

# What are the Clinical Factors that Affect Quality of Life in Adult Asthmatics?

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## Summary

A study was conducted to determine the clinical factors that affect the quality of life in adult asthmatics. As part of their routine follow-up visit, 399 patients completed the SF-36 quality of life questionnaire, had peak expiratory flow rate readings (PEFR) taken and were interviewed to determine current symptom severity. The grade of severity of asthma was verified by the consultant physician in-charge. The mean age of the patients was 41.8 years and 31.8% of the patients were men. Most of the patients were Malay (64.7%), 89% had at least secondary level education and the mean duration of asthma was 17.6 years. The majority of patients had moderate or severe disease (43.6% and 55.9% respectively). For asthmatics with moderate or severe symptoms of chest tightness and/or shortness of breath, all domains of SF-36 scored significantly lower than those with mild symptoms, with the exception of the domain bodily pain. Patients with moderate/severe cough recorded significantly lower scores than those with mild cough for all domains except for bodily pain and social functioning. Only the physical functioning, role physical, general health and role emotional scores were significantly worse in those with a consultant grade of severe asthma compared to those with mild/moderate asthma. Patients with PEFR < 80% predicted had lower scores for the domains physical functioning, role physical and general health than those with PEFR  $\geq$  80% predicted, but the scores for the other domains were similar in both groups. Quality of life is significantly impaired in adult asthmatics with current respiratory symptoms. However, consultant grade of severity of asthma and PEFR readings do not affect quality of life scores as much.

**Key Words:** Quality of life, Asthma, Outcome

## Introduction

Asthma is known to be an important cause of admission to hospital, attendance in accident and emergency departments and attendance in hospital outpatient clinics. The second National Morbidity and Health Survey conducted by the Ministry of Health, Malaysia in 1996 found that the estimated prevalence of asthma was 4.2%; it was

4.5% in children aged up to 14 years, and 4.1% in adults aged 15 years and over<sup>1</sup>.

The application of patient assessed measures of health outcome has become increasingly important to evaluation of health care. Health related quality of life (QoL) refers to the functional effect of an illness and the consequent therapy on

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a patient, as perceived by the patient, and it is a measure of patients' evaluation of their own health compared with what they expect possible or ideal. Questionnaires to evaluate QoL may be generic such as the Medical Outcome Survey Short-Form 36 (SF-36)<sup>2</sup> or disease-specific such as the Asthma Quality of Life Questionnaire (AQLQ)<sup>3</sup>. Generic measures, which usually measure several health domains, can be used across different patient populations<sup>4</sup>, and the SF-36 is one of the most widely used generic QoL scales<sup>5</sup>. It has been used successfully to assess outcome in patients with asthma and has been shown to have the sensitivity to detect differences between patients with different severity of the disease<sup>6-10</sup>.

Subjective measures of asthma severity have been found to correlate better with measures of QoL than objective physiological measures<sup>11,12</sup>. The purpose of this study was to determine the relationship between QoL and current severity of symptoms, severity of disease and PEFR measurements in adult asthmatic patients.

## Materials and Methods

A multicentre study of QoL in asthmatics was undertaken in 1999/2000 under the auspices of the Public Health Institute, Ministry of Health Malaysia; only data from patients seen in this centre was analysed for the purpose of this paper. Follow-up patients seen in Asthma Clinics located in specialist clinics and outpatients department were included if they were Malaysian, aged 18 years and above and had been diagnosed with asthma for at least a year. Excluded were institutionalised patients, outpatients who needed admission on the day of the survey and patients with physical and/or mental disability. Patients were requested to fill up the self-administered bilingual version of the SF-36, had peak expiratory flow rate (PEFR) measurements done and were interviewed by clinic doctors to obtain information on symptom severity for the current visit. The author had already verified the diagnosis of asthma during the patients' first visit to the Asthma Clinic.

The author also reviewed all patients' case records to verify the grade of severity of asthma (mild, moderate or severe disease). Classification of severity was based on recommendations in guidelines on management of adult asthma published by the Malaysian Thoracic Society and took into consideration aspects of the patients' history, symptoms and PEFR measurements at initial assessment<sup>13</sup>.

The SF-36 has 36 items which represent eight health concepts: physical functioning (PF), role physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role emotional (RE) and mental health (MH). A summated score using specific formulae was computed for each scale, yielding a profile of the eight multi-item scales<sup>14</sup>. A summary of the various SF-36 scales is shown in Table I<sup>15,16</sup>. The SF-36 scores range from 0 (maximum impairment) to 100 (no impairment). Our questionnaire contained the original English language version as well as a translated Bahasa Malaysia version. The research team that developed the Bahasa Malaysia version in Universiti Sains Malaysia has reported satisfactory internal consistency for this questionnaire.

