

# ANALYSIS OF HEALTH-RELATED QUALITY OF LIFE DETERMINANTS IN ADULT ASTHMATIC PATIENTS IN A DISTRICT HOSPITAL OF JAKARTA

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## ABSTRACT

Uncontrolled asthma leads to patients' poor outcomes and decreases health-related quality of life/HRQoL. Little research has been done to analyze the determinants of HRQoL in asthmatics patients. The objective of this study is to determine asthma control and patients' compliance levels, and evaluate the appropriateness of medicine use and determinants of HRQoL. During this prospective study, adult asthmatic patients currently experiencing asthma attack were evaluated in asthma clinic of a district hospital in EastJakarta and administered study questionnaires. Demographic variables and data related to asthma control, patients' compliance level and the appropriate use of medications were summarized using descriptive statistics. The determinants of HRQoL were determined using bivariate and multivariate regression analysis. All data were analyzed using SPSS version 22.0. The results showed that there were 11 males and 43 females aged approximately 45 years old. More than 50% of the patients had uncontrolled asthma and low level compliance to their medications. Nearly all medicines used were inappropriate according to National Asthma Treatment Guideline. Bivariate correlation test revealed four significant determinants of HRQoL: asthma duration ( $P=0.033$ ), asthma control level ( $p=0.007$ ), asthma severity level ( $p=0.001$ ) and the presence of smoke exposure in neighbourhood ( $p=0.032$ ). Multivariate analysis showed only the presence of smoke exposure significantly affecting HRQoL. **In conclusion**, the majority of patients had uncontrolled asthma status and low level of compliance to their medications. Non-compliance to asthma treatment guideline was uncovered in nearly all cases. Additionally, this study highlighted the exposure of smoke exposure as the solely determinant of HRQoL amongst asthmatic patients.

**Keywords** : asthma, health-related quality of life, hospital.

## ANALISIS PENENTU KUALITAS HIDUP TERKAIT KESEHATAN PADA PASIEN ASMA DEWASA DI RUMAH SAKIT UMUM DAERAH DI JAKARTA ABSTRACT

### ABSTRAK

Penyakit asma yang tidak terkontrol dapat mengakibatkan penurunan kualitas hidup terkait kesehatan pada pasien (*health-related quality of life*, HRQoL). Jumlah penelitian yang dilakukan untuk menganalisis faktor penentu HRQoL pada pasien asma masih sangat terbatas. Tujuan penelitian ini adalah untuk menentukan tingkat pengendalian asma dan tingkat kepatuhan pasien, serta mengevaluasi kesesuaian pengobatan asma sesuai tingkat keparahan dan penentu kualitas hidup terkait kesehatan (HRQoL). Pasien asma dewasa yang sedang mengalami serangan asma dievaluasi secara prospektif di sebuah klinik asma di sebuah rumah sakit daerah di Jakarta. Pasien diberikan tiga jenis kuesioner penelitian yaitu kuesioner pengendalian asma, kuesioner kepatuhan dengan pengobatan dan kuesioner kualitas hidup pasien asma. Variabel demografi dan data terkait pengendalian asma, tingkat kepatuhan pasien dengan pengobatan dan kesesuaian pengobatan asma dianalisis secara deskriptif. Penentu HRQoL dianalisis menggunakan uji bivariat dan uji regresi multivariat. Semua data dianalisis menggunakan SPSS versi 22.0. Hasil penelitian menunjukkan bahwa terdapat 11 pasien pria dan 43 wanita yang rata-rata berusia 45 tahun. Lebih dari 50% pasien mempunyai asma yang tidak terkontrol dan tingkat kepatuhan pengobatan yang rendah. Hampir semua obat asma yang digunakan tidak mengikuti Panduan Pengobatan Asma Nasional. Uji korelasi bivariat menunjukkan empat faktor yang secara signifikan menjadi penentu skor total HRQoL yaitu durasi asma ( $p=0.033$ ), tingkat pengendalian asma level ( $p=0,007$ ), tingkat keparahan asma ( $p=0,001$ ) dan adanya paparan asap rokok di lingkungan tempat tinggal. Analisis multivariat menunjukkan hanya satu faktor yang signifikan mempengaruhi kualitas hidup pasien yaitu adanya paparan asap rokok di lingkungan tempat tinggal. Dari hasil penelitian ini, dapat disimpulkan bahwa studi ini mendapati mayoritas pasien mempunyai status asma yang tidak terkontrol dan tingkat kepatuhan pengobatan yang rendah. Selain itu, studi ini juga menemukan paparan asap rokok di lingkungan tempat tinggal pasien menjadi faktor tunggal penentu HRQoL pada pasien asma.

