

Assessment of health-related quality of life among outpatients with asthma at Hue University of Medicine and Pharmacy Hospital

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Abstract

Background: Asthma is either a chronic respiratory disease or a serious global health problem that is common in all ages at a high rate. It seriously affects not only the physical health but also the health-related quality of life (HRQoL) of patients. **Objectives:** (1) To determine HRQoL score among asthmatic outpatients at Hue University of Medicine and Pharmacy Hospital; (2) To assess factors associated with HRQoL among asthmatic outpatients at Hue University of Medicine and Pharmacy Hospital. **Subjects and methods:** A descriptive cross-sectional study was conducted on 102 asthmatic outpatients at Hue University of Medicine and Pharmacy Hospital by using a self-administered questionnaire. **Results:** The male-to-female patient ratio was 1.68/1. The mean age of study participants was 59.2 ± 15.39 (26-95). A large number of patients were unemployed (55.9%) and had a low education level (54.9%). Participants with comorbidities and time of being diagnosed with asthma over 10 years accounted for the highest percentage, 69.6%, and 48.0% respectively, but most patients were not hospitalized due to an acute asthma attack within the past year (88.2%). The most common type of inhaler being used was DPI or the combination of MDI and DPI (35.3%) whereas the prevalence of patients only using the Metered-Dose Inhalers (MDI) was 29.4%. There were 40.2% of patients who were severely affected. The mean value of the total HRQoL score was 4.27 ± 0.747 . The domain that most impacted HRQoL was "Activity limitations" whereas "Symptoms" affected the least. Men had higher HRQoL than women (6.441 times); The participants who did not have asthma-related family history were likely to have better HRQoL than others (3.3 times); The patients who used MDI or DPI alone had higher HRQoL scores than the group used the combination of two devices (2.788 times). **Conclusions:** Asthma remarkably affected asthmatic patients' quality of life. The factors associated with HRQoL were gender, family history of asthma, and the type of inhaler.

Keywords: Asthma, Health-related Quality of life, Outpatients, Hue University of Medicine and Pharmacy Hospital.

1. INTRODUCTION

Asthma is a serious global health problem that is common in all ages at a high rate. This medical condition seriously affects 1-18% of the total population worldwide and exerts a significant burden not only on patients but also on their families [1]. According to the World Health Organization, most asthma-related deaths occur in low- and middle-income countries where diagnosis and treatment remain suboptimal [2]. In Vietnam, the prevalence of asthma is about 3.9% of the population (children aged 13-14 years accounted for 14.8%) which is equal to approximately 4 million asthmatic patients. Additionally, an estimated 3000-4000 people have died due to asthma each year [3].

Medical care for this condition has greatly improved in recent years thanks to advances in diagnosis, drug therapy, and non-pharmacological treatments [4]. However, many studies have shown

that treatment objectives have not been met. The fact that the number of patients with uncontrolled or poorly controlled asthma is still high leads to negative impacts not only on treatment costs but also on the patient's quality of life [5]. The quality scores measured in asthmatic patients were significantly lower than in healthy subjects. In adults, asthma reduces working capacity, limits a lot of physical and social activities as well as influences sleep. The disease also affects children's development and reduces academic performance. Up to 40% of children are absent from school due to an acute asthma attack [6],[7]. Good asthma control and improving the quality of life of asthmatic patients are considered important and long-term goals in the strategies for asthma management and prevention of the "Global Initiative on Asthma" Organization (GINA) as well as the Vietnam Ministry of Health [1],[8]. Nowadays, studies on the quality

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of life in asthmatic patients are becoming more and more popular around the world to better assess the burden of this disease as well as measure the effectiveness of preventive and therapeutic interventions. Nevertheless, in Vietnam, there have not been many studies on the effectiveness of asthma management as well as asthmatic patients' quality of life. Most of the above-mentioned studies were carried out in the northern and southern provinces. Meanwhile, data on the quality of life of asthmatic patients in the central regions such as Hue city are still limited and insufficient. Therefore, to contribute to the additional data of this site, the study was conducted at Hue University of Medicine and Pharmacy Hospital to determine the HRQoL score and assess factors associated with HRQoL among asthmatic outpatients with asthma.

