ORIGINAL ARTICLE

Obstructive Sleep Apnea: a review of thirty patients at Fatima Memorial Hospital

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ABSTRACT

Aim: Obstructive sleep apnea is a significant and an emerging problem affecting the quality of life of a patient and also imposing a threat to health of the sufferer.
Study design: Observational, **c**ross-sectional study and a **p**ilot study
Setting: carried out at the polysomnography laboratory (sleep laboratory) of Neurology department at Fatima Memorial Hospital, Lahore.
Results: Among those thirty patients 19 patients were males and 11 were females. The age range of patients was between 20 and 70 years of age. Majority of the patients belonged to ages of 40 to 50 years. The weight range of patients was between 80 to 170 kilograms. The maximum number of patients belonged in the weight range of 100 to 120 kgs. The height of most of the patients was around five feet and six inches. The mean body mass index was 42 and the mean neck circumference was 17.4 inches. Similarly the mean waist circumference was 104.72 cm. Epworth Sleeping Scale of these thirty patients was abnormal ranging between a minimum of 19 to a maximum of 24*.*
Key words: Sleep apnea,hypoapnea, snoring, and polysomnography.

INTRODUCTION

Obstructive sleep apnea (OSA) is a potentially life threatening condition associated with a number of metabolic neurocognitive and cardiovascular complications. OSA is considered to be a part of the spectrum of sleep related breathing disorders and is characterized by the occurrence of repeated partial or complete upper airway obstruction episodes resulting in desaturation and micro awakenings[1].OSA is considered to be the major contributor to mortality and morbidity of the subjects in developed countries. However its impact in developing countries is now only being appreciated[2]. As it has been a disorder with a major impact on human body if not identified timely, there has always been a need to have sleep disorder centers to diagnose and manage such patients. It is unfortunate to state that Pakistan with a population of about 200 million, there are only a few polysomnography laboratories, which are mainly concentrated in Karachi and Lahore.

MATERIAL AND METHODS

A total of thirty patients were included in the study according to the predesigned inclusion and exclusion criteria. Patients above 18 years of age with a body mass index of 30 kg/m^2 or more having Epworth sleeping scale ≥10 were included in the study. Patients on sedatives and corticosteroids, with an established diagnosis of major diseases pertaining to cardiovascular, neurological and metabolic disorders, difficulty to lie supine, sleeping time of less than three hours per night, lack of REM stage sleep, pregnant and patients with Narcolepsy and cataplexy were excluded from the study.

Those patients meeting the inclusion criteria had the sleep study done in the sleep laboratory of Fatima Memorial Hospital. The sleep laboratory was set up in year 2009. The study was conducted in a supervised setting by well-trained technicians using the Medex machine model MEA-07 (24). The polysomnography was conducted between 10 pm to 7 am. Both baseline and follow up studies were done. After taking the history and examination, EEG electrodes and airflow channel were attached. EMG electrodes were also attached for muscle tone assessment. Thoracoabdominal movements were recorded by attaching transducer belts. Pulse oximetry, blood pressure and ECG were also monitored. Gross body movements were notified by the supervisor in his notes. Snoring was recorded by special sensors and body position was also recorded. There was also facility to record grave events like cardiac arrhythmias and oxygen desaturations. An overnight polysomnographic evaluation was performed according to internationally approved methods. During test period, a full night sleep video recording facility was also available, and the test was terminated after patient woke up in the morning. Data was collected in computerized polysomnography

system and scoring was performed manually, according to the current internationally approved criteria. Staging criteria was defined by Rechtschaffen and Kales[3]. The respiratory events were scored according to the American Academy of Sleep Medicine criteria[4]. Hypoapnea was defined as a >50 % decrease in airflow that persisted for at least 10 seconds, and was accompanied by a decrease of >3% in oxygen saturation or by EEG recorded arousal. The apnea /hypoapnea index (AHI) was defined as the number of apneic and hypoapneic events that occurred per hour of sleep. The AHI was scored as follows: AHI ≥ 5 events /hour and labeled as obstructive sleep apnea syndrome. The apneas last for 10 seconds and are associated with a decrease in blood oxygenation. Combining apneas and hypoapneas gives an overall sleep apnea severity score which evaluates both sleep disruptions and degree of oxygen desaturation. The AHI is calculated by dividing the number of events by the number of hours of sleep[5].