Clinic nurses who had been trained to record the best of three consecutive readings carried out PEFR measurements. The predicted values for PEFR were obtained from a nomogram based on a study of adult Chinese subjects<sup>17</sup>. The questions asked regarding severity of symptoms referred to the symptoms of cough, shortness of breath and chest tightness. Patients were divided into two groups: those with mild, infrequent symptoms experienced only with triggering factors, exertion or infections and those with symptoms on most days with or without symptoms at night.

Comparisons in QoL scores were made between groups of subjects with different symptom severity, grade of severity of asthma and PEFR. The Mann-Whitney U test was used to test if the distribution of the SF-36 scores was the same across different grades of severity of

symptoms/disease/PEFR and to assess whether the SF-36 scores were associated with age, sex, ethnic group, marital status, employment status, educational level, duration of asthma and the presence of comorbidity. A multivariate regression model was used to test for significance between groups with different grades of severity of symptoms/disease/PEFR after adjusting for age, sex, ethnic group, marital status, employment status and number of comorbid illnesses. Spearman's rank correlation was used to assess the association between PEFR % predicted and SF-36 scores. A p value of less than 0.05 was considered statistically significant. All analyses were conducted using SPSS version 11.0 (SPSS, Chicago, Illinois, USA).

## Results

A total of 399 asthmatics were included in the study. The mean (SD) age was 41.8 (12.2) years (range 18 - 79 years) and 31.8% were men. Most of the patients were Malay (64.7%), and the rest included 19.8% Indians, 14.3% Chinese and 1.2% from other races. Most of the patients were married (83.0%), 89% had at least secondary level education and 58.6% were employed. Mean (SD) duration of asthma was 17.6 (12.4) years (range 1 - 55 years). Just under a quarter of the patients (23.3%) had one or more comorbid illnesses, the commonest being hypertension and diabetes mellitus.

The majority of patients reported mild, infrequent symptoms: 91.5% for the symptom of cough, 89.2% for the symptom of shortness of breath and 90.7% for the symptom of chest tightness. Only 2 patients had mild asthma (0.5%), 174 had moderate asthma (43.6%) and 223 had severe disease (55.9%). In keeping with the preponderance of moderate and severe asthmatics included in the study, all were on regular inhaled corticosteroids with 54.9% taking a dose equal to or exceeding 800 mcg per day, and eight patients were on long-term oral corticosteroids as well. The mean (SD) PEFR was 81.4 (17.4) % predicted.

Less than half of the patients (171/399, 42.9%) had PEFR below 80% predicted.

In the patients studied, educational level, duration of asthma and sex were not found to be important determinants of QoL scores. Patients aged 40 years and over had higher scores for the domain MH than younger patients but the scores for the other domains were not significantly affected by age of the patient. Among the major ethnic groups, Indians had significantly lower scores for the domains PF, BP, VT, SF and RE than the other races. Married patients had significantly higher scores for the domains PF, VT, RE and MH than those who were single, widowed or divorced and patients with comorbid illnesses had significantly lower scores for the domains PF, RP and BP. Patients who were employed had higher scores for the domains PF, RP, VT and RE than those who were not employed.

Figures 1a, 1b and 1c show the SF-36 scores for patients with different degree of severity of asthma symptoms. For the symptom of cough, asthmatics with cough on most days with or without cough at night recorded significantly lower scores than those with mild, infrequent cough for all domains except for BP and SF, even after adjusting for the effects of age, sex, ethnic group, marital status, employment status and number of comorbid illnesses. For those with moderate or severe symptoms of chest tightness and/or shortness of breath, all domains of SF-36 scored significantly lower than for patients with mild symptoms, with the exception of the domain BP.

Figure 2 shows the SF-36 scores for different consultant grading of severity of asthma. Only the PF, RP, GH and RE scores were significantly worse in those with a consultant grade of severe asthma compared to those with mild/moderate asthma. The scores for BP, VT, SF and MH domains were not significantly different between these two groups of patients.

