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The Socioeconomic Status and Quality of Life in Patients with Chronic Obstructive Pulmonary Disease

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ABSTRACT

Background: *The quality of life in patients with chronic obstructive pulmonary disease (COPD) is associated with poor pulmonary function, respiratory symptoms, incapacity to perform daily activities, as well as mental and cognitive disorders. Although there exists some evidence regarding the effect of socioeconomic status on the quality of life in the general population and those with chronic diseases, research is scarce on this issue in COPD patients. This study aimed to investigate the association between income and quality of life in COPD patients.*

Materials and Methods: *In a case-control study, 131 subjects were selected through systematic sampling from all COPD patients admitted to the pulmonology Clinic of the Baqiyatallah Hospital during the year 2006. Subjects were then divided into three groups based on their household monthly income as follows: group I (n=52), income <2,000,000 Rials; group II (n=62), income between 2,000,000 and 3,000,000 Rials; and group III (n=17), income >3,000,000 Rials. The groups were matched with regard to gender, age, educational background, marital status, comorbidity burden, and insurance coverage. Spirometric measures and quality of life (SF-36) were compared between the groups.*

Results: *The overall quality of life and physical health subscale were significantly different between the groups ($p<0.05$). Other parameters of SF-36 including physical functioning, role limitation due to physical problems, bodily pain, social functioning, general mental health, role limitation due to emotional problems, vitality, and mental health exhibited no significant difference between the groups ($p>0.05$).*

Conclusion: *Quality of life and physical function of COPD patients are significantly correlated with their socioeconomic status. Future prospective studies are needed to find potential causative associations between the level of income and life quality in these patients.* ***(Tanaffos 2007; 6(2): 38-45)***

Key words: *Chronic obstructive pulmonary disease, Quality of life, Income level, Socioeconomic status*

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INTRODUCTION

Given the high prevalence of COPD, its long duration, and costs of treatment and rehabilitation, a great social and economic burden is imposed on patients, their families and the community (1). The socioeconomic status is also a factor in COPD patients and seems to be more influential compared to other chronic diseases. As the gap between socioeconomic groups within a community widens, the need to control social and economic inequalities becomes more apparent (2).

Chronic obstructive pulmonary disease (COPD) is one of the important causes of mortality and morbidity in the world (3). It has been predicted that the social burden of COPD, in terms of work days lost due to disability, will rise in rank from 12 in the year 1990 to 5 in the year 2020 (4). In 1990, the number of deaths due to COPD (excluding asthma) in France was 21,648, twice the number of deaths due to accidents (5). From the national health point of view, COPD is a disabling and potentially fatal disease (6).

Quality of life can be used not only as a good indicator of health in COPD patients, but also as a good measure of treatment efficacy (7). Several studies have shown the decreased quality of life in COPD patients (8,9). Compared with the general population, patients suffering from severe stages of COPD go through significant reductions in their quality of life (10). Even those with milder stages of COPD do not have a satisfactory quality of life (11). This diminished life quality is a result of both physical and mental disorders, including sleep disturbances (12). In addition, the association of quality of life with pulmonary function (8,13), respiratory symptoms (14), exercise tolerance (8), ability to perform daily activities (14) and mental factors has been reported by previous authors. Alternatively, some studies have attributed the low quality of life in these patients to depression (15), cognitive disorders (16), severe hypoxia (9), and also factors such as age, social class and physiologic well-being (16).

Little data exists regarding the effects of income level on the quality of life in COPD patients. This study aimed to investigate the association between socioeconomic status and the quality of life in these subjects.

MATERIALS AND METHODS

A total of 131 subjects were selected through systematic sampling from all COPD patients admitted to the pulmonology Clinic of the Baqiyatallah Hospital between August 2006 and December 2006. The diagnosis of COPD was confirmed by a pulmonologist based on exhibiting persistent cough, sputum production and dyspnea on most days of the week for at least three consecutive months per year during the past 2 years (17) and the GOLD criteria (18). Patients with clinical diagnosis of COPD, and FEV1/FVC greater than 70% were categorized as grade 0 (18).