2. METHODS

2.1. Study design and participants

The descriptive cross-sectional study was conducted on all asthmatic outpatients who were available at Hue University of Medicine and Pharmacy Hospital from March 1st, 2022 to April 31st, 2022 by convenience (non-probability) sampling method.

The inclusion criteria were as follows: (1) Outpatients were diagnosed with asthma, aged 18 years or older, and (2) were prescribed drug delivery devices (MDI or DPI) for at least four weeks before participating in this study. Exclusion criteria were: (1) inability to answer interview questions or unwillingness to participate in the study; (2) Using other drug delivery devices for asthma treatment in parallel with MDI and DPI.

As a result, the number of participants who were enrolled in the study was 102.

2.2. Research instrument:

- Interviewing patients by using a questionnaire including three main parts:

(1) Sociodemographic features: gender, age, occupation, educational level.

(2) Disease profile: comorbidity, asthma duration, being hospitalized due to an acute asthma attack within the past year, family history of asthma, type of inhaler.

(3) AQLQ(S) (The Standard Version of Asthma Quality Of Life Questionnaires - Self Administered): The original September - 2017 Vietnamese version was used with permission from QOL Technologies Limited Company:

- AQLQ(S) includes 32 questions in four domains:

12 questions in Symptoms (question numbers: 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 29, 30), 4 questions in Environmental stimuli domain (question numbers: 9, 17, 23, 26), 11 questions in Activity Limitations domain (question numbers: 1, 2, 3, 4, 5, 11, 19, 25, 28, 31, 32) and 5 questions in Emotional function domain (question numbers: 7, 13, 15, 21, 27). Participants were asked to think about their asthma experiences during the last two weeks before being interviewed and then responded to each question on a 7-point scale (7 = no impairment, 1 = severe impairment) [9].

- Individual items were equally weighted. The overall AQLQ score was the mean of the responses to each of the 32 questions. Therefore, all 32 questions were added together and then dividing the total by 32. The resultant overall score would be between 1 and 7. The domains were analyzed in the same way. Adding the responses to each of the items in the domain and then dividing by the number of items in that domain. Therefore, the scores from a domain with four items and a domain with eleven items would both be between 1 and 7 [9]. The level of HRQoL was defined as follows [7], [10]:

+ Mean of AQLQ(S) score \geq 6: Be affected at a low level;

+ Mean of AQLQ(S) score from 4 to less than 6: Be affected at a moderate level;

+ Mean of AQLQ(S) score less than 4: Be affected at a serious level.

2.3. Data collection

The survey was conducted in two areas including the waiting area of the outpatient clinic and the health insurance medicine dispensing area of Hue University of Medicine and Pharmacy Hospital, within the time frame from 8 am to 11 am, Monday to Friday. Each patient was only interviewed once, duplicated cases of patients who went for a follow-up examinations in the following months were not included. Patients self-administered questions without any intervention from the research team or people around. Each question was answered with only one choice.

2.4. Statistical analysis

The data were entered and analyzed by using IBM SPSS version 20.0. All qualitative variables were statistically described by frequency and percentage. Quantitative variables were calculated as mean and standard deviation (SD) or median (IQR) (if not normally distributed). Multivariate regression was used to determine the factors associated with HRQoL. The odd ratio, with a 95% CI, was reported. A p-value $<$ 0.05 was considered significant.

