(e) ISSN Online: 2321-9599

(p) ISSN Print: 2348-6805

Original Article

Evaluating the chronic obstructive pulmonary disease and assess its relation to the disease severity to other factors with impairment degree of the health-related Quality Of Life (HRQOL)- An Observational Study

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ABSTRACT

Background and objectives: COPD (Chronic obstructive pulmonary disease) affects structural and functional domains of the lung with great impact with additively involving and presenting the extra-pulmonary effects which in turn, have an impact on the overall well-being of the affected subjects

Aims: The present study was conducted to assess the health-related quality of life in subjects with Chronic obstructive pulmonary disease and assess the relation of the disease severity to other factors with impairment degree of the health-related quality of life (HRQOL).

Methods: The present cross-sectional study included 102 subjects with COPD from both genders and ages of more than 45 years where disease severity was assessed using the GOLD (Global Initiative for Obstructive Lung Disease) system. PFT (Pulmonary function) was done following the guidelines by the American Thoracic Society and European Respiratory Society task force standardized lung function testing, whereas, the quality of life was assessed using SGRQ (St. George's Respiratory Questionnaire) concerning its COPD-specific version. Total scores of SGRQ were compared for different parameters including COPD grades, gender, and age. The collected data were subjected to statistical evaluation.

Results: p-values for impact component scores were 0.06, <0.001, and <0.001 for COPD grades 2, 3, and 4 respectively. Activity component scores had respective p-values of 0.342, 0.09, and <0.001 for COPD Grades 2, 3, and 4. For symptom component scores, the p-values for COPD grades 2, 3, and 4 were 0.03, <0.001, and <0.001. It was seen that significance was seen for impact and symptom component scores in COPD grades 3 and 4, and activity component score for grade 4

Conclusions: The present study concludes that in COPD subjects, health-related quality of life is impaired and it further decreases with an increase in the disease severity. Also, the younger the age of COPD onset, the more significant deterioration of HRQOL is seen owing to the early presentation of complications and symptoms. This focus is on the early detection and management of COPD with a special focus on pulmonary rehabilitation programs.

Keywords: COPD, HRQOL, GOLD classification, pulmonary disease, St. George's Respiratory Questionnaire.

Received: 13-05-2013 **Accepted: 24-05-2013**

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This article may be cited as: Kulkarni SS. Evaluating the chronic obstructive pulmonary disease and assess its relation to the disease severity to other factors with impairment degree of the health-related Quality Of Life (HRQOL)- An Observational Study. J Adv Med Dent Scie Res 2013;1(1):179-183.

INTRODUCTION

COPD (Chronic obstructive pulmonary disease) is characterized by limitation in airflow which is progressive and has increased inflammatory response to noxious gases or particles in the lungs and airways as described by GOLD (Global Initiative for Obstructive Lung Disease). COPD is considered a common treatable and preventable disease in humans. COPD contributes to one of the most common and leading causes of non-communicable global mortality. However, it is a major chronic respiratory disease that is also preventable COPD is also associated with high mortality rates in Indian subjects. COPD poses a high burden on the health care sector globally as well as in India with nearly 210 million people having COPD globally. It is expected to become the third leading cause of mortality by 2030 owing to the expected increase in death by 30% due to COPD in the coming 10 years.[1]

Along with high mortality rates associated with COPD, it is also associated with high morbidity across the globe. There is an increased burden of chronic respiratory diseases in India with approximately 32% of subjects with COPD from the global population are residing in India based on global DALYs (disability-adjusted life years). There is a large increase in subjects with COPD In India from 28 million to 55 million from 1990 to 2016 which is an alarming situation. The DALYs everyday score per COPD subject was seen nearly 1.7% more in India than on global platform in the comparable socioeconomic background as assessed in 2016 in nearly all Indian

states. The common etiologic factors associated with COPD in India are occupational exposure, tobacco use, and air pollution.[2]

Assessing the social, physical, and mental aspects of COPD is important to improve the quality of life in the affected subjects. HRQOL (Health-related quality of life) is an important parameter differing from survival or physiological measures and comprise of domains related to the social, emotional, mental, and physical aspects. An extensive and widely used instrument for assessing HRQOL in subjects having respiratory diseases is SGRQ (St. George's Respiratory Questionnaire). SGRQ-C (St. George's Respiratory Questionnaire Classification) is a short and modified version of SGRQ originated from the original version which was developed to measure health effects in subjects with COPD.[3]

Based on the high health care burden of COPD in countries having middle and low incomes including India, the disease severity can adversely affect the quality of life in COPD subjects.[4] Hence, the present study was conducted to assess the health-related quality of life in subjects with Chronic obstructive pulmonary disease and assess the relation of the disease severity to other factors with impairment degree of the health-related quality of life (HRQOL).