Study groups:

Based on their household monthly income, patients were divided into the following three groups: group I (n=52), subjects with an income <2,000,000 Rials; group II (n=62), subjects with an income between 2000000 and 3,000,000 Rials; and group III (n=17), subjects with an income >3,000,000 Rials. The groups were matched with respect to gender, age, educational level, marital status, smoking history and smoking index (defined as pack-years, estimated by multiplying the number of packs of cigarettes smoked per day by the number of years of smoking), insurance coverage, and the presence of

comorbidities (assessed by the Ifudu comorbidity index).

Main outcome measure:

Spirometric measures, including vital capacity (VC), forced expiratory volume in one second (FEV1), forced vital capacity (FVC), FEV1/FVC, peak expiratory flow (PEF), and maximal mid-expiratory flow (MMEF) were recorded, and quality of life was evaluated according to the short form – 36 (SF-36) for each patient.

SF-36 consists of 36 items which assess the quality of life in eight subscales: physical functioning, role limitation due to physical problems, bodily pain, social functioning, general mental health, role limitation due to emotional problem, and vitality. Each subscale is scored from 0 to 100, and the subscales yield a total score ranging between 0-100, with higher scores indicating better quality of life (19). Scores of physical health and mental health are also calculated (20). The value of SF-36 for the assessment of the quality of life in COPD patients has been previously documented (21), and the questionnaire has also been validated for use among the Iranian population (22).

Ifudu comorbidity index is a numerical scale which measures comorbidity in patients and has 14 components for evaluation of 14 main body systems. The systems evaluated in this scale are as follows:

1) stable angina or myocardial infarction (ischemic heart diseases), 2) other cardiovascular problems (hypertension, congestive heart failure, cardiomyopathy, and other non-ischemic diseases), 3) chronic respiratory diseases including asthma or COPD, 4) autonomic neuropathy (gastroparesis, diarrhea, cystopathy, obstipation, orthostatic hypotension), 5) other neurologic problems (including cerebrovascular accidents or brain attacks), 6) neuromuscular disorders (as well as musculoskeletal diseases), 7) infections including HIV, 8) pancreas and biliary diseases (hepatitis, hepatic disorders, pancreatic enzyme defect), 9) hematological disorders (excluding anemia), 10) low back pain, spine or joint disorders, 11) visual disorders (decreased visual acuity up to complete blindness), 12) limb amputation (from fingers to lower extremities), 13) mental or emotional illness, and 14) genitourinary diseases. Each component takes a score ranging from 0 (absence of comorbidity) to 3 (presence of severe comorbidity). Total comorbidity score would be the sum of scores gained from each of the above components, while higher scores represent greater comorbidity (23). Given that our patients had COPD, the third component of the Ifudu questionnaire was not considered for the evaluation of comorbidities. The validity and reliability of this questionnaire although not reported in our country, has been used widely in our several previous studies (not published yet) on various diseases including COPD (24). The Cronbach Alpha was 0.701 in our samples.

Statistical analyses were performed using SPSS version 13.0. Quantitative variables were defined as measures of variability and central tendency, and qualitative variables as tables of frequency. The correlations between total scores and scores of subscales of quality of life, comorbidity and monthly income were examined using the Kruskal Wallis test. P-values less than 0.05 were considered significant.

RESULTS

Subjects:

Mean (±SD) age of subjects was 58.3±11.0 yrs (range, 45-82 years). Of 131 patients, 80 (61%) were men. Among these patients, 115 (88%) were married, 8 (6%) were single, and 8 (6%) were widows or

widowers. Also, 48 (36%) subjects were illiterate, 39 (30%) had elementary education, 18 (14%) secondary education, 22 (17%) diplomas, and 4 (3%) had university education (table 1).