RESULTS

The total number of patients enrolled in the study was 30 out of which 19 were males and 11 were females. The patients who were included in the study had the complaint of snoring as their chief complaint. All patients who were included in the study had hypertension. Out of 30 patients, 17 were non-diabetics and the remaining 13 patients were already diagnosed with diabetes. Among the female patients, 5 out of 11 (45.5%) had diabetes and among the male patients 8 out of 19 (42.1%) carried a diagnosis of diabetes. Two patients were known epileptics and were already on anti- epileptic medication. Eight patients had history of ischemic heart disease.
Symptoms suggestive of depression were found in 7 out of 11 females (63.6%) and 16 out of 19 males (84.2%). The age range of the patients was 26 to 62 years. Most of the patients fell in the age range of 40-55. Mean age of females was 46.3 and that of the males was 43.4 years. The body mass index of all the patients was above the normal range. The neck and waist circumference was also above the normal range for the given height and age of the patients.

The mean neck circumference of female and male patients was 16.59 inches and 17.95 inches respectively. Mean weight of female and male patients was 107.35kgs and 120.68kgs respectively. Mean height was 5 feet and 3 inches for the females and 5 feet and 5 inches for the male patients. Mean body mass index of female patients was 41.36 kg/m^2 and was 43.47 kg/m^2 for the male patients. The maximum waist circumference was 103cm and 105cm among females and males respectively.

Gender

	Frequency	%	Valid %	Cumulative %
Female	11	36.7	36.7	36.7
Male	19	63.3	63.3	100

		Female	Male	Total
Snoring Index	Mean	109.55	105.47	106.97
	St. Deviation	67.89	62.97	63.67
	Minimum	12.00	6.00	6.00
	Maximum	241.00	241.00	241.00
AHI	Mean	42.54	38.03	39.69
	St. Deviation	18.47	21.85	20.47
	Minimum	6.00	5.67	5.67
	Maximum	76.00	80.00	80.00
Sleep Deficiency	Mean	79.73	78.79	79.13
	St. Deviation	13.74	10.11	11.35
	Minimum	50.00	63.00	50.00
	Maximum	93.00	93.00	93.00
Low 02 during sleep	Mean	82.27	81.42	81.73
	St. Deviation	8.83	6.73	7.43
	Minimum	60.00	69.00	60.00
	Maximum	90.00	93.00	93.00
Low 02 in REM	Mean	82.82	81.53	82.00
	St. Deviation	8.72	7.11	7.61
	Minimum	61.00	71.00	61.00
	Maximum	90.00	93.00	93.00
Low 02 in NREM	Mean	82.64	81.58	81.97
	St. Deviation	8.58	6.48	7.19
	Minimum	61.00	70.00	61.00
	Maximum	90.00	93.00	93.00
Total Epworth Score of 24 hours	Mean	22.27	22.58	22.47
	St. Deviation	1.85	1.71	1.74
	Minimum	19.00	19.00	19.00
	Maximum	24.00	24.00	24.00

A complete history was obtained and a complete physical examination was performed including neurological, cardiopulmonary, ear nose and throat evaluation. ECG and tests for thyroid, liver and kidneys were done and were in the normal range in all subjects. Different stages of NREM and REM sleep were recorded as a percentage of the total sleep time. The AHI ranged from 6-76 in females and 5.67 to 80 in males. Sleep efficiency was similar in both the sexes. The minimum oxygen desaturation was also similar in both the males and the females. The Epworth Sleepiness Scale was abnormal in all of our patients with a minimum score of 19 and a maximum score of 24, in both males and females.

