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Study of Quality of Life and Functional Status Among Elderly with Chronic Obstructive Pulmonary Disease

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Abstract

Background: Chronic Obstructive Pulmonary Disease (COPD) is a major public health problem and one of the well-known age-associated diseases.

Objective: To study the quality of life and functional status among elderly with COPD.

Methods: We carried out a case control study on 90 elderly patients above sixty years old who had attended Ain Shams University Hospitals, Egypt. Thirty elderly male patients diagnosed to have COPD and Thirty elderly female patients diagnosed to have COPD and Thirty healthy elderly participants (both males and females), age matched with no apparent evidence of COPD. Each patient gave an oral consent then subjected to history taking, full clinical examination, diagnosis of COPD by (GOLD, 2014) criteria, assessment of quality of life by St George's Respiratory Questionnaire (SGRQ) and Short form 36 (SF-36) and assessment of functional status using Activity of Daily Living (ADL) and Instrumental Activity of Daily Living (IADL).

Results: We found statistically significant higher frequency of COPD complications: orthopnea, cyanosis and lower limbs edema among male group in comparison to the other two groups and a higher percentage of dependency in ADL and IADL among male group in comparison to the other two groups and that all SF-36 subscales were significantly lower indicating worse Health-related quality of life (HRQOL) in male group followed by female group and less affected in control group (better HRQOL) and that all SGRQ components were significantly higher (near to 100 indicates worse HRQOL) in male group followed by female group and less affected in the control group (near to zero indicates better HRQOL) and statistically significant negative correlation between SGRQ components and Forced Expiratory Volume 1 (FEV1), indicating worse HRQOL in groups with lower mean FEV1.

Conclusion: Quality of life is significantly impaired in patients with COPD and increasing severity of COPD is associated with a significant increase in SGRQ score and significant decrease in SF36 subscales which indicate impairment in Quality of Life (QOL).

Introduction

GOLD (the Global initiative for Obstructive Lung Disease) considers COPD a major public health problem and one of the well-known age-associated diseases and believes that COPD fails to receive adequate attention from the healthcare community and government officials [1]. According to world health organization (WHO) worldwide, COPD affects 329 million people or nearly 5% of the population. In 2012, it ranked as the third-leading cause of death in the developed world. By the year 2020 it will be faster growing than lung cancer, heart disease and stroke, killing over 3 million people [2]. Health-related quality of life (HRQL) in COPD patients has received an increasing interest over the past decade. An impaired health status is a risk factor for frequent exacerbations and hospital admissions [3]. COPD is a severe and irreversible pulmonary disease that impacts the patient's general physical condition, functioning, and quality of life [4]. COPD is a main cause of severe deterioration of quality of life in elderly

subjects and that the degree of this impairment mainly depends on the severity of airway obstruction [5] The main goal of management and treatment in COPD is to improve symptoms and QOL [1]. According to the GOLD (Global Obstructive Lung Disease) guideline the goals of clinical control in patients with COPD include health-related quality of life goals (improved exercise tolerance and emotional function) and clinical goals (prevention of disease progression and minimization of symptoms) [6].

The importance of measurement of quality of life (QOL) in COPD subjects is indicated because of two important facts. The first is that no single measurement of lung function can satisfactorily summarize the various disturbances that may cause breathlessness in patients with COPD, for example, there is increasing evidence that increased functional residual capacity may cause breathlessness and exercise limitation, independently of disturbances in FEV1. The second is that the correlation between measures of airways obstruction and exercise impairment is frequently poor [7] that is why the aim of this work was to study QOL and functional status in patients with COPD.

Subjects and Methods

This was a case control study. The study was carried out at Ain Shams University Hospital in Cairo, Egypt. The study was approved by the ethical committee of Ain Shams University. The study sample comprised ninety participants aged sixty years and above. The studied sample was divided into three groups:

Group A: Thirty elderly male patients above sixty years old, diagnosed to have COPD. They were recruited from the inpatient wards and outpatient clinics of Ain Shams university hospital.

Group B: Thirty elderly female patients above sixty years old, diagnosed to have COPD. They were recruited from the inpatient wards and outpatient clinics of Ain Shams university hospital.

Group C: (control group) Thirty healthy elderly participants (both males and females), age matched with no apparent evidence of COPD after full medical history and clinical examination. They were recruited from the community.

Exclusion Criteria of Patients:

- Patients who are unwilling to participate.
- Finally, subjects in group C (control group) were excluded if their FEV1 <80%.

Each Patient Gave an Oral Consent Then Underwent the Following : Careful history taking including personal history, with stress on smoking history, environmental hazards, and COPD symptoms, Full clinical examination including general and chest examination, ST GEORGE respiratory questionnaire and Short form 36 (SF-36) for assessment of quality of life in COPD patients, assessment of functional status using Activities of daily living (ADL) [8]and Instrumental activities of daily living (IADL) [9].