Mean (±SD) and range of VC predicted in patients was 83±12 (41-109), of FEV1 predicted, 77±15 (34-101), and of FVC predicted was 83±13 (43-109) (table 2).

Mean (±SD) number of comorbidities was 1.3±1.3 (range, 0-5). Of all subjects, 47 (36%) had no comorbidity, 36 (27%) had one comorbidity, and 49 (37%) two or more comorbidities. The most common comorbidities were visual disorders (39%) and non-ischemic cardiovascular diseases including hypertension (26%), and genitourinary disorders (26%), (table 3).

Table 1- Demographic characteristics and their frequency in the study groups

Variable	Sub-group	Group I, number (%)	Group II, number (%)	Group III, number (%)	p-value
Gender	Male	31 (60)	38 (62)	11 (61)	NS*
	Female	21 (40)	23 (38)	7 (39)	
Marital status	Married	45 (86)	54 (88)	16 (88)	NS
	Widowed	3 (6)	4 (7)	1 (6)	
	Single	4 (8)	3 (5)	1 (6)	
Educational level	Illiterate	19 (36)	22 (36)	7 (39)	NS
	Elementary school	15 (29)	19 (31)	5 (28)	
	Secondary school	7 (14)	8 (31)	3 (17)	
	Diploma	11 (21)	9 (15)	2 (11)	
	University	0	3 (5)	1 (6)	
Smoking index (Mean ±SD)		53.4 ± 29.6	53.7 ± 29.2	52.7 ± 30.5	NS

*NS: not significant

Table 2- Mean (±SD) spirometric measures in the study groups

Measure	Group I	Group II	Group III	p-value*
VC predicted	84±13	82±13	83±10	0.99
FEV1 predicted	77±14	76±16	78±13	0.98
FVC predicted	83±13	82±13	84±10	0.95
FEV1/FVC	93±11	93±11	93±10	0.99

*Kruskal Wallis test

VC: vital capacity; FEV1: forced expiratory volume in one second; FVC: forced vital capacity

Table 3- Frequency and percentage of comorbidities in the study groups

Comorbidity		Group I, number (%)	Group II, number (%)	Group III, number (%)
Visual problems		22 (42)	22 (36)	8 (44)
Non-ischemic heart diseases and hypertension		14 (27)	15 (25)	5 (28)
Genitourinary disorders		17 (33)	15 (25)	2 (11)
Low back pain, spine and joint disorders		8 (15)	4 (7)	2 (11)
Infections		4 (8)	3 (5)	2 (11)
Liver, pancreas and biliary diseases		6 (12)	2 (3)	0
Ischemic heart diseases		3 (6)	4 (7)	0
Neuromuscular disorders		1 (2)	0	0
Comorbidity	0	14 (27)	27 (44)	6 (33)
	1	15 (29)	15 (25)	6 (33)
	≥2	23 (34)	19 (31)	6 (33)
Total Ifudu score		1.5 ±1.3	1.1 ±1.3	1.1 ±1.0

Mean (±SD) age, in group I, was 56.7±10.4 yrs. (range 45-80 years), in group II, was 59.6±12.1 yrs. (range 45-82 years) and in group III, was 58.7±10.1 yrs. (range 45-78 years) (p>0.05).

Comparison of life quality among study groups:

Quality of life and subscales of physical health were significantly different between the study groups (p<0.05). No significant difference was found between the groups in other components of quality of life (p>0.05), (table 4).