PEFR % predicted was weakly but significantly correlated with all the SF-36 scores ( $r = 0.11 - 0.14$ ,

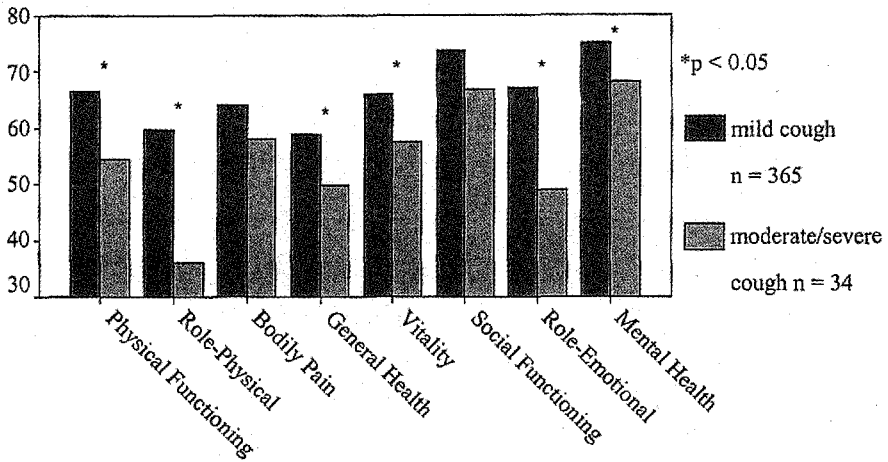
$p < 0.05$ ), except for the mental health score. When a multiple regression analysis was made to adjust for the effect of the confounding variables age, sex, marital status, ethnic group and number of comorbid illnesses, it was found that only the scores for PF, RP and GH were significantly higher

in patients with PEFR values 80% predicted and above compared to those with values less than 80% predicted (Figure 3). The scores for the other domains were not significantly different in patients with relatively normal PEFR compared to those with low PEFR.

**Table 1: Health Concepts, Abbreviated Content, and Number of Questionnaire Items (k) for Eight SF-36 Scales**

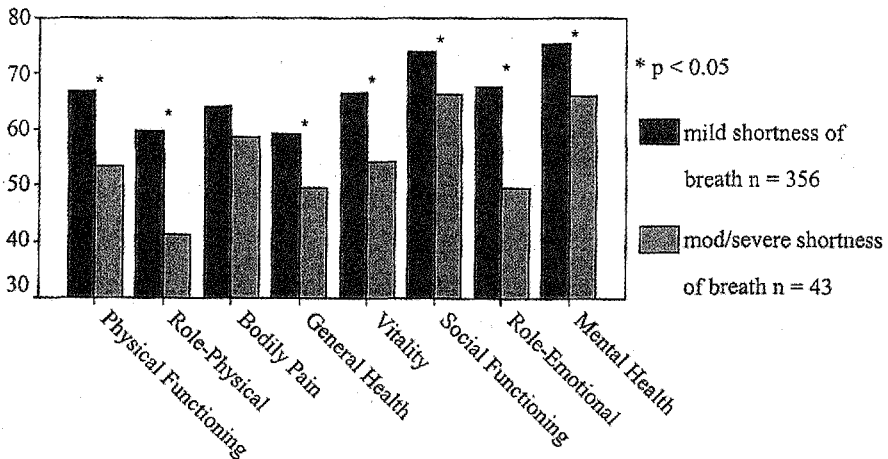
Health Concept	Abbreviated Content	k
Physical functioning	Extent to which health limits physical activities such as self-care, walking, climbing stairs, bending, lifting, and moderate and vigorous activities	10
Role functioning - physical	Extent to which physical health interferes with work or other daily activities, including accomplished less than wanted, limitations in the kind of activity	4
Bodily pain	Intensity of pain and effect of pain on normal work, both inside and outside the house	2
General health perceptions	Personal evaluations of health, including current health, health outlook, resistance to illness	5
Vitality	Energetic and full of pep vs. tired and worn out	4
Social functioning	Extent to which physical health or emotional problems interfere with normal social activities	2
Role functioning - emotional	Extent to which emotional problems interfere with work or other daily activities, including decreased time spent, accomplished less than wanted, did not work as carefully as usual	3
Mental health	General mental health, including depression, anxiety, behavioural-emotional control, psychological well-being	5