**Kata Kunci** : asma, kualitas hidup terkait kesehatan

## Introduction

Asthma is a chronic inflammatory respiratory disease characterized by widespread but variable airflow obstruction which is often reversible either spontaneously or with treatment. The airway inflammation results in a range of episodic symptoms including dyspnea, wheezing, chest tightness and coughing especially at night or in the early morning. Asthma is considered as one of the most common chronic diseases worldwide. According to the report released by the Institute for Health Metrics and Evaluation, the global asthma prevalence is approximately 334 million people and the number tends to increase each year across all age groups (The Institute for Health Metrics and Evaluation 2012). In addition, the World Health organization (WHO) has estimated that asthma is responsible for the loss of around 16 million disability-adjusted life-years worldwide which represent 1% of the total global disease burden (WHO 2011). In the context of Indonesia, the data from Indonesia Basic Health Survey 2013 revealed that the prevalence of asthma in Indonesia accounted for 4.5% of the population (Badan Penelitian dan Pengembangan Kesehatan 2013). Thus, asthma is considered as a serious public health issue in all countries regardless of their development status. It has been evident that asthma is responsible for a considerable number of hospitalizations, health care visits and missed work days. Consequently, it may affect health care-related costs and patients' quality of life (Dougherty and Fahy 2009). Due to its rationale as chronic disease, asthma management associates with long-term treatment which require major involvement of asthmatic patients the availability of quality health care. The asthma patients should understand the nature of its disease and comply with the treatment. Furthermore, it has been emphasized in some clinical studies that the ultimate goal of asthma management is to achieve optimal disease control and improve health-related quality of life (HRQoL) (Bateman et al. 2007, Carr and Higginson 2001, Moy et al. 2001). Nevertheless, it has been evident that the outcomes of asthma management have been assessed merely on improvement in asthma control (measured by forced expiratory volume in 1 second/FEV<sub>1</sub>, peak

flow rate, symptom scores and the frequency of reliever medication use) and little research has focused on HRQoL (Moy et al. 2001). WHO has defined (HRQoL) as "the individual perception of their position or life in the context of the culture and value systems in which they live and in relation to their goals, expectations and concerns" (WHO 1993). It can be inferred from the aforementioned definition that patients' own perceptions are essential as they indicate the impairments perceived by patients as essential. Further more, the evidence uncovers the fact that the correlation between asthma control and HRQoL is modest; highlighting HRQoL cannot be solely measured by clinical parameters. Hence, it is recommended that the success indicators of asthma management should deal with clinical parameters and increased quality of life among the patients concurrently (Rulishauser et al. 1998). With this as a background, this study aimed to determine asthma control and patients' compliance levels, and to evaluate the appropriateness of medicine use in relation to asthma severity and HRQoL in an attempt to identify the most important determinants affecting HRQoL in these patients.

## Material and Methods

### *Study design and population*

This study was a cross-sectional prospective study conducted in an asthma clinic of a district hospital in East Jakarta during three-month period. The inclusion criterias of recruited asthmatic adult patients were as follows: adult (>18 years of age) asthmatic patients who currently experienced asthma attack and admitted to asthma clinic of the study hospital as outpatients, did not have other respiratory airway-related diseases and/or other chronic diseases (e.g. hypertension, cardiovascular diseases, liver diseases, renal diseases, cancer). All patients who met the inclusion criterias during the study period were included as study participants. The study protocol was approved by Faculty of Pharmacy Pancasila University Institutional Review Board and Human Ethics Committee at the study hospital. The study objectives and the instruments were explained to the participants. Thereafter, informed consent was taken from the participants and they were reassured that the collected information would remain confidential.