Table 4- The correlation between income level and quality of life in the study groups

Variable	Subscale	Group I	Group II	Group III	p-value*
SF-36	Physical functioning	37.4 ±20.4	40.9 ±21.1	50.3 ±23.6	0.1
	Role limitation due to physical problems	31.1 ±14.8	35.2 ±16.0	38.6 ±18.0	0.2
	Bodily pain	32.0 ±21.1	34.2 ±21.0	29.8 ±21.1	0.7
	Social function	33.2 ±19.0	39.7 ±19.2	33.1 ±17.1	0.1
	General mental health	32.0 ±12.5	35.9 ±13.0	38.2 ±14.2	0.1
	Role limitation due to emotional problems	35.5 ±15.7	38.9 ±17.1	40.7 ±20.4	0.6
	Vitality	31.1 ±12.9	35.1 ±13.2	32.8 ±11.9	0.3
	Physical health	30.5 ±12.8	35.7 ±12.2	37.2 ±15.7	0.05**
	Mental health	28.2 ±10.1	33.3 ±11.4	31.4 ±12.3	0.1
	Total score	31.2 ±11.8	36.1 ±11.6	36.8 ±14.4	0.05**

*Kruskal Wallis test, ** Significant differences are seen between group I and II, and group I and III.

DISCUSSION

This study shows that the overall quality of life (total SF-36 score) and its physical health components are significantly associated with monthly income in COPD patients. A similar study on low income COPD subjects reported that the quality of life is considerably affected in these patients (25). In addition, a former research confirmed the link between socioeconomic status and quality of life in the general population (26).

Despite the proven association between economic status and the quality of life, the cause is still unclear. It is possible that low income limits activity, thus limiting paid work possibilities lowering income (27). However, it seems that physical health is related to socioeconomic status (27,28).

It is important to note that COPD like many other chronic conditions require a sufficient budget to provide appropriate medical services and maintain satisfactory quality of life. In COPD, it has been reported that the costs of medical services and the burden that the patients' families, the community and insurance companies endure are remarkably high (3). Direct expenses relate to the prevention, diagnosis and treatment of the disease; indirect expenses relate to the reduced functional capacity of the patient. The burden of the disease relates to the pain, trouble, and the decreased quality of life patients suffer. In COPD patients, the largest part of expenses comes from frequent emergency admissions and hospitalizations (29). One American study reported that the total per capita expenditures for Medicare beneficiaries with COPD were about two and a half times the mean of all beneficiaries (30). Also, over the past decade, the total expenditure for the treatment of COPD has been twice the amount spent on all other diseases in the United States (31).

Access to medical services may mediate between income level and quality of life (32). Also, some other factors, such as psychiatric health and family support, can mediate between socioeconomic status and quality of life. It is believed that low socioeconomic status can affect an individual's health by various mechanisms, namely, influencing lifestyle, increasing environmental stress, decreasing access to medical services, and lowering the quality of services received (33). On the other hand, one's economic status affects aspects of self-care, such as exercise status and proper nutrition (34).

It is crucial to bear in mind that the development of comorbid diseases can indeed affect the quality of life (35). Research has shown that low economic status indirectly decreases the quality of life by increasing the number of physical comorbidities (36). In this study, the groups were matched according to the number of physical comorbid conditions, which means comorbidities have not confounded the effect of low income on the quality of life. The study groups were also matched for gender, age, educational level and marital status; thus, changes seen in the quality of life could not have been caused by these factors. All of our patients were covered by a similar type of insurance; that is to say, the potential confounding effect of access to medical insurance on the quality of life was not present in our study either (37).

This study confirms previous reports stating that the socioeconomic gradient is a real problem in COPD patients and probably more evident than other chronic diseases (2). This study not only shows that socioeconomic level and quality of life are interrelated issues, but also that it supports one prior study which reported that COPD patients with the lowest socioeconomic level had a three-fold risk of re-hospitalizations compared to those with the highest (38). Low socioeconomic status has also been reported to be associated with greater mortality in COPD patients (39).

The reliability of SF-36 for evaluation of health in our subjects has been documented in previous studies (40). We need to emphasize that this study was not trying to establish a causative relationship between socioeconomic status and quality of life. It merely shows the significant association between these two variables.

CONCLUSION

The quality of life is associated with socioeconomic status in COPD patients. It is recommended that greater attention be paid to low income patients, in order to diagnose and improve the quality of life. However, future research is warranted to explore any causative relationship.

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