3. RESULTS

3.1. Sociodemographic characteristics and disease profile of participants

Table 1. Sociodemographic features and disease profile of the participants (N = 102)

Characteristics	Distribution n (%)
1. Sociodemographic features	
Gender	
Male	64 (62.7)
Female	38 (37.3)
Age (year)	
18 - 59	49 (48.0)
≥ 60	53 (52.0)
Mean ± SD	59.2 ± 15.39 (26 - 95)
Active occupation	
Non-working	57 (55.9)
Farmers, Workers, Housewives	31 (30.4)
Cadres and civil servants	14 (13.7)
Educational level	
Under high school	56 (54.9)
High School	23 (22.5)
Upper high school	23 (22.5)
2. Disease profile	
Comorbidity	
Yes	71 (69.6)
No	31 (30.4)
Asthma duration (year)	
< 5	19 (18.6)
5 - 10	34 (33.3)
> 10	49 (48.0)
Median (IQR)	10.0 (5.0 - 23.5)
Being hospitalized due to an acute asthma attack within a past year	
Yes	12 (11.8)
No	90 (88.2)
Asthma-related family history	
Yes	42 (41.2)
No	60 (58.8)
Type of inhaler used	
Metered-Dose Inhalers (MDI)	30 (29.4)
Dry Powder Inhalers (DPI)	36 (35.3)
MDI and DPI	36 (35.3)

The male-to-female ratio was 1.68/1 and the average age was 59.2 ± 15.39 (26-95). More than half of the participants were unemployed (55.9%). Regarding educational level, most of the participants were at the under high school level (54.9%). Additionally, participants with comorbidities and time of being diagnosed with asthma over 10 years accounted for the highest percentage, 69.6%, and 48.0% respectively, but most patients were not

hospitalized due to an acute asthma attack within the past year (88.2%). The majority of patients had no known asthma-related family history (58.8%). The prevalence of respondents who only used the Metered-Dose Inhalers (MDI) was 29.4% whereas the percentage of Dry Powder Inhalers (DPI) and a combination of two devices users were equal at the rate of 35.3%.

3.2. Overall HRQoL score and domain score of patients**3.2.1. The influence of each domain on asthmatic patients' HRQoL****Table 2. The influence of each domain on asthmatic patients' HRQoL**

Question	Score distribution						
	1 n (%)	2 n (%)	3 n (%)	4 n (%)	5 n (%)	6 n (%)	7 n (%)
1. Symptoms domain							
How much discomfort or distress have you felt over the last 2 weeks as a result of chest tightness	1 (1.0)	2 (2.0)	6 (5.9)	15 (14.7)	37 (36.3)	24 (23.5)	17 (16.7)
Feel short of breathe as a result of your asthma	1 (1.0)	2 (2.0)	11 (10.8)	38 (37.3)	39 (38.2)	11 (10.8)	0 (0)
Experience wheeze in your chest	1 (1.0)	2 (2.0)	17 (16.7)	36 (35.3)	29 (28.4)	13 (12.7)	4 (3.9)
How much discomfort or distress have you felt over the last 2 weeks as a result of coughing	2 (2.0)	2 (2.0)	17 (16.7)	15 (14.7)	31 (30.4)	16 (15.7)	19 (18.6)
Experience a feeling of chest heaviness	0 (0)	2 (2.0)	10 (9.8)	25 (24.5)	36 (35.3)	24 (23.5)	5 (4.9)
Feel the need to clear your throat	1 (1.0)	4 (3.9)	11 (10.8)	29 (28.4)	39 (38.2)	14 (13.7)	4 (3.9)
Experience difficulty breathing out as a result of your asthma	1 (1.0)	7 (6.9)	20 (19.6)	41 (40.2)	22 (21.6)	8 (7.8)	3 (2.9)
Wake up in the morning with asthma symptoms	2 (2.0)	2 (2.0)	2 (2.0)	21 (20.6)	38 (37.3)	29 (28.4)	8 (7.8)
Feel bothered by heavy breathing	0 (0)	2 (2.0)	10 (9.8)	40 (39.2)	31 (30.4)	17 (16.7)	2 (2.0)
Were you woken at night by your asthma	5 (4.9)	5 (4.9)	16 (15.7)	24 (23.5)	28 (27.5)	15 (14.7)	9 (8.8)
Has your asthma interfered with getting a good night's sleep	8 (7.8)	5 (4.9)	21 (20.6)	25 (24.5)	23 (22.5)	10 (9.8)	10 (9.8)
Have a feeling of fighting for air	0 (0)	3 (2.9)	7 (6.9)	18 (17.6)	21 (20.6)	39 (38.2)	14 (13.7)
2. Environmental stimulies domain							
Experience asthma symptoms as a result of being exposed to cigarette smoke	4 (3.9)	9 (8.8)	32 (31.4)	25 (24.5)	15 (14.7)	7 (6.9)	10 (9.8)
Experience asthma symptoms as a result of being exposed to dust	2 (2.0)	8 (7.8)	31 (30.4)	28 (27.5)	16 (15.7)	8 (7.8)	9 (8.8)
Experience asthma symptoms as a result of the weather or air pollution outside	4 (3.9)	9 (8.8)	47 (46.1)	26 (25.5)	7 (6.9)	5 (4.9)	4 (3.9)
Experience asthma symptoms as a result of being exposed to strong smells or perfume	3 (2.9)	6 (5.9)	11 (10.8)	15 (14.7)	9 (8.8)	23 (22.5)	35 (34.3)
3. Activity limitations domain							
Strenuous activities (such as hurrying, exercising, running upstairs, sports)	17 (16.7)	17 (16.7)	17 (16.7)	20 (19.6)	11 (10.8)	14 (13.7)	6 (5.9)