### Study measurements

The collected socio-demographic data were patients' age, gender, educational level, family income, type of insurance and the presence of smoke exposure in their neighborhoods. Factors related to disease and treatment comprised duration of asthma since initial diagnosis, history of allergy, history of admission to emergency department over the past three months, level of asthma control, forced expiratory value in 1 second (FEV1) and level of patients' compliance to asthma treatment and the appropriateness of asthma treatment.

FEV1 data were obtained from patients' medical records, whilst the remaining data were collected using questionnaires which were validated previously. Self-administered questionnaires were distributed to participants who met the inclusion criteria. The level of asthma control was measured using Global Initiative for Asthma (GINA) Assessment of Asthma Control, whilst the patients' compliance level to asthma treatment was assessed using 8-item Morisky Medication Adherence Scale (MMAS-8). The appropriateness of asthma treatment was determined by analyzing the medications received based on patients' asthma severity in comparison to guidelines of asthma treatment used in the study hospital. Further, the measurement of HRQoL was undertaken using the Juniper Asthma Quality of Life Questionnaire (JAQLQ). JAQLQ measured the functional problems (physical, emotional, occupational and social) that were most troublesome to adult patients with asthma. This questionnaire consisted of 32 questions addressing four domains: activity limitations, symptoms, emotional function and exposure to environmental stimuli. Individual questions were equally weighted and the overall HRQoL score was the mean of the responses to each of the 32 questions (each question on a 7-point scale). The overall HRQoL score would be between 1 and 7, and the HRQoL score of each domain was analyzed exactly in the same way.

### Statistical analysis

Socio-demographic characteristics; data related to disease and treatment; and HRQoL scores were summarized using descriptive statistics (mean  $\pm$  standard deviation for variables measured on a

continuous scale, and frequencies and percentages for categorical variables). The determinants of HRQoL were determined using bivariate and multivariate regression analysis. Bivariate correlation between HRQoL scores and study variables (socio-demographic characteristics, disease and treatment-related factors) were analyzed using Pearson's correlation. Multivariate regression analysis was undertaken to determine the factors affecting the patients' HRQoL (HRQoL determinants). All data were analysed using SPSS version 22.0. Significance was defined as  $p < 0.05$ .

## Result and Discussion

### Socio-demographic characteristics and disease and treatment-related factors

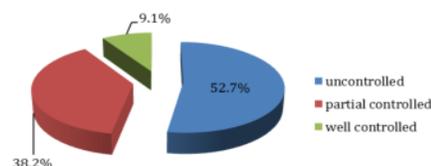
Prior to data collection, a pilot study involving 25 asthmatic patients in the study hospital was conducted to determine the validity and reliability of the study questionnaires. The result showed that each question in the questionnaires was valid and reliable (Cronbach's  $\alpha > 0.70$ ) so the tested questionnaires passed the requirement as the study instruments.

During the study period, there were 54 patients who met the inclusion criteria. The socio-demographic characteristics and some of disease/treatment-related data of patients visited the asthma clinic during the study period are summarized in Table 1. The mean of patients' ages was 45.00 years and there were considerably more female patients than their counterparts. More than three-quarters of patients in this study had secondary degree as the highest educational level. In addition, patients with monthly family income less than IDR 2 million accounted for just half of the patients. As seen in Table 1, nearly all patients participated in the present study were the holder of national insurance scheme; leaving around 5% not having any insurance to cover their health-related expenses. In terms of duration of asthma, approximately 63% of patients had suffered more than 10 years since its initial diagnosis. It is interesting to note that more than half of the patients had smoking exposure in their neighborhood and experience of admission to emergency department over the past 3 months.

