergic diseases, such as atopic dermatitis, drug allergy, and food allergy (F = 0.09; p = 0.916).

Our Serbian version of Asthma Quality of Life Questionnaire showed a high internal consistency, with Cronbach’s alpha of 0.72 for environment, 0.78 for activities, 0.91 for emotions, 0.93 for symptoms, and 0.93 for the overall score.

Discussion

The validity of asthma patient quality of life questionnaire is usually evaluated on the basis of its relationship with various clinical parameters of the severity of the disease (9,11,13). Our study confirmed that the Serbian version of Asthma Quality of Life Questionnaire was discriminative, highly reliable, and specific for the evaluation of the quality of life of asthma patients.

Sex and age of a patient may influence the quality of life in patients with asthma (16,24). Juniper et al (16) reported that women had better quality of life, which was not in accordance with our results. The same study (16) suggested that younger patients had worse quality of life. In our study, older patients had worse quality of life (p<0.001) and exposure to environmental stimuli (p=0.008).
greater limitations in performing activities that they found most important in their everyday lives, and in the domain of environmental exposure where they were exposed to various stimuli such as cigarette smoke, dust, strong smells, perfumes, or weather changes. This could indicate that younger patients adapted more easily to the disease by choosing less limiting everyday activities.

Most authors found the correlation between pulmonary function parameters, ie, obstruction degree, and quality of life (13,18,25-28). In our asthma patients, increased values of pulmonary function parameter FEV1 (% predicted) were related to significantly better quality of life in all domains except environmental exposure. Marks et al (28) obtained different results, observing a low correlation between pulmonary function parameters and the questionnaire results, whereas Rowe et al (25) and Jones et al (27) reported the correlation of FEV1(L) and FEV1,% with limitations in the activity domain.

Comparing Asthma Quality of Life Questionnaire scores obtained from atopic and nonatopic patients, we did not note a significant difference in any of the Questionnaire domains. Quality of their life was not related to the form of asthma. In atopic asthma patients, the type of allergen did not determine the symptom difference or symptom severity, but it significantly influenced all other quality of life domains. However, atopic asthma patients sensitive to house dust mite (Dermatophagoides pteronyssinus) had significantly higher limitations in all Asthma Quality of Life Questionnaire domains. This could be explained by the ubiquity of this allergen as well as by the difficulties in applying the measurements for its elimination from patients’ environment. The influence of allergic rhinitis and associated allergic diseases on the quality of life was not detected in atopic patients.

Life in rural areas and changes of weather conditions influenced the same domains of quality of life in our patients, whereas the presence of air pollutants at the place of residence did not affect the quality of life. Weather conditions significantly determined the activity limitation, symptoms, environmental exposure domains and overall quality of life, except domain of emotional state of our asthma patients. Exposure to air-pollution did not significantly influence their quality of life, although it may act as a significant impairment trigger factor and exacerbate the disease (29,30). These findings reflect above all the sensitivity of atopic patients to the specific allergens and not to non-specific respiratory irritants known as non-specific bronchoconstrictors and impairment triggers. However, patients with asthma frequently avoid situations and environment in which they are exposed to cigarette smoke, dust, strong smells, allergens, and other stimuli.

There have been few studies on the correlation between patients’ quality of life and environmental characteristics. Apter et al (31) suggested demographic and socio-economic factors as important determinants of asthma patients’ quality of life. Schmier et al (24) found that women, particularly those belonging to lower socioeconomic groups and ethnic minorities, had poorer quality of life as a result of their asthma symptoms.

Our findings suggested that asthma patients living in rural areas experienced greater limitations than those living in urban areas. The place of residence did not influence emotional state domain, but it showed significant effect in all other domains of the quality of life. This could be explained by the rural way of life: greater daily workload (greater physical exertion), higher exposure to allergens both outdoors (pollen) and indoors (mites, mold, and animal allergens), and remoteness of physicians and health facilities, ie, unavailability of other medical help.

Stressful life events and duration of disease were not limiting factors of the quality of life of asthma patient.

Allergic rhinitis and asthma very often coexist in the same patient and both diseases impair social and physical domains of quality of life (6,32,33). Leynaert et al (6) reported that social life of asthma patients was affected by nasal symptoms whereas exercise and physical activities were affected by bronchial symptoms. Our study showed that the occurrence of allergic rhinitis in atopic asthma patients did not significantly impair quality of life. This was in contrast to the results of some studies performed by generic SF-32 questionnaire, that reported that allergic rhinitis patients have the same quality of life impairments, or even worse quality of life than those with asthma (6,34). The two diseases correlated both in pathophysiology, epidemiology, and therapy (35). It has been suggested that they would be better described as a continuous inflammation of airways during a lifetime, or United Airway Disease (36). Recently, Baiardini et al (37) developed and validated the first quality of life questionnaire (RHINASTHMA) for adult patients with rhinoconjunctivitis, asthma, or both, aimed at assessing both rhinitis and asthma impact on daily life.

In our study, the co-occurrence of one or more allergic diseases in patients with atopic asthma did not significantly influence the Asthma Quality of Life Questionnaire scores, indicating that the administered Serbian version of Asthma Quality of Life Questionnaire was highly specific to asthma, a lower airways disease, regardless of its etiology.

The duration of the disease can influence the quality of life in asthma patients (29). The longer the disease lasts, the more impaired quality of life is. However, according to our results, the duration of the disease did not significantly affect the quality of life.

Patients with severe asthma in our study had worse quality of life than patients with mild, moderate or intermittent form of the disease. Besides overall quality of life impairment, patients with severe asthma showed a significant limitation in everyday activities, symptoms (poorer quality of life due to dyspnea, shortness of breath, wheezing, and cough), were more liable to emotional dysfunction, and more sensitive to specific outdoor factors that might worsen the disease. The fact that Serbian version Asthma Quality of Life Questionnaire detected patients with
different level of disorders, ie, different disease severity, proved the questionnaire’s good discriminative properties. The observed significant differences in Asthma Quality of Life Questionnaire scores according to disease severity were expected.

A common strategy to ensure the reliability or reproducibility of measurements, especially for research purposes, is to replicate the measurements and evaluate the degree of agreement. Because it is difficult to administer the same instruments to the same people on more than one occasion, some researchers often use internal consistency reliability as an estimate of test-retest reliability. Reliability as measured in other languages, except Cronbach’s alpha of 0.93, the Serbian version of Asthma Quality of Life Questionnaire showed to be highly reliable. In other words, if the Asthma Quality of Life Questionnaire-Serbian version was used on the same subjects twice, the correlation between their overall score of quality of life was estimated to be 0.93.

In conclusion, the Serbian version of Asthma Quality of Life Questionnaire has good discriminative properties and high reliability and specificity for evaluation of the quality of life of asthma patients, similar to the original version. Its use for the evaluation of quality of life in asthmatic patients in our surroundings is very appropriate.

Asthma Quality of Life Questionnaire translated into and adapted to the Serbian language preserved its discriminative properties and validity, ie, it showed quality equal to translations of this questionnaire into other languages. Except in clinical research in drug effectiveness and quality of health services, the concept of the health-related quality of life should be used in routine everyday practice as an efficient indicator of asthma patient health status within the comprehensive assessment of that and other chronic diseases.

**References**


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