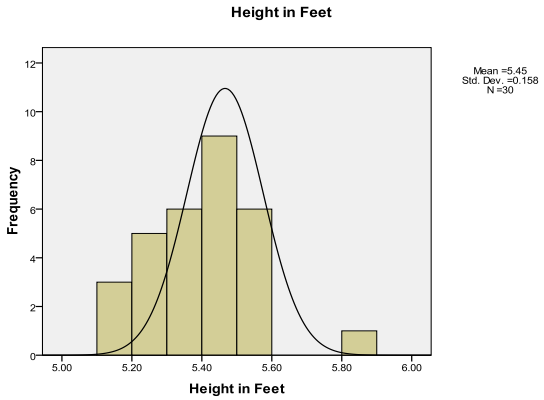
	Female				Male			
	Mean	**S.D**	**Min**	**Max**	**Mean**	**S.D**	**Min**	**Max**
Age	46.3	10.2	36.0	62.0	43.4	10.5	24.0	58.0
Weight in Kg	107.35	10.76	93.00	120.00	120.68	19.77	86.00	170.00
Height in Feet	5.34	.10	5.20	5.50	5.51	.15	5.11	5.90
BMI	41.36	3.64	36.00	47.00	43.47	7.52	30.00	60.00
Neck circumference	16.59	.63	16.00	17.50	17.95	1.12	16.00	19.50
systolic bp	148.09	18.39	121.00	179.00	158.63	12.91	134.00	180.00
Diastolic BP	98.64	3.93	90.00	105.00	100.74	5.62	90.00	112.00
Waist Circumference	103.00	3.63	98.00	109.00	105.72	5.87	99.00	119.00

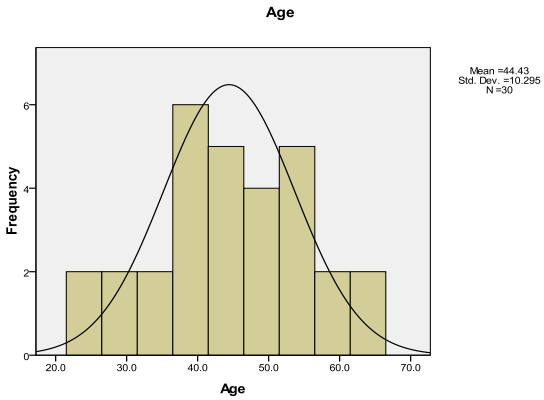
Descriptive Statistics

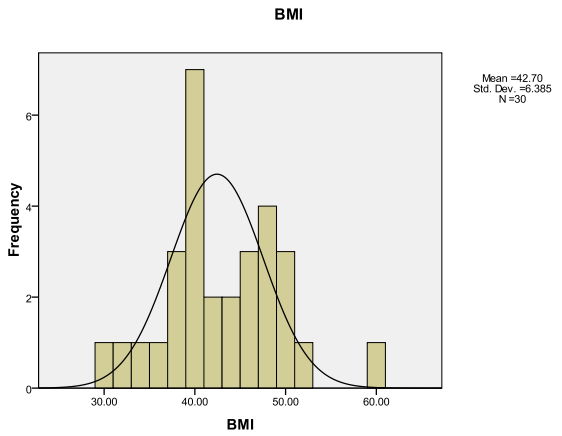
	N		Mean	Std. Deviation	Minimum	Maximum
	Valid	Missing				
Snoring Index	30	0	106.9667	63.67400	6.00	241.00
Stage 1 %	30	0	17.4957	10.71409	5.00	45.00
Stage 2 %	30	0	63.8130	13.21596	22.64	75.00
Stage 3 & 4	30	0	13.5943	5.22140	4.00	38.46
REM	30	0	5.2300	3.87054	1.00	16.40
AHI	30	0	39.6857	20.46820	5.67	80.00
Sleep Eficiency	30	0	79.1333	11.34638	50.00	93.00
Low 02 during sleep	30	0	81.7333	7.42750	60.00	93.00
Low 02 in REM	30	0	82.0000	7.61124	61.00	93.00
Low 02 in NREM	30	0	81.9667	7.19427	61.00	93.00
Total Epworth Score of 24 hours	30	0	22.4667	1.73669	19.00	24.00