MATERIAL & METHODS

The present study was conducted to assess the health-related quality of life in subjects with Chronic obstructive pulmonary disease and assess the relation of the disease severity to other factors with impairment degree of the health-related quality of life (HRQOL). The study was conducted at Department of TB & Chest, Chhatrapati Shivaji Maharaj Hospital and Rajiv Gandhi Medical College, Kalwa, Thane, Maharashtra from January 2011 to January 2012. The study population was comprised of the subjects visiting the Department of Pulmonary Medicine of the Institute. After explaining the detailed study design, informed consent was taken from all the subjects in both written and verbal form.

The study included a total of 102 subjects from both the genders of age 45 years or more having COPD (Chronic Obstructive Pulmonary Disease) as assessed with the GOLD criteria. The exclusion criteria for the study were subjects having myopathies, diabetes, asthma, tuberculosis, or other lung diseases were excluded from the study. The disease severity was assessed using a GOLD staging system depending on airflow limitation and obstruction degree. A pulmonary function test was used to assess the airflow limitation following the guidelines by the American Thoracic Society and European Respiratory Society task force standardized lung function testing. SGRQ was used to assess the quality of life in the study subjects which included 50 items that were disease specific measuring perceived well-being, daily life, and overall health in subjects with obstructive diseases of the airway. SGRQ comprises of the two parts where part 1 includes covering symptoms of severity and frequency, whereas, part 2 covers impact components like psychologic disturbances and social functioning along with coverage of activities caused and limited by the breathlessness developing from diseases of the airway. The SGRQ scores are from 0-100 with more limitations in subjects with higher scores.

The SGRQ and HRQOL were given to all subjects with the Hindi translation to the study subjects. Their reliability and accuracy have been established in the various previous literature studies by various authors. The translation was given in local language understood to subjects.

The collected data were subjected to the statistical evaluation using SPSS software version 21 (Chicago, IL, USA) and one-way ANOVA and t-test for results formulation. The data were expressed in percentage and number, and mean and standard deviation. The level of significance was kept at $p<0.05$.

RESULTS

The present cross-sectional study was conducted to assess the health-related quality of life in subjects with Chronic obstructive pulmonary disease and assess the relation of the disease severity to other factors with impairment degree of the health-related quality of life (HRQOL). The study included a total of 102 subjects from both the genders of age 45 years or more having COPD (Chronic Obstructive Pulmonary Disease) as assessed with the GOLD criteria. The demographic characteristics of the study subjects are listed in Table 1. The mean age of the study subjects was 58.62±6.48 years with the age range of 45-80 years. The majority of the study subjects were within the age range of 66-75 years with 56.86% (n=58) subjects followed by ≥76 years with 25.49% (n=26) subjects, 11.76% (n=12) subjects from 56-65 years, and least in 45-55 years with 5.88% (n=6) subjects. There were 85.29% (n=87) males and 14.70% (n=15) females in the present study. Grade 1, 2, 3, and 4 COPD was seen in 20.58% (n=21), 40.19% (n=41), 21.56% (n=22) and 17.64% (n=18) subjects respectively (Table1).

