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**Chaitanya Deshpande**  
BPT Student, Cardio-Respiratory Physiotherapy.  
Dr. A.P.J. Abdul Kalam  
College of Physiotherapy,  
Maharashtra, India

**Dr. Aashirwad Ajit Mahajan**  
Assistant Professor, Cardio-Respiratory Physiotherapy.  
Dr. A.P.J. Abdul Kalam  
College of Physiotherapy,  
Maharashtra, India

**Correspondence**

**Dr. Aashirwad Ajit Mahajan**  
Assistant Professor, Cardio-Respiratory Physiotherapy.  
Dr. A.P.J. Abdul Kalam  
College of Physiotherapy,  
Maharashtra, India

## Assessment of sleep quality in COPD patients

**Chaitanya Deshpande and Dr. Aashirwad Ajit Mahajan**

### Abstract

**Background:** The study purpose was to assess the sleep quality in COPD patients using PSQI scale.

**Methodology:** Pittsburgh sleep quality index (PSQI) is a 19-item questionnaire which was provided to the samples physically. The samples were asked to answer the questionnaire using a 3 point Likert scale.

**Results:** The mean value of sleep duration, sleep latency and sleep efficiency were calculated.

**Conclusion:** In normal person sleep duration is generally 7 to 9 hours. But in COPD patients sleep duration on average in COPD patient is 5 hours.

**Keywords:** PSQI, sleep, COPD

### 1. Introduction

COPD results into thickening of the airways resulting into increased production of the mucus resulting into increased secretions and thus affecting the respiratory rate. Breathlessness is one of the common symptoms of COPD. Due to the breathlessness, patient suffers tremendously as the sleep pattern of patient gets affected. Quality of sleep is also a major determinant of health-related quality of life (HRQOL) in COPD and their daytime of symptoms<sup>[1]</sup>. With the respiratory system getting affected in COPD, sleep is also one of the major part which gets affected in patients<sup>[2]</sup>

In COPD patients, dyspnea is associated with both fatigue and sleep difficulty<sup>[3]</sup>. Sleep quality plays major role in health-related quality of life in COPD and their daytime of symptoms<sup>[4]</sup>.

There are many tools for measuring sleep quality. Pittsburgh sleep quality index (PSQI) is one of the reliable and valid measure to assess the quality of sleep in COPD patient. Its good reliability and validity could be shown for patients with psychiatric and sleep disorders<sup>[5]</sup>.

Pittsburgh Sleep Quality Index (PSQI) is a 19-item self-rating scale designed to measure the quality of sleep during the previous month using seven components of sleep i.e., sleep quality, sleep latency, sleep duration, sleep efficiency and sleep disturbance, use of sleep medications and daytime dysfunction<sup>[6]</sup>. Sleep disorders are common in patients with chronic obstructive pulmonary disease (COPD) and are associated with greater disease severity, more frequent exacerbations, greater use of emergency health care, and higher mortality<sup>[7]</sup>.

Sleep usually have several unwanted consequences in patients with COPD. These sleep-related modifications in the respiratory system do not induce adverse effects in healthy subjects, but may cause problems in patients with chronic obstructive pulmonary disease (COPD)<sup>[8]</sup>.

In the Sleep Health Heart Study (SHHS), co-occurrence of COPD and obstructive sleep apnea in the same individual appeared to have implications for sleep quality and nocturnal oxygenation<sup>[9]</sup>.

### 2. Materials and Method

Patients aged 40-70 were selected for the present study. Both male and female were included in the study. Participants were excluded from the study if he/she has breathlessness grading more than grade 3. The protocol was approved from the ethical committee. Informed consent was obtained from the participants.

**2.1 Inclusion criteria**

- Patients affected with COPD.
- Age group 40 to 70.
- Both male and female.
- Patients admitted in IPD of PIMS Ioni.
- Breathlessness grading upto 2.(A.T.S.)
- COPD severity GOLD 2 moderate:  $50\% \leq FEV1 < 80\%$  predicted.

**2.2 Exclusion criteria**

- Patients with breathlessness grading more than 3.
- Patients with oxygen saturation level less than 80%

- Patients with age more than 70
- Patients with age less than 40
- Patients admitted in ICU & CCU.

**3. Statistical analysis**

The objective of the study is to assess the sleep quality in COPD patients with the help of Pittsburgh Sleep Quality Index (PSQI). The statistical analysis was done using Microsoft Excel. Various statistical measures such as mean, standard deviation (S.D.) used to analyzing the data. Sampling of the data recorded from the COPD patients by PSQI scale is as below.