Descriptive Statistics

	N		Mean	Std. Deviation	Minimum	Maximum
	Valid	Missing				
Age	30	0	44.433	10.2946	24.0	62.0
Weight in Kg	30	0	115.7967	18.03251	86.00	170.00
Height in Feet	30	0	5.4470	.15842	5.11	5.90
BMI	30	0	42.7000	6.38506	30.00	60.00
NECK (CIRCUMFERENCE(inches)	30	0	17.4500	1.16227	16.00	19.50
Systolic BP(mmHg)	30	0	154.7667	15.71005	121.00	180.00
Diastolic BP(mmHg)	30	0	99.9667	5.09552	90.00	112.00
Waist Circumference(centimeter)	30	0	104.7233	5.26129	98.00	119.00






BMI
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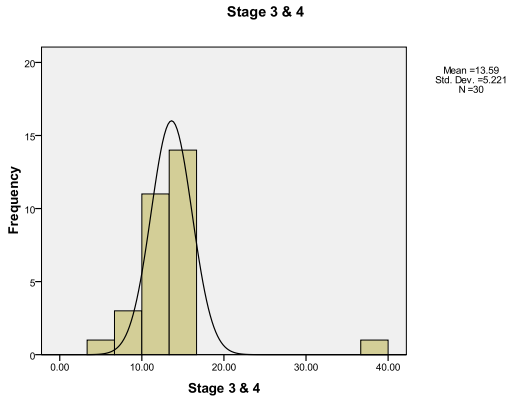
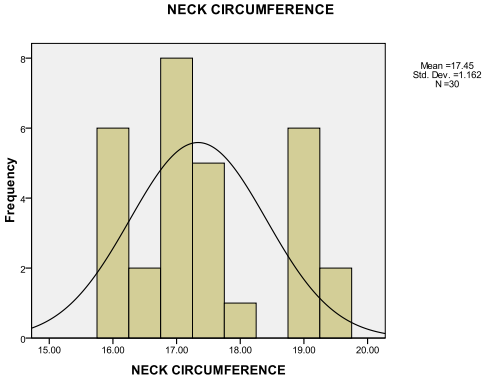
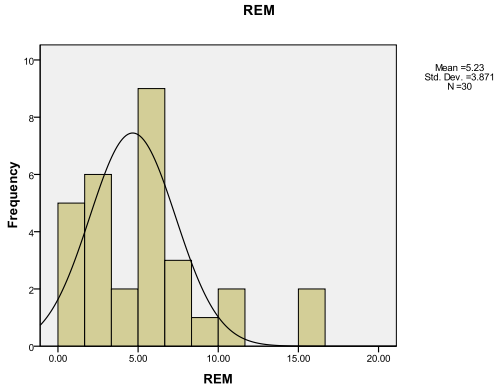
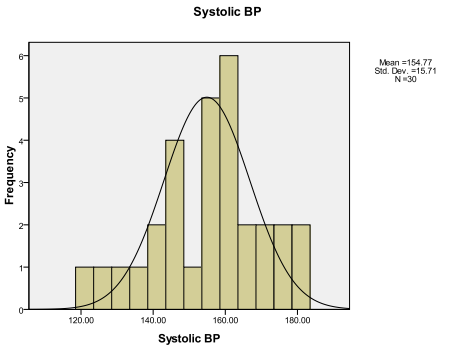
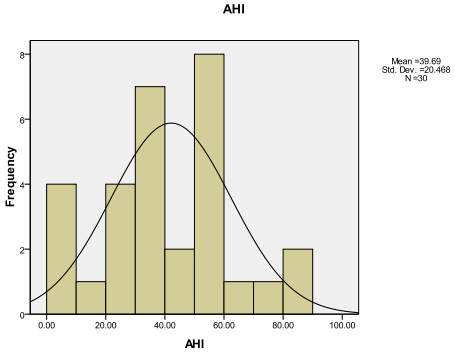
Std. Dev. =6.385
N =30
Frequency
BMI