On assessing various component scores based on various parameters, it was seen that in 45-55 years impact, activity, and symptom component scores were 35.3±12.3, 46.6±18.9, and 42.3±10.7 respectively, for 56-65 years, these scores respectively were 24.8±11.2, 36.3±16.7, and 48.9±15.3, for 66-75 years they were 42.9±17.2, 48.3±16.2, and 56.2±21.5 respectively and for the age of 76 years or more, these scores were 59.5±17.2, 66.2±16.3, and 73.5±20.8 respectively. These values for all the scores in all age groups were statistically significant with $p<0.001$. For gender, in males, impact, activity, and symptom component scores were 43.6±18.7, 49.6±17.7, and 58.8±21.2 respectively, whereas, these respective scores in females were 46.8±22.2, 59.9±20.4, and 56.8±25.2. These were non-significant for all components with respective p-values of 0.576, 0.05, and 0.762. For

COPD grades 1, 2, 3, and 4 impact component scores were 28.7±12.2, 36.2±14.0, 52.3±16.7, 65.3±12.7, and respectively, activity component scores were 41.1±12.7, 45.2±15.9, 53.4±19.1, and 69.1±14.5respectively, and symptom activity scores were 41.4±14.9, 51.7±16.3, 65.1±19.9, and 81.7±16.6 respectively. These scores were statistically significant for all COPD grades and all components with p<0.001 (Table 2).

For assessing the significance of various component scores for different COPD grades, it was seen that p-values for impact component scores were 0.06, <0.001, and <0.001 for COPD grades 2, 3, and 4 respectively. Activity component scores had respective p-values of 0.342, 0.09, and <0.001 for COPD Grades 2, 3, and 4. For symptom component scores, the p-values for COPD grades 2, 3, and 4 were 0.03, <0.001, and <0.001. It was seen that significance was seen for impact and symptom component scores in COPD grades 3 and 4, and activity component scores for grade 4 as shown in Table 3.

S. No	COPD Grades	Impact component score (p)	Activity component score (p)	Symptom component score (p)	Total scores (p)
1.	**1**				**-**
2.	**2**	0.06	0.342	0.02	0.03
3.	**3**	<0.001	0.09	<0.001	<0.001
4.	**4**	<0.001	<0.001	<0.001	<0.001
5.	**R^2 (%)**	48.3	30.3	40.5	53

S. No	Characteristics	Percentage (%)	Number (n)
1.	**Mean age (years)**	58.62±6.48	
2.	**Age range (years)**		
a)	45-55	5.88	6
b)	56-65	11.76	12
c)	66-75	56.86	58
d)	≥76	25.49	26
3.	**Gender**		
a)	Males	85.29	87
b)	Females	14.70	15
4.	**COPD Grade**		
a)	1	20.58	21
b)	2	40.19	41
c)	3	21.56	22
d)	4	17.64	18
e)	Total	100	102

Table 1: Demographic characteristics of the study subjects

S. No	Characteristics	Number %(n)	Impact component score	Activity component score	Symptom component score	Total scores
1.	**Age range (years)**					
i.	45-55	6	35.3±12.3	46.6±18.9	42.3±10.7	39.7±10.5
ii.	56-65	12	24.8±11.2	36.3±16.7	48.9±15.3	32.3±10.7
iii.	66-75	58	42.9±17.2	48.3±16.2	56.2±21.5	46.7±14.5
iv.	≥76	26	59.5±17.2	66.2±16.3	73.5±20.8	63.6±15.4
v.	p-value		<0.001	<0.001	<0.001	<0.001
2.	**Gender**					
i.	Males	87	43.6±18.7	49.6±17.7	58.8±21.2	47.7±16.5
ii.	Females	15	46.8±22.2	59.9±20.4	56.8±25.2	52.2±19.6
iii.	p-value		0.576	0.05	0.762	0.376
3.	**COPD Grade**					
i.	1	21	28.7±12.2	41.1±12.7	41.4±14.9	34.7±7.8
ii.	2	41	36.2±14.0	45.2±15.9	51.7±16.3	41.7±11.9
iii.	3	22	52.3±16.7	53.4±19.1	65.1±19.9	54.9±15.4
iv.	4	18	65.3±12.7	69.1±14.5	81.7±16.6	69.4±11.6
v.	Total	102	43.6±19.0	50.6±18.4	58.2±21.6	48.3±16.9
vi.	p-value		<0.001	<0.001	<0.001	<0.001

Table 2: SGRQ questionnaire scores of various components based on various parameters in the study subjects