Diagnosis of COPD: is based on an assessment of risk factors (e.g. smoking, environmental hazards) and symptoms (cough, sputum) and is then confirmed with spirometry (lung function testing) when FEV1>80% of predicted value [1]. According to **GOLD 2014**, there are four stages of COPD mild: >80%, moderate: 50-79, severe: 30-49, very severe: <30% or chronic respiratory failure.

St George's Respiratory Questionnaire for COPD Patients: St George's Respiratory Questionnaire(SGRQ) has 50 questions covering three areas:

- Symptoms associated with pulmonary disease (frequency and severity),
- Activities likely to be limited by dyspnoea,
- Impacts on social and psychological functioning resulting from the airway obstruction

Their sum provides a total score between zero (best) and 100 (worst). Low scores indicate a better (Heath Related Quality of Life) HRQOL [10].

Short form 36 (SF-36):

A summary of the SF-36 question topics which assess Heath Related Quality of Life.Higher scores indicate a better HRQOL; while low scores indicate worsen HRQOL [11].

Statistical Analysis

Statistical presentation and analysis of the present study was conducted, using the mean, standard error, student t- test, Chi-square, Linear Correlation Coefficient and Analysis of variance [ANOVA] tests by Statistical Package for Social Sciences (SPSS) 17. Chi-square test was to test the association between categorical variables. the hypothesis that the row and column variables are independent, without indicating strength or direction of the relationship. Pearson chi-square and likelihood-ratio chi-square. Fisher's exact test and Yates' corrected chi-square are computed for 2x2 tables. Linear Correlation coefficient was used for detection of correlation between two quantitative variables in one group. ANOVA test was used for comparison among different times in the same group in quantitative data.

Results

A case control study was conducted on 90 participants aged sixty years and above. The studied sample was divided into three groups: 30 elderly males with COPD, their mean age was 66.5± 4.2, 30 elderly females with COPD, their mean age was 63.6± 2.9 and 30 elderly controls without COPD, their mean age was 71.2 ± 7.2. There was significant higher frequency of COPD

complications: Orthopnea, cyanosis and lower limbs edema among male group in comparison to the other two groups (Table 1).

Parameters		Male		Female		Controls		Total		Chi-Square	
		N	%	N	%	N	%	N	%		
		3	10	0	0	0	0	3	3.33	X^2	P-value
Complications	R.F	12	40	6	20	0	0	18	20	52.961	<0.001*
	Corpulmonale	8	26.67	24	80	30	100	62	68.89		
	No Complication	7	23.33	0	0	0	0	7	7.78		
	R.F + corpulmonale	30	100	30	100	30	100	90	100		
	Total	30	100	30	100	0	0	60	66.67		
Hospitalizations	Positive	0	0	0	0	30	100	30	33.33	90	<0.001*
	Negative	30	100	30	100	30	100	90	100		
	Total	23	76.67	7	23.33	0	0	30	33.33		
Decubitus	Orthopnic	7	23.33	23	76.67	30	100	60	66.67	41.7	<0.001*
	Non - orthopnic	30	100	30	100	30	100	90	100		
	Total	11	36.67	1	3.33	0	0	12	13.33		
Cyanosis	Positive	19	63.33	29	96.67	30	100	78	86.67	22.483	<0.001*
	Negative	30	100	30	100	30	100	90	100		
	Total	21	70	6	20	0	0	27	30		
L.L edema	Positive	9	30	24	80	30	100	63	70	37.143	<0.001*
	Negative	30	100	30	100	30	100	90	100		
	Total										
R.F (Respiratory failure)											

Table 1: Comparison between study groups as regards COPD complications and hospitalization.

There was statistically significant higher percentage of dependency in ADL and IADL among male group in comparison to the other two groups (Table 2).

Parameters		Male		Female		Controls		Total		Chi-Square	
		N	%	N	%	N	%	N	%	X^2	P-value
ADL	Independent	16	53.33	28	93.33	30	100	74	82.22	28.663	<0.001*
	Assisted	12	40	2	6.67	0	0	14	15.56		
	Dependent	2	6.67	0	0	0	0	2	2.22		
	Total	30	100	30	100	30	100	90	100		
IADL	Independent	1	3.33	14	46.67	9	30	24	26.67	28.442	<0.001*
	Assisted	21	70	15	50	21	70	57	63.33		
	Dependent	8	26.67	1	3.33	0	0	9	10		
	Total	30	100	30	100	30	100	90	100		
ADL (Activity of Daily Living) & IADL (Instrumental Activity of Daily Living)											

Table 2: Assessment of function in the study groups using ADL and IADL.