**Table 1.** Socio-demographic characteristics and data related to disease/treatment of study participants (N=54)

Patient characteristics	Value
Age in years, mean $\pm$ SD(range)	45.00 $\pm$ 16.16
Gender (%)	
- Male	11 (20.4)
- Female	43 (79.6)
Level of education (%)	
-Senior high school as the highest degree	43 (79.6)
-Diploma/bachelor/master degree	11 (20.4)
Family income (%)	
- < IDR 2 million/month	28 (51.8)
- IDR 2-5 million/month	21 (38.9)
- > IDR 5 million/month	5 (9.3)
Type of insurance	
-No insurance	3 (5.6)
-National insurance	51 (94.4)
Asthma duration since initial diagnosis (%)	
- $\leq$ 5 years	18 (33.3)
- 6-10 years	2 (3.7)
- > 10 years	34 (63.0)
Presence of smoking exposure in neighborhood	
-Yes	31 (57.4)
-No	23 (42.6)
Any history of emergency department admission over the past 3 months (%)	
-Yes	38 (70.4)
-No	16 (29.6)

Further, asthma control level assessment was conducted to evaluate the patients' asthmatic status by reviewing the asthma-related symptoms experienced by patients over the past 4 weeks. The result of asthma control level measurement is depicted in Figure 1. It can be seen in Figure 1 that patients with uncontrolled asthma comprised just more than half of all study subjects and less than 10% of patients reported well-controlled asthma status. In addition, measurement of patients' compliance level to their medication is of importance as the nature of asthma management being a chronic disease requires long-term treatment. It is quite unfortunate that the data revealed that more than half of the patients had low compliant level, followed by medium compliant (16.7%) and high compliant level (27.8%), respectively.

**Figure 1.** Asthma control level of the study patients (=54)

This study also investigated the appropriate use of treatment based on asthma severity in comparison with the National Asthma Treatment Guideline adopted in the study hospital. Asthma severity was classified based on asthma-related clinical symptoms and lung function (shown by FEV1 values). The result showed that approximately 56% of the patients had mild-intermittent in asthma severity followed by mild-persistent severity which was seen in about a quarter of the patients.

The rest of the cases were considered moderate-persistent (5.6%) and severe-persistent (12.9%). Due to incomplete data available, particularly medications received not recorded in all patients' medical record, this assessment can be conducted in 26 patients. The result showed that nearly all medicines used were inappropriate according to

National Asthma Treatment Guideline; leaving just one patient received appropriate treatment for managing asthma according to its severity.

### **HRQoL scores and determinants of HRQoL Scores**

The overall HRQoL score ranged between 1.53 and 5.41 with a mean  $\pm$  SD of  $3.34 \pm 0.03$ . Meanwhile, the HRQoL scores (mean  $\pm$  SD) for activity limitation domain, emotional function and symptoms were  $3.78 \pm 1.24$ ,  $3.44 \pm 1.30$  and  $3.06 \pm 1.09$ , respectively. The least score was documented from exposure to environmental stimuli domain with  $2.86 \pm 1.76$ .

Further, bivariate correlation was undertaken to identify the factors affecting HRQoL. Socio-demographic characteristics and data related to disease/treatment used as the prospective determinants were defined previously, but the variable of treatment appropriateness was not included for correlation analysis due to incomplete data for each patient. Bivariate correlation test revealed three factors which adversely affected the total score of HRQoL, namely asthma duration ( $p=0.033$ ), asthma control level ( $p=0.007$ ), asthma severity level ( $p=0.001$ ). Meanwhile, the presence of smoke exposure in neighbourhood which had significant positive correlation ( $p=0.018$ ) with the total score of HRQoL.

Further, multivariate analysis showed only one factor namely the presence of smoke exposure ( $p=0.031$ ) which significantly affected patients' quality of life. Patients who did not have smoking exposure in their neighborhood were 3.57 times (odds ratio: 0.280) to report high HRQoL (defined as total HRQoL score  $>3.50$ ) compared to those exposed to smoking.