Moderate activities (such as walking, housework, gardening, shopping, climbing stairs)	0 (0)	4 (3.9)	11 (10.8)	16 (15.7)	17 (16.7)	28 (27.5)	26 (25.5)
Social activities (such as talking, playing with pets/children, visiting friends relatives)	0 (0)	1 (1.0)	2 (2.0)	16 (15.7)	26 (25.5)	26 (25.5)	31 (30.4)
Work related activities (tasks you have to do at work)	0 (0)	3 (2.9)	13 (12.7)	22 (21.6)	38 (37.3)	17 (16.7)	9 (8.8)
Sleeping	3 (2.9)	5 (4.9)	10 (9.8)	34 (33.3)	27 (26.5)	13 (12.7)	10 (9.8)
Feel you had to avoid a situation or environment because of cigarette smoke	58 (56.9)	16 (15.7)	14 (13.7)	4 (3.9)	1 (1.0)	1 (1.0)	8 (7.8)
Feel you had to avoid a situation or environment because of dust	53 (52.0)	25 (24.5)	14 (13.7)	1 (1.0)	4 (3.9)	9 (8.8)	5 (4.9)
Avoid or limit going outside because of the weather or air pollution	52 (51.0)	21 (20.6)	11 (10.8)	9 (8.8)	5 (4.9)	2 (2.0)	2 (2.0)
Feel you had to avoid a situation or environment because of strong smells or perfume	18 (17.6)	7 (6.9)	8 (7.8)	8 (7.8)	2 (2.0)	26 (25.5)	33 (32.4)
Think of the overall range of activities that you would have liked to have done during the last 2 weeks. How much has our range of activities been limited by your asthma	13 (12.7)	18 (17.6)	24 (23.5)	17 (16.7)	15 (14.7)	8 (7.8)	7 (6.9)
Overall, among all the activities that you have done during the last 2 weeks, how limited have you been by your asthma	2 (2.0)	10 (9.8)	21 (20.6)	20 (19.6)	26 (25.5)	16 (15.7)	7 (6.9)
4. Emotional functions domain							
Feel concerned about having asthma	0 (0)	2 (2.0)	33 (32.4)	41 (40.2)	24 (23.5)	2 (2.0)	0 (0)
Feel frustrated as a result of your asthma	1 (1.0)	0 (0)	4 (3.9)	29 (28.4)	44 (43.1)	21 (20.6)	3 (2.9)
Feel concerned about the need to use medication for your asthma	1 (1.0)	5 (4.9)	29 (28.4)	27 (26.5)	22 (21.6)	14 (13.7)	4 (3.9)
Feel afraid of not having your asthma medication available	19 (18.6)	8 (7.8)	25 (24.5)	11 (10.8)	11 (10.8)	24 (23.5)	4 (3.9)
Feel afraid of getting out of breath	0 (0)	4 (3.9)	17 (16.7)	32 (31.4)	27 (26.5)	20 (19.6)	2 (2.0)