S. No	COPD Grades	Impact component score (p)	Activity component score (p)	Symptom component score (p)	Total scores (p)
6.	**1**				**-**
7.	**2**	0.06	0.342	0.02	0.03
8.	**3**	<0.001	0.09	<0.001	<0.001
9.	**4**	<0.001	<0.001	<0.001	<0.001
10.	**R^2 (%)**	48.3	30.3	40.5	53

Table 3: Assessment of various component scores and SGRQ in the study subjects

DISCUSSION

The present cross-sectional study was conducted to assess the health-related quality of life in subjects with Chronic obstructive pulmonary disease and assess the relation of the disease severity to other factors with impairment degree of the health-related quality of life (HRQOL). The study included a total of 102 subjects from both the genders of age 45 years or more having COPD (Chronic Obstructive Pulmonary Disease) as assessed with the GOLD criteria. The mean age of the study subjects was 58.62±6.48 years with the age range of 45-80 years. The majority of the study subjects were within the age range of 66-75 years with 56.86% (n=58) subjects followed by ≥76 years with 25.49% (n=26) subjects, 11.76% (n=12) subjects from 56-65 years, and least in 45-55 years with 5.88% (n=6) subjects. There were 85.29% (n=87) males and 14.70% (n=15) females in the present study. Grade 1, 2, 3, and 4 COPD was seen in 20.58% (n=21), 40.19% (n=41), 21.56% (n=22) and 17.64% (n=18) subjects respectively. These demographics were comparable to the studies of J. Izquierdo et al[5] in 2009 and E. Staihl et al[6] in 2005 where authors assessed COPD subjects with similar demographics as in the present study.

Concerning various component scores based on various parameters, it was seen that in 45-55 years impact, activity, and symptom component scores were 35.3±12.3, 46.6±18.9, and 42.3±10.7 respectively, for 56-65 years, these scores were 24.8±11.2, 36.3±16.7, and 48.9±15.3 respectively, for 66-75 years they were 42.9±17.2, 48.3±16.2, and 56.2±21.5 respectively and for the age of 76 years or more, these scores were 59.5±17.2, 66.2±16.3, and 73.5±20.8 respectively. These values for all the scores in all age groups were statistically significant with p<0.001. For gender, in males, impact, activity, and symptom component scores were 43.6±18.7, 49.6±17.7, and 58.8±21.2 respectively, whereas, these respective scores in females were 46.8±22.2, 59.9±20.4, and 56.8±25.2. These were non-significant for all components with respective p-values of 0.576, 0.05, and 0.762. For COPD grades 1, 2, 3, and 4 impact component scores were 28.7±12.2, 36.2±14.0, 52.3±16.7, 65.3±12.7, and respectively, activity component scores were 41.1±12.7, 45.2±15.9, 53.4±19.1, and 69.1±14.5respectively, and symptom activity scores were 41.4±14.9, 51.7±16.3, 65.1±19.9, and 81.7±16.6 respectively. These scores were statistically significant for all COPD grades and all components with p<0.001. These results were comparable to the studies of P. Carrasco Garrido et al[7] in 2006 and C. Mark et al[8] in 2011 where severity components related to various parameters as in the present study.

For the significance of various component scores for different COPD grades, it was seen that p-values for impact component scores were 0.06, <0.001, and <0.001 for COPD grades 2, 3, and 4 respectively. Activity component scores had respective p-values of 0.342, 0.09, and <0.001 for COPD Grades 2, 3, and 4. For symptom component scores, the p-values for COPD grades 2, 3, and 4 were 0.03, <0.001, and <0.001. It was seen that significance was seen for impact and symptom component scores in COPD grades 3 and 4, and activity component scores for grade 4. These findings were in agreement with the findings of J. Miravitlles et al[9] in 2007 and Heijdra[10] in 2002 where significance levels as of the present study were reported by the authors.

CONCLUSION

Within its limitations, the present study concludes that in COPD subjects, health-related quality of life is impaired and it further decreases with an increase in the disease severity. Also, the younger the age of COPD onset, the more significant deterioration of HRQOL is seen owing to the early presentation of complications and symptoms. This focus is on the early detection and management of COPD with a special focus on pulmonary rehabilitation programs. However, the present study had a few limitations including a small sample size, short monitoring period, and geographical area biases. Hence, more longitudinal studies with a larger sample size and longer monitoring period will help reach a definitive conclusion.

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