Fig. 1a Mean SF-36 scores and cough mild vs. moderate/severe



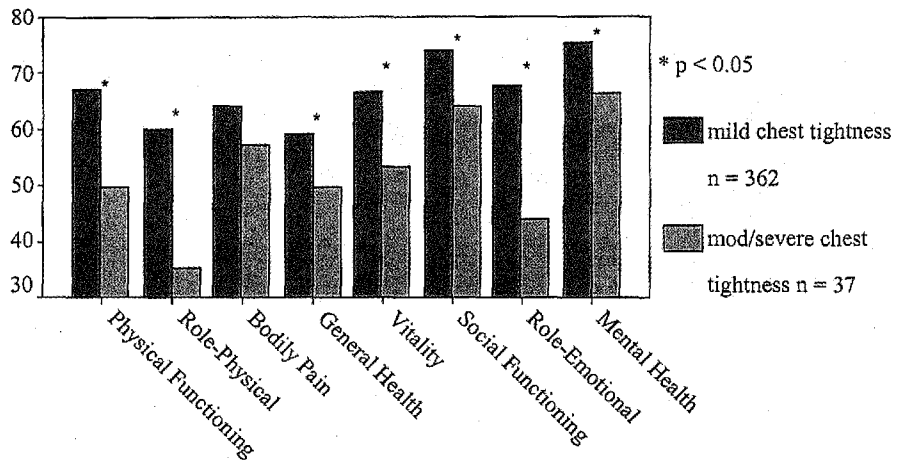
p values adjusted for age, sex, marital status, ethnic group, employment status and number of comorbid illnesses

Fig. 1b Mean SF-36 scores and shortness of breath, mild vs. moderate/severe



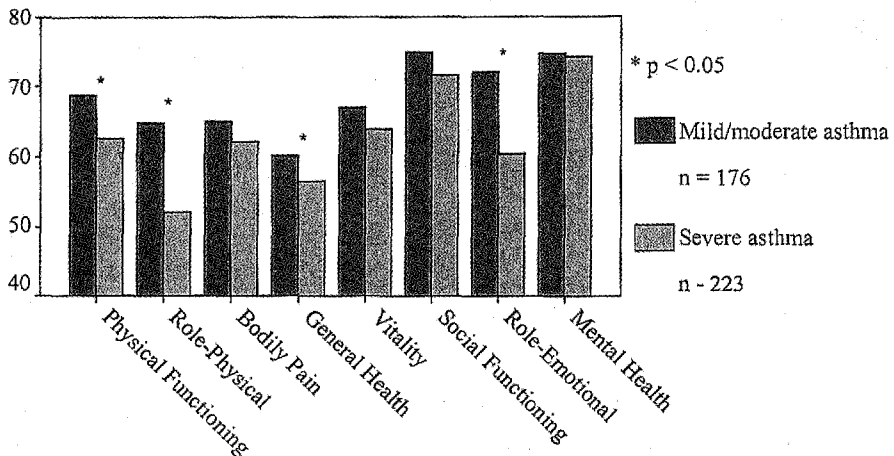
p values adjusted for age, sex, marital status, ethnic group, employment status and number of comorbid illnesses

**Fig. 1c Mean SF-36 scores and chest tightness, mild vs. moderate/severe**

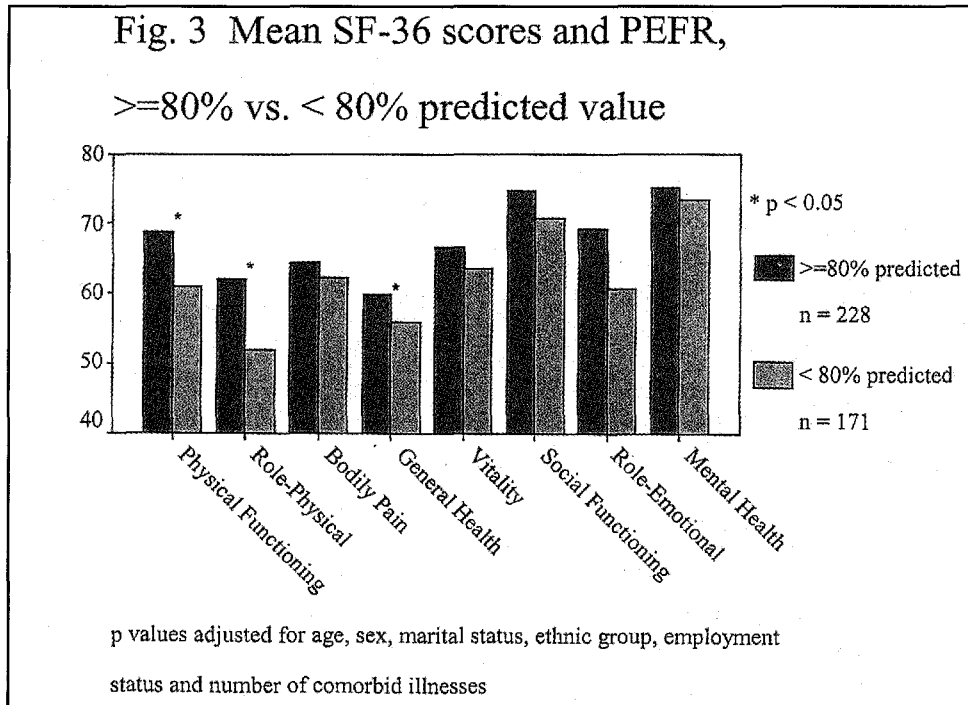


p values adjusted for age, sex, marital status, ethnic group, employment status and number of comorbid illnesses