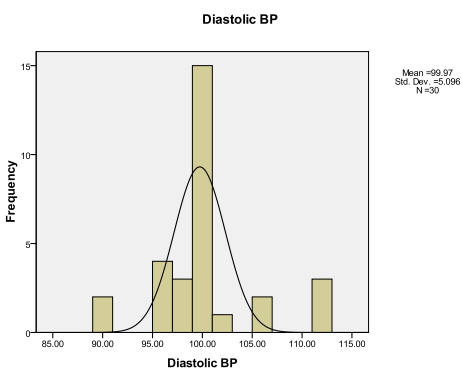

Stage 3 & 4
Mean =13.59
Std. Dev. =5.221
N =30
Frequency
Stage 3 & 4

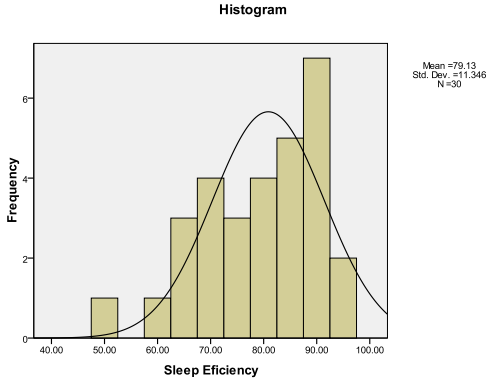

NECK CIRCUMFERENCE
Mean =17.45
Std. Dev. =1.162
N =30
Frequency
NECK CIRCUMFERENCE