Note: 7 = no impairment, 1 = severe impairment

Symptoms by which a large number of patients were affected at moderate and severe levels (corresponding to the frequency of symptoms from "sometimes" to "always") were "feeling short of breath", "wheezing", "difficulty breathing out" or "feeling bothered by heavy breathing", with the highest total percentage of patients selecting scores from 1 to 4.

Environmental factors considerably impacted the quality of life of asthmatic patients. The majority

of respondents were affected at a severe level (corresponding to "all of the time" or "a good bit of the time" experience, with a score from 1 to 3) when being exposed to 3 out of 4 types of agents including cigarette smoke; dust exposure and weather or air pollution outside.

Additionally, a large of patients were moderately to completely restricted in strenuous activities. However, in moderate activities or social activities they were less limited (most of the responses were

scored 5 to 7). They also were affected even when sleeping (2.9% to 33.3%). More than 50% of patients must avoid conditions or environments at all times due to cigarette smoke, dust, air pollution, or changes in the weather outside. A large proportion (72/102 of the patients) reported that they had moderate to severe limitations (corresponding to scores 1 – 4) in activities they would like to participate in.

Regarding the influence of the emotional

functions domain, the majority of patients occasionally or frequently felt concerned about having asthma (40.2% and 32.4% respectively). Particularly, up to 50.9% of patients were so afraid because of not having asthma medication available (“all of the time” or “a good bit of the time”, corresponding to a score from 1 to 3). However, most patients rarely or even never “felt frustrated” or “felt afraid of getting out of breath”.

3.2.2. HRQoL score among asthmatic patients

Table 3. The overall HRQoL score and domain score

Domain	Mean (± SD)
Symptoms	4.66 ± 0.838
Environmental stimuli	4.20 ± 1.089
Activity limitation	3.87 ± 1.009
Emotional function	4.24 ± 0.853
Overall score	4.27 ± 0.747

In general, all domains affected asthmatic patients’ quality of life at a quite severe level (the mean values were approximately below 4 or slightly more than 4). The most affected domain was activity limitation and the least affected one was the symptom domain. The overall AQLQ(S) score of asthmatic patients was 4.27 ± 0.747.

Table 4. Classification of level of HRQoL

Levels of quality of life	Distribution n (%)
Low affected	2 (2.0)
Moderately affected	59 (57.8)
Seriously affected	41 (40.2)

Overall, up to 40.2% of patients whose HRQoL at severe impairment whereas 59.8% were at a low and a moderate degree of impairment.

3.3. Factors associated with HRQoL among asthmatic outpatients

Table 5. Factors associated with overall HRQoL of asthmatic patients

Features		OR (95% CI)	p
Gender	Male	6.441 (1.999 - 20.755)	0.002*
	Female	1	-
Age (years)	18 - 59	2.819 (0.719 - 11.051)	0.137
	≥ 60	1	-
Educational level	Under high school	3.268 (0.715 - 15.943)	0.127
	High School	1.540 (0.245 - 9.667)	0.645
	Upper high school	1	-
Active occupation	Non-working	1	0.884
	Farmers, Workers, Housewives	0.947 (0.231 - 3.872)	0.939
	Cadres and civil servants	1.587 (0.206 - 12.201)	0.657