As regard health-related quality of life of the study groups using SF 36 scale, all SF-36 subscales were significantly lower (indicates worse HRQOL) in male group followed by female group and less affected in control group (indicates better HRQOL) (Table 3).

		(SF-36)		ANOVA		Tukey's test	
		Range	Mean ± SD	F	P-value	Comp.	P-value
Emotional	**Male**	8.00-56.00	29.07±12.02	132.454	<0.001*	P1	<0.001*
well being	**Female**	20.00-56.00	45.73±10.33			P2	<0.001*
	Controls	52.00-84.00	70.53±6.68			P3	<0.001*
Social	**Male**	0.00-50.00	22.08±13.80	107.384	<0.001*	P1	<0.001*
functioning	**Female**	12.50-62.50	38.33±13.90			P2	<0.001*
	Controls	50.00-100.00	73.33±13.82			P3	<0.001*
Pain	**Male**	0.00-45.00	19.50±14.15	83.851	<0.001*	P1	<0.001*
	Female	0.00-45.00	34.50±12.86			P2	<0.001*
	Controls	45.00-100.00	68.17±17.36			P3	<0.001*
General	**Male**	0.00-30.00	9.67±9.64	172.242	<0.001*	P1	0.438
health	**Female**	0.00-30.00	12.50±10.73			P2	<0.001*
	Controls	40.00-60.00	48.00±5.51			P3	<0.001*
Physical	**Male**	0.000-35.000	16.667±9.942			P1	<0.012*
functioning	**Female**	10.000-35.000	24.167±4.749	101.941	<0.001*	P2	<0.001*
	Controls	20.000-65.000	51.333±13.126			P3	<0.001*
Limitation due to	**Male**	0.000-0.000	0.000±0.000			P1	1
Physical health	**Female**	0.000-0.000	0.000±0.000	53.218	<0.001*	P2	<0.001*
problem	**Controls**	0.000-100.000	61.667±46.300			P3	<0.001*
Limitation due to	**Male**	0.000-0.000	0.000±0.000			P1	1
emotional	**Female**	0.000-0.000	0.000±0.000	188.5	<0.001*	P2	<0.001*
problem	**Controls**	0.000-100.000	86.667±34.575			P3	<0.001*
	Male	0.000-30.000	20.500±8.545			P1	<0.001*

Energy/ fatigue	**Female**	20.000-50.000	33.167±6.757	98.146	<0.001*	P2	<0.001*
	Controls	40.000-65.000	47.833±7.273			P3	<0.001*
SF-36 (Short form 36)							

Table 3: Assessment of health-related quality of life of the study groups using SF-36 scale.

All SGRQ components were significantly higher (near to 100 indicates worse HRQOL) in male group followed by female group and less affected in control group (near to zero indicates better HRQOL) (Table 4).

		SGRQ		ANOVA		Tukey's test	
		Range	**Mean ± SD**	**F**	**P-value**	**comp.**	**P-value**
Symptoms Score	**Male**	38.400-95.000	80.173±14.532	330.444	<0.001*	P1	<0.001*
	Female	46.800-90.800	64.300±14.670			P2	<0.001*
	Controls	0.000-25.500	2.190±6.020			P3	<0.001*
Activity Score	**Male**	66.190-100.000	88.951±9.881	184.811	<0.001*	P1	<0.001*
	Female	66.190-92.510	80.648±6.412			P2	<0.001*
	Controls	29.490-59.460	50.687±7.650			P3	<0.001*
Impacts Score	**Male**	47.809-100.000	78.322±15.777	343.721	<0.001*	P1	<0.001*
	Female	38.261-91.619	67.196±12.507			P2	<0.001*
	Controls	0.000-10.620	4.598±2.871			P3	<0.001*
Total Score	**Male**	53.211-99.175	81.851±13.101	361.632	<0.001*	P1	<0.001*
	Female	52.609-89.780	70.790±9.635			P2	<0.001*
	Controls	9.292-26.513	18.812±4.185			P3	<0.001*

Table 4: Assessment of St George's Respiratory Questionnaire (SGRQ) components in the study groups.

There was statistically significant negative correlation between SF36 subscales and SGRQ components. There was statistically significant negative correlation between SF36 subscales and age while positive correlation between SGRQ components and age. We found statistically significant positive correlation between SF36 subscales and FEV1 while negative correlation between SGRQ components and FEV1. These indicate worse HRQOL in groups with lower mean FEV1 (Table 5).