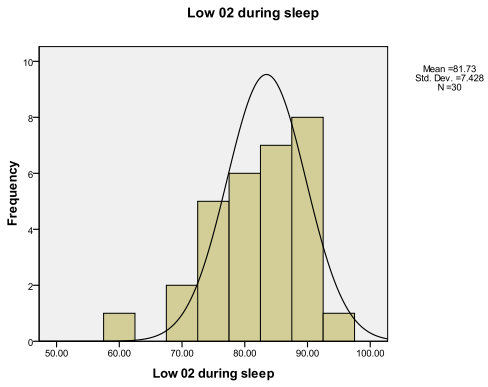

REM
Mean =5.23
Std. Dev. =3.871
N =30
Frequency
REM

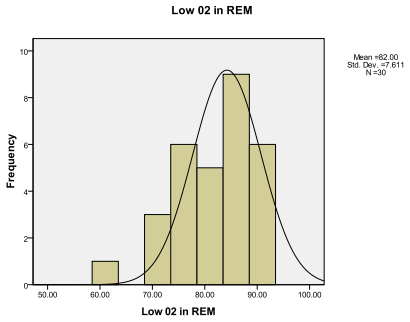

Systolic BP
Mean =154.77
Std. Dev. =15.71
N =30
Frequency
Systolic BP

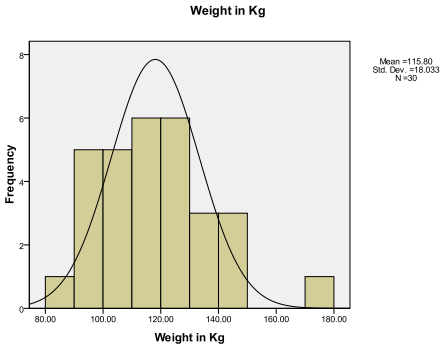

AHI
Mean =39.69
Std. Dev. =20.468
N =30
Frequency
AHI

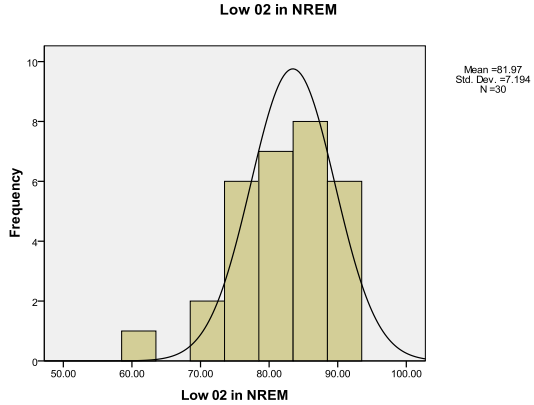

Diastolic BP
Mean =99.97
Std. Dev. =5.096
N =30
Frequency
Diastolic BP

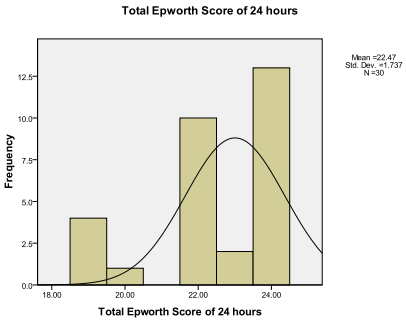

Histogram
Mean =79.13
Std. Dev. =11.346
N =30
Frequency
Sleep Eficiency











DISCUSSION

Sleep is a naturally recurring state characterized by reduced or absent consciousness, relatively suspended sensory activity and inactivity of nearly all the voluntary muscles. Sleep is divided into two broad types: rapid eye movement (REM) and non rapid eye movement sleep (NREM)[6].

Obstructive sleep apnea is defined as repetitive pauses in breathing during sleep typically lasting for 20 to 40 seconds.[7] Symptoms may be present for years before being identified. It can affect all age groups and typically overweight to obese individuals, however, slender individuals are also affected. Structural and non structural factors both contribute towards its etiology. OSA can also be transient following upper airway infection.

The prevalence of obstructive sleep apnea was found to be 9% in women and 24% in men in a community based study in the United ***States.[8]This*** prevalence estimate is similar to findings from other countries. It is estimated that 93% of females and 82% of males with OSA are under diagnosed***.***

On the other hand prevalence of OSAS in subjects attending the outpatients was found to be higher. In a multicenter study done across the United States and Europe, more than one third of the subjects presenting to the primary care physician***s*** had high pretest probability for OSA[9]. Although there is a lack of data on prevalence in subjects presenting to a tertiary care center, it may be reasonable to assume it to be the same or even higher. Nevertheless, many patients with OSAS may not have typical symptoms and such patients may escape attention. US population reports 52-54% of snoring symptoms[10].

The OSAS prevalence data from Asia is scarce, however, it is reported that prevalence ranges from 2.1 to 7.5% with a male to female ratio of 2:1. In India it is reported to be 7.5%[11]. The studies from Pakistan are lacking. Studies done on the Pakistani population investigating the prevalence of OSAS and its impact on our part of the world are lacking. A study done by Haqqee et al showed a high

prevalence of snoring (46%), frequency of snoring with apnea was reported to be 7%, snoring with apnea and excessive daytime sleepiness was 3%[12].

In an another study conducted at Agha Khan University Hospital, Taj et al report that significant proportion of population is at risk for OSAS, unfortunately most physicians are unaware of the clinical spectrum of OSAS with only 18% treating sleep disturbances with sedatives only. A total of 418 patients were included in this study and 24.9% reported snoring with males snoring twice as much as females. The highest proportion 47.6% of high risk individuals was found in age above 60 years however the overall prevalence was 10%[13].

Frequency of snoring and symptoms of sleep apnea among Pakistani medical students was studied by Sara N. Pasha by a survey done at Shifa College of Medicine, Islamabad. A total of 111 subjects were included in the survey and the frequency of snoring was found to be 27% in males and 12% in females[14].

A survey conducted in Canada in 2009 reports that 3.4 % of Canadian adults were diagnosed as sleep apnea and an additional 23.4 % were at high risk for OSA.[15]

CONCLUSION

Results show that snoring and obstructive sleep apnea are not uncommon and are more prevalent in males. The symptoms of sleep apnea need to be recognized early by the primary care physicians and also the general population needs to be educated about the symptoms of sleep apnea, so that they can seek help for early diagnosis and treatment of this common problem.

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(Note: This article has been reproduced because of some gross mistakes)