Comorbidity	Yes	1	-
	No	2.306 (0.658 - 8.080)	0.191
Asthma duration (years)	< 5	1	0.997
	5 – 10	1.046 (0.256 - 4.266)	0.950
	> 10	1.007 (0.274 - 3.698)	0.991
Being hospitalized due to an acute asthma attack within a past year	Yes	1	-
	No	2.152 (0.463 - 10.013)	0.328
Asthma-related Family history	Yes	1	-
	No	3.300 (1.149 - 9.477)	0.027*
Type of inhaler	Combination of MDI and DPI	1	-
	Only one of two devices (MDI or DPI)	2.788 (1.093 - 7.827)	0.044*

* p < 0.05

The study only found three factors associated with HRQoL of asthmatic patients according to multivariate regression analysis including: gender, family history of asthma, and type of drug delivery devices used for asthma treatment. The group of male patients had higher HRQoL than female patients (6,441 times). Patients with no asthma-related family history had HRQoL 3.3 times as high as the other group. The respondents using MDI or DPI alone had HRQoL 2.788 times higher than those using the combination of two devices.

4. DISCUSSION

The result of research conducted on a sample of 102 asthmatic patients showed that the male-to-female ratio was 1.68/1. This rate was quite equivalent to the study of Bui Thi Huong et al (1.85/1) [10]. The mean age of participants was 59.2 ± 15.39 (26-95) which was similar to the study of Mitsuru Adachi et al [11]. Unemployed patients as well as those with low educational level accounted for more than 50% of the sample, 55.9%, and 54.9% respectively. These results correlated with the features of age in which more than half of patients were over 60 years old.

It could be seen that the majority of patients had comorbidities (at a high rate of 69.6%). Once again, this was suitable for the average age of the study participants, because the older they were, the greater they got the risk of developing a variety of diseases. In this survey, some comorbidities were mentioned mostly by patients such as hypertension, diabetes, dyslipidemia, etc. Regarding asthma duration, the group of patients being diagnosed with asthma for more than 10 years accounted for nearly half of the survey sample. This was because bronchial asthma was characterized as an early-onset disease, some patients with atopy could be diagnosed at a very young age. Until the period of puberty, the disease tended to regress but relapsed when the patient got older. Besides, in this study, there were 11.8%

of patients had to be hospitalized due to an acute asthma attack in the past year. This meant that the asthma control of some patients was still not good. The rate of 41.2% of patients having asthma-related family history also proved that the genetic factor was always one of the most important causes of asthma. Regarding the feature of using drug delivery devices for asthma treatment, the proportion of patients using MDI and DPI alone were 29.4% and 35.3%, respectively whereas patients having to use the combination of two devices accounted for 35.3% of the sample. MDI often contains the Short-acting β_2 agonist (SABA) substances, Inhaled corticosteroids and Short-acting β_2 agonist combination (ICS+SABA) or the combination of Short-acting β_2 agonist and Short acting muscarinic antagonist (SABA+SAMA) which has the effect of cutting asthma attack. Whereas, DPI contains the combination of Inhaled corticosteroids and Long-acting β_2 agonist (ICS+LABA) that has the effect of controlling asthma. According to ECRHS 2019, discontinuation of SABA is the goal of asthma treatment because using SABA for a long time will cause many adverse reactions such as tremors, anxiety and tachycardia... which significantly influence patients' quality of life. In this study, the total number of patients using MDI separately and the combination of MDI and DPI accounted for a large proportion (64.7%). It was shown that the patient's asthma control was not good because the ICS + SABA

combination was frequently recommended to relieve the acute attack for patients with asthma in third grade (moderate, persistent) or higher.