**Table 1:** Sampling Data of Pittsburgh Sleep Quality Index

Sr. No	C1	C2	C3	C4	C5	C6	C7	PSQI Score
1	2	3	1	0	1	0	3	10
2	0	3	0	0	2	0	0	7
3	3	3	0	0	1	3	3	13
4	1	3	2	0	1	0	0	7
5	1	3	1	0	1	0	0	6
6	2	3	1	0	1	0	1	8
7	2	3	0	0	2	0	0	7
8	2	3	0	0	2	0	2	9
9	1	3	1	0	1	0	2	8
10	1	3	1	0	1	0	1	7
11	2	3	1	0	1	0	1	8
12	2	3	2	1	1	0	2	11
13	2	3	2	1	1	0	2	11
14	2	3	1	2	1	1	1	11
15	2	3	2	1	1	0	2	11
	1.666666667	3	1	0.333333	1.2	0.266666667	1.333333	8.933333

Mean: - 8.933333 SD: - 2.086236

**4. Result****Table No 1**

In table no 1 sleep duration of 15 COPD affected patients was assessed. Their sleeping time and the time at which they woke up were assessed. While their sleep duration was considered for calculations, late night disturbances were also considered. Average sleep duration is: - 4.9 hours.

**Table No. 2**

In table no 2 sleep latency of 15 COPD affected patients was assessed. Time at which patient went to bed and time at which patient actually slept was calculated. (In minutes). But in our study COPD affected patients the latency period was 60 to 90 minutes. Average latency period is: - 80(in minutes)

**Table 2:** Sleep Latency

Sr. No	Time at which patient goes to bed	The time patient actually slept	Sleep latency (In minutes.)
1	11:30PM	1:00AM	150
2	11:00PM	12:00AM	60
3	10:00PM	12:00AM	120
4	11:00PM	12:30AM	90
5	10:30PM	11:30PM	60
6	10PM	10:30PM	30
7	11PM	12:00AM	60
8	8PM	10:30PM	150
9	11PM	12:30AM	90
10	10:30PM	11:00PM	30
11	11PM	12:30AM	90
12	12PM	1:00AM	60
13	11:30PM	1:00AM	90
14	10PM	11:00PM	60
15	12:30AM	1:30AM	80
			S.D.:- 37.03280399
			Average:- 80 min.

Table No. 3

In table no 3 sleep efficiency of 15 COPD affected patients was assessed. Patients hours of sleep/ total hours in bed  $\times$  100. Sleep efficiency was calculated in percentage. Average sleep efficiency is:-75.03%

**Table 3:** Sleep Efficiency

Sr. no.	Hours of sleep	Total hours in bed	Sleep efficiency
1	4	5.5	72.72
2	6	7	85.71
3	5	6	83.33
4	4	7	57.14
5	6	7.5	80
6	5	6	83.33
7	6	7	85.71
8	6	8	75
9	5	7	71.42
10	4	6	66.66
11	5	7	71.42
12	3	6	50
13	4	5	80
14	5	7	71.42
15	5.5	6	91.66
			Average:75.03466667
			SD: 11.18962011

## 5. Discussion

The present study was undertaken to assess the sleep quality in COPD patients. Age group for the study is elderly people i.e., people with age group 40-70. Normally in people with age group 40-70 have normal sleeping time upto 7 to 9 hours [10]. The COPD has previously been associated with daytime sleepiness and poor quality of sleep [11]. It directly affects the sleeping quality of the patient. Sleep disturbance is one of the most common symptoms reported by COPD patients, occurring in, and 40% of patients in one large study [12]. In addition, several studies have shown that sleep quality is worse in people with COPD compared to healthy individuals [13]. However, the physiological hypoventilation normally present during sleep is accentuated, resulting in profound hypoxaemia in patients with respiratory insufficiencies such as COPD [14]. The presence of COPD symptoms, such as dyspnea, cough, sputum or wheezing, is associated with arousals and difficulty with maintenance of sleep, decreased total sleep time and sleep efficiency have been confirmed in sleep studies [15].

One of the Pathological consequences of COPD is stretching of the diaphragm due to lung hyperinflation, which may reduce the efficiency of diaphragmatic contraction, thus necessitating an increased accessory muscle contribution to breathing [16]. It has been claimed that sleep disorders is the third determinant of quality of life in patients with COPD, after dyspnea and tiredness [17]. GERD (gastroesophageal reflux) may also influence sleep quality which could potentially contribute to some of the sleep complaints reported by persons with COPD [18]. COPD patients were found to suffer from shorter total sleep time (TST) and diminished sleep efficiency compared to healthy subjects [19].

## 6. Conclusion

In COPD, patients subjective sleep quality gets affected due to the factors like smoking or air pollution. In normal individuals average sleep time is 7 to 9 hours in age group

40-70. The age group in the inclusion criteria of this project is also 40-70. So by assessment of PSQI scale in 15 COPD affected patients we can conclude that sleep duration is decreased as compared to the normal individuals. Sleep duration on average is 4.9 i.e., 5 hours. Also sleep latency and sleep efficiency is decreased as compared to the sleep time in normal individuals.

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