	FEV1	
	R	**P-value**
Physical functioning (sf36)	0.756	<0.001*
Energy/fatigue (sf36)	0.720	<0.001*
Emotional well being (sf36)	0.651	<0.001*
Social functioning (sf36)	0.804	<0.001*
Pain (sf36)	0.810	<0.001*
General health (sf36)	0.556	<0.001*
Symptoms score (SGRQ)	-0.703	<0.001*

Activity score (SGRQ)	-0.771	<0.001*
Impacts score (SGRQ)	-0.707	<0.001*
Total score (SGRQ)	-0.772	<0.001*
Short form 36 (SF-36)St George's Respiratory Questionnaire (SGRQ)		

Table 5: Correlation between Forced Expiratory Volume 1 (FEV1) and components of SF36 and SGRQ.

There was a statistically significant low mean SF36 subscale in patients with orthopnea, cyanosis and lower limbs edema in comparison to patients without these complications (indicates worse HRQOL). There was a statistically significant high mean SGRQ component in patients with orthopnea, cyanosis and lower limbs edema in comparison to patients without these complications (indicates worse HRQOL). There was statistically significant low mean SF36 subscales among dependent subjects in ADL & IADL in comparison to the assisted and independent patients (indicates worse HRQOL) and statistically significant high mean SGRQ components among dependent subjects in ADL & IADL in comparison to the assisted and independent patients (indicates worse HRQOL).

Discussion

Health status in patients with COPD is influenced by many different factors. However, the level of influence on health status of each factor is difficult to estimate because of the many different questionnaires used and because some factors influence different parts or domains of the available questionnairesthe aim of this work was to study QOL and functional status in patients with COPD. This work was carried out on 90 elderly: 60 elderly patients with COPD diagnosed according to GOLD 2014 and 30 age matched controls.

In the present study, COPD complications were statistically significant higher among male group as shown in (Table 1) and COPD severity was more prominent in males asregard statistically significant lower mean FEV1 in male group then female group in comparison to control group, also in this study, male function was more impaired when assessed by ADL and IADL as shown in (Table 2). And there was decrease in QOL among male group more than other groups, when QOL was assessed by SF36 and SGRQ as show in (Table 3, 4).

Our findings were in contrast to that of Skumlien et al., 2006 [12] who found no gender differences in pulmonary function (% of predicted) and SGRQ. Activity scores were only different for men and women for items concerning home management where women had changed their functional performance the most, particularly for the heaviest chores [12,13] found no significant differences in QOL with regards to gender.

The current study confirmed the relationship between age and the overall QOL in patients with COPD, with a decline in the QOL being associated with an older age, as regard SF36 and SGRQ scores, this agrees with many previous studies [14,15]. Some studies confirmed that QOL of COPD patients is affected by age e.g. Stahl et al., 2005 [13] found that the COPD patients' QOL deteriorates with disease severity and age, while another researches by Engstrom et al, 2001; Ketelaars et al, 1997 [16,17] found out that there was no relationship between the QOL and age.

Our results showed impairment in QOL as regard SF36 and SGRQ components in patients with dyspnea, orthopnea, cyanosis and lower limbs edema (as signs of complication). Moreover, other studies have found respiratory symptoms and signs to be more closely related to QOL than impairment in FEV1. This could indicate that QOL is impacted more by symptoms, signs and complications than the actual airway narrowing that FEV1 measures [18,19].

Aspects of daily life are most affected, either due to the severity of the disease or the existence of social, economic, or occupational factors that could interfere with the management of the disease or complicate its progression which would impair QOL [20].This was found clearly in our study as we found statistically significant low mean SF36 subscales among dependent subjects in ADL and IADL assessment and high mean SGRQ components among dependent subjects in ADL and IADL assessment, that reflects QOL impairment as assessed by SF36 and SGRQ in our study.

According to our findings there was a significant relationship between FEV1% predicted and FVC% predicted and the QOL of COPD patients as regard SF36 and SGRQ in (Table 5). Wijnhoven et al., 2001[21]found a weak relationship between pulmonary function and the QOL measurements, on the contrary Stahl et al., 2005[13] found a strong relationship between FEV1% predicted and the QOL in COPD patients. Another study conducted by McGlone and colleagues 2006 [22] found that there was a significant relationship between physical activity, disease severity which was assessed by spirometry and QOL of COPD patients

Although spirometry is traditionally seen as the most important determinator of the diagnosis and severity of COPD, the relation between health status and all spirometric values mainly

FEV1 is weak. This indicates that assessment of COPD severity in clinical practice could benefit from the additional measurement of health status [23].

Thus evaluation of COPD patients should not be based only on pulmonary function tests, but also on measurement of QOL. Psychological assessment and psychiatric consultation are important for improving COPD symptoms, QOL and for early detection and treatment of superimposed psychiatric symptoms that could worsen COPD condition and seriously affect QOL.

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