**Fig. 2 Mean SF-36 scores and consultant grading of asthma severity**



p values adjusted for age, sex, marital status, ethnic group, employment status and number of comorbid illnesses



**Discussion**

In asthma, a substantial impact of disease is on QoL rather than survival. Although it would be ideal to measure outcome of medical care from the patient's point of view, administering a questionnaire such as the SF-36 routinely during follow-up visits would be difficult and tedious for clinicians, since time for outpatient assessment is limited. It is therefore of interest to determine what clinical factors are most closely related to QoL. This study has shown that the severity of current respiratory symptoms significantly affects quality of life. Even after adjusting for the effects of age, sex, ethnic group, marital status, employment status and number of comorbid illnesses, most domains had significantly lower scores in patients with persistent daily symptoms. This adverse effect of respiratory symptoms on functioning and subjective well being has been documented by others<sup>7,11</sup>. Given that QoL is a self-assessed measure, it is not surprising that symptom frequency correlates more closely with poor QoL

than consultant grading of severity of disease. Asthma is a variable disease and may be characterised by periods of relative freedom from symptoms interrupted by episodes of severe symptoms. Therefore, it is important to assess the impact of these episodes on health status and QoL<sup>18</sup>. Other studies have also found that the presence of symptoms reflect more closely current control of asthma and may not correlate well with specialist-assessed long-term asthma severity<sup>19</sup>.

Among the domains measured by the SF-36, the ones most severely reduced in patients with persistent asthmatic symptoms were those relating to role physical and role emotional capabilities as well as general health status. Hence, patients with symptoms perceived that physical health and emotional problems have interfered with their work and other activities and also evaluated their current health, health outlook and resistance to illness as poor. Other studies have found that the scores for the domains role physical and general health are worse in asthmatics compared to

controls<sup>16,20</sup>. Apart from physical limitation, there is evidence that psychosocial problems can arise in chronic asthma<sup>21,22</sup> and this may account for the limitation in daily activities ascribed to emotional problems.

The scores for the domain bodily pain were not affected by increasing severity of symptoms/disease or worsening PEFR. This domain has been found to be affected in patients with asthma<sup>11,23</sup> and the mean score for patients in this study was indeed below the expected population norm for scores of SF-36<sup>24</sup>. However, it would seem that the score for this domain is unable to discriminate between groups of patients with differing severity of symptoms, severity of disease and PEFR.

The symptoms of chest tightness and shortness of breath were the most strongly associated with impaired QoL scores. Breathlessness is the critical link between lung disease and ensuing disability<sup>25</sup>. Objective measures of lung function with spirometry and PEFR have been found to correlate relatively poorly with disability resulting from dyspnoea and subjectively perceived impairment of health<sup>7,26</sup>. It is likely that variability between individuals in the perception of breathlessness is a more important factor than airflow limitation in determining the impact of lung disease on patients' disability. The finding that PEFR measurements did not affect the scores for most of the SF-36 domains is in keeping with this observation. Patients with near normal PEFR had significantly higher scores only for the domains physical functioning, role physical and general health. This infers that low PEFR is correlated mainly with limitation of physical activities; assessing morbidity based on PEFR measurements alone would not identify impairment in well being related to the other domains such as social functioning, role emotional and mental health. In this study, PEFR was measured and not FEV<sub>1</sub> (forced expiratory volume in 1 second) because spirometry is not commonly available in outpatient clinics and the

findings are unlikely to differ, since previous research has shown good correlation between PEFR and FEV<sub>1</sub><sup>27,28</sup>.

QoL may be affected by cultural and socio-demographic factors<sup>16,23,24,29</sup>, and in this study it was decided to control for the effects of age, sex, marital status, ethnic group, employment status and number of comorbidities. Little information is available on the differences in QoL scores between different ethnic groups, and particularly in a multi-ethnic country such as Malaysia, population studies will be needed to obtain normative data before the effects of cultural factors can be ascertained.

The findings may not be applicable to other asthmatic populations since a highly selected group of patients with mainly moderate or severe asthma were studied, whereas most asthmatics in the community suffer from mild asthma. However, there is evidence that the SF-36 performs uniformly in asthma in different situations<sup>30</sup>, and can be used to compare patients in the community with those followed-up in hospital.

In conclusion, severity of current symptoms in adult asthmatics is closely related to QoL. Consultant grade of severity of asthma and PEFR measurements do not affect QoL scores as much.

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