It has been thought that assessment of HRQoL captures multiple and complex entities (e.g. patient satisfaction with health care, psychological issues, adverse effects from the medications) which are not invariably associated with clinical outcomes. Hence, routine assessment of HRQoL, in addition to clinical parameters of asthma severity is of importance to evaluate patients' asthma status (Moy *et al.* 2001). The result of our study showed that on average the patients had modest total HRQoL score and the score of exposure to environmental

stimuli was the most affected domain indicating day-to-day exposure to the potential trigger factors (e.g. polluted air and smoke) in their surroundings implicated in decreased HRQoL score. It was hypothesized that being in the major city like Jakarta along with its reduced environmental quality contributed to low HRQoL. There is no wonder that the multivariate linear regression model pointed the smoking exposure was the significant predictors of asthma. Likewise, a Hungarian study revealed that patients' quality of life was mostly affected due to restricted daily activities as they had to avoid cigarette smoke and dust (Szabo and Cserhati 2004).

Further, the result of bivariate correlation uncovered three factors negatively correlating with the HRQoL score, namely asthma duration, asthma control level, asthma severity level. Asthma duration adversely affected HRQoL where the lower score of HRQoL was demonstrated in patients being diagnosed with asthma for longer period since initial diagnosis and the reverse was true. Corresponding with our study, the similar result was reported in some previous studies indicating the years' patients dealing with asthma might influence their judgments regarding the activities they can participate in the future and eventually the perception of their quality of life (Leander *et al.* 2012, Al-Gewely *et al.* 2013). It is intriguing that the present study and the study done by Zendah *et al.* (2011) uncovered the slightly-unexpected result that patients with well-controlled asthma had lower HRQoL score as opposed to their counterparts. Nonetheless, Guilbert *et al.* (2011) found conflicting result in which uncontrolled asthma represented by its symptoms could reduce HRQoL. Inconsistent results from different studies were likely due to the nature of asthma control level-related data that relied on patients' memory to recall the asthmatic symptoms over the past 4 weeks. This type of measurement was subjective so the resulting data might not represent the actual control level. However, the subjectivity of this assessment can be minimized if each patient is equipped with daily note/diary describing asthma status (Mancuso *et al.* 2010).

Additionally, asthma severity level correlated with HRQoL in which patients with less severe asthma were likely to have higher HRQoL. This result

corresponds well with that conducted by Mohangoo et al. (2007). However, distinct evidence was reported in some studies where the result showed that the severity level was not associated with HRQoL (Moy et al. 2001, Everhart and Fiese 2009, Vila et al. 2003). It appears that the varied results occurred due to the source of data used for assessment. Asthma severity level is measured based on combination of subjective (i.e. symptoms) and objective data (i.e. FEV1), whilst the assessment of HRQoL is obtained from patients' perception on complex entities affecting their asthma. Thus, it can be said that both measurements focus on different aspects of asthma management (Wijnhoven et al. 2001).

It is true that some previous studies have been conducted to identify the determinants of HRQoL in asthmatic patients. The present study had the strong point as it attempted to incorporate a range of potential factors deemed significantly affecting HRQoL (both socio-demographic and disease/related characteristics) and undergone some measurements (asthma control, patient compliance, asthma severity and the appropriateness of medication use) which were important to give more complete picture of the patients' asthma status and its implication on patients' quality of life. Nevertheless, the result of this study should be interpreted cautiously. This study was conducted in one district hospital, which diminishes the generalizability of the findings. There are difficulties in drawing accurate comparisons with other studies due to considerable variations in settings, design, duration, size and method. Another limitation is related to the nature of cross-sectional research design so this study is unable to evaluate the long-term effects of asthma on the scores of HRQoL.

### Conclusions

In summary, this study uncovered the majority of patients had uncontrolled asthma status and low level of compliance to their medications. The majority of patients did not receive appropriate asthma treatment in accordance to its severity level. Further, the exposure of smoke exposure particularly in patients' neighbourhood was found as the solely determinant of HRQoL amongst asthmatic patients.

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