Additionally, when individually evaluating four domains of the AQLQ(S), we found that most patients were affected by main symptoms related to chest tightness, wheezing, cough, and shortness of breath. However, compared with other domains, Symptoms had the least influence on patients' HRQoL (the mean score of this domain was 4.66 ± 0.838). This result was also quite suitable for the pathological characteristics of study sampling in which 88.2% of patients did not have to be hospitalized due to acute asthma attacks within the past year. Regarding environmental factors, the study showed that many patients frequently encountered asthma symptoms due to being exposed to agents such as dust, strong smell and cigarette smoke... which forced them to stay home and rest more. In addition, a large number of patients had moderate to complete limitations when doing strenuous activities such as exercise, running up stairs or playing sports... This was also the domain having the most significant impact on patients' HRQoL in comparison with others (the average score in the domain of Activity limitations was $3.87 \pm 1,009$). This result was similar to the study reported by Thai Thi Thuy Linh (2007) [12]. Another reason for the higher limitation in activity was likely connected to our study sample's age feature with the majority of patients being approximately 60 years old. Regarding the emotional function domain, about 30% of patients felt concerned about asthma and the need to use medication as well as feeling so afraid of not having medication available.

The overall mean score of HRQoL in our research was 4.27 ± 0.747 . This meant that the patient's HRQoL was affected at a quite serious level. This finding was consistent with the results of Thai Thi Thuy Linh (2007) and Carranza R. (2004), with an overall average score was 4.43 and 4.50 respectively, but quite higher than the score reported by Rashid Ali (3.84 ± 1.87) [12],[13],[14]. It was clear that when the mean score dropped below 4.0, the patient's HRQoL was severely affected. Thus, we need urgent solutions and counseling programs to help patients improve awareness, attitudes as well as skills of asthma prevention and treatment, thereby improving the patient's quality of life because according to the AQLQ assessment guidelines, only a 0.5 change in the quality of life score created a clinically significant improvement

[9].

Through analysis of the multivariable regression model, factors associated with asthmatic patients' HRQoL were defined as gender, family history of asthma, and type of inhaler used for asthma treatment. Male patients had HRQoL 6.441 times as high as female patients. This was similar to the conclusions of some studies [10],[14]. It could be explained that women often had more sensitive psychological reactions to diseases and so they were more anxious than men. On the other hand, women were often weaker than men, therefore they could be influenced more seriously in daily activities. In terms of the relationship between HRQoL and a family history of asthma, patients without asthma-related family history had HRQoL 3.3 times as high as the ones with known asthmatic family history. This result was consistent with the study of Rashid Ali et al [14]. This was because they either suffered from an early onset of asthma due to genetic factors or had an anxious psychological response to their health condition and their family members as well. The last factor associated with HRQoL of patients was the type of drug delivery devices used to treat asthma. The group using a combination of MDI and DPI had HRQoL 2.788 times higher than the one using only one of two devices. Not only was the cost of treatment and inconvenience considered but also some adverse reactions. The fact that doctors had to prescribe simultaneously MDI and DPI device showed that the patient's asthma control in our study sample was still not good. Simultaneous usage of multiple active ingredients also caused undesirable effects to a certain extent and thus worsened the patient's HRQoL. Although no associations were seen between age and comorbidities with HRQoL in our study, other several authors have noticed a decrease in HRQoL with increasing age [14] because many factors were related to age and illness such as immunosenescence. Aging and comorbidities contribute to the severity of asthma symptoms and even interfere with the use of certain asthma medications due to contraindications and side effects.

Our study also has several limitations. Firstly, we had to apply non-probability sampling due to the difficulty in data collection during the Covid epidemic period. Therefore, the result of this study might not be sufficient and fully representative. Additionally, it was not feasible to conduct other study design factors such as the correlation between pulmonary ventilation function (PEF,

FEV1), asthma severity or treatment adherence and the patient's HRQoL. Lastly, participants self-answered the questionnaire related to their asthma experiences during the last two weeks before being interviewed, so the recall bias could not be eliminated.

5. CONCLUSION

Asthma significantly influenced asthmatic patients' HRQoL. Patients were affected most seriously in the activity limitation domain and least in the symptoms domain. Factors such as gender, family history of asthma, and type of inhaler were associated with the patient's HRQoL.

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