

“The Syndrome of Sleep Apnea in the elderly suffering from COPD and live in the county of Attica”.

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ABSTRACT

Introduction: Chronic obstructive pulmonary disease and obstructive sleep apnea syndrome are two diseases often coexist in one person. The sleep apnea is often caused by an interruption of breathing during sleep due to obstruction of the upper airway during inhalation, causing the sufferer chronic snoring, morning headaches, increased body weight, blood pressure and sleepiness during the day.

Aim: The purpose of this study is the identification of the problem among the elderly people living in the Attica Basin.

Materials and Methods: Material of the study were 500 people, including 274 men and 226 women. The data collection took place by using an anonymous questionnaire specialized in identifying patients with apnea, after a personal interview with the researcher. The processing and imaging carried out, using the statistical package SPSS 17.

Results: The men who took part in the survey have a precedence over women, 54.8% versus 45.2%. Based on their responses to the questionnaires, it was found that 98.0% of the participants have abnormal sleepiness during the day. The 35.4% of them show no apnea, while 36.0% of the sample has sleep apnea but in normal levels. It is important though, the fact that about 1 out of 3 seniors, 28.6%, shows sleep apnea in a high risk level.

Conclusions: COPD is a complex disease that occurs in a large proportion of the elderly. Emphasis should be given on early diagnosis and treatment of sleep apnea syndrome, in order to improve the quality of life of the elderly.

Key Words: COPD, Obstructive Sleep Apnea, Daily Sleepiness.

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Introduction:

Chronic Obstructive Pulmonary Disease is a group of diseases, including chronic bronchitis and pulmonary emphysema, having as a common feature the blockage of the airways of the lung, thus reducing significantly the flow of air at the end and trapping the air inside. The obstruction initially causes decline in lung function, leading to decreased breathing, especially after severe fatigue. Moreover, daily living of elderly is often disturbed by exacerbations of the disease, caused by frequent pulmonary infections (Kontaxakis and Hristodoulou, 2000; Sahini-Kardasi and Panou, 1997).

The main characteristic of COPD is a progressive airway obstruction, however the term COPD often refers to a separate group of diseases concerning their pathophysiology, which share common causes, such as smoking and air pollution, leading to a common result of obstruction. The obstruction in COPD is irreversible, but some patients have a low degree of reversibility after administration of bronchodilators and cortisone drugs, that is why often appear common characteristics with chronic asthma, where airway obstruction may be improved (Ohri and Steiner, 2004; Pauwels et. al. 2001; Nazir and Erbland 2009).

The elderly consist a vulnerable age group, with many special features and needs. Several times, the elderly suffering from Chronic Obstructive Pulmonary Disease appear complications in breathing, during sleep, that characterize sleep apnea syndrome. Apnea is defined as the cessation of breathing, of the air flow, in a sleeping person, at least for 10 seconds, causing electrocerebral "awakening" and drop of the saturation of hemoglobin in oxygen (Koutsourelakis and Vagiakis, 2008). If the cessation of airflow is accompanied by lack of respiratory movements in the chest and abdomen, and there is no aspiratory effort, then the apnea is characterized as central, where, on the contrary, if there is respiratory activity in the chest or both, and the inhalation effort is growing during apnea, then it is characterized as obstructive (American Academy of Sleep Medicine Force, 1999).

The term sleep apnea is usually laboratory, in contrast with the term Sleep Apnea Syndrome, which, in addition to apnea, requires the appearance of clinical symptoms. To show the clinical manifestations of the syndrome usually are required more than 15 apneas per one hour of sleep, and vary depending on the chronic status, the number and severity of apneas. At the beginning, the clinical symptoms appearing to patients with COPD are of low gravity or absent, during time, as COPD progresses, apneas increase, leading to more symptoms, of acute gravity (American Thoracic Society, 1994).

The main clinical symptoms of the Syndrome of Obstructive Sleep Apnea are (Koutsourelakis and Vagiakis, 2008; Younget al., 1993):

- **Sleepiness during the day:** It is the most important and troublesome symptom seen in an elderly patient

with COPD. Often patients complain that they have not slept for several hours and that they fall asleep during daily activities. This is because the nocturnal sleep is disturbed and interrupted by apneas. People who have an increased level of daytime sleepiness should be advised to avoid driving, in order to prevent accidents (Farsin et al., 2003).

- **Snoring:** It is a sound generated during sleep by the vibration of the walls of the pharynx and soft palate. The vibration is caused due to the difficulty of access to air through a clogged throat. Along with sleepiness are the main symptoms of the syndrome and the type of snoring can help in diagnosis, since the instability in frequency and intensity, suggest the presence of the Syndrome of Obstructive Sleep Apnea (American Thoracic Society, 1989).
- **Obesity:** The Syndrome occurs more often in people with increased body weight, causing increased fat tissue in the neck.
- **Night frequent urination:** It forces sufferers to cease their sleep and occasionally to have involuntary loss of urine. This is due to release of natriuretic factor from the dilatation of the sinuses and to a pressure of the urinary bladder, caused by increased abdominal pressure during obstructive apnea.
- **Night sweats:** Are often due to restless sleep and the intense respiratory efforts during sleep.
- **Morning headaches, irritability and memory decline:** Patients awake with a feeling of dizziness, headaches and dry mouth. In more severe cases, there is a reduction in memory, concentration and observation. Trying to overcome the drowsiness and the sense of inferiority because of the symptoms, usually leads to depressive symptoms and stress disorders.
- **Decreased Sexual Activity:** Men often face sexual problems due to loss of libido and sense of helplessness.

The diagnosis of obstructive sleep apnea syndrome takes place by studying the elderly patients in a special workshop during sleep, while recording parameters of sleep and respiratory function (Bear and Priest, 1980). For the staging of sleep, EEG is recorded, along with the movements of the eyes, with an electrocardiogram, the movements of chest and abdominal wall, the airflow in the nose and mouth, the saturation of hemoglobin and the body's position during sleep. Other methods that help assess the functioning of the position and the degree of airway obstruction during sleep are the imaging methods of computing and MRI, fluoroscopy, and ultrasound (Boraz et al., 1979). The only non-imaging method, but also the only one that directly assess the functional competence in multiple sites of upper airways, is the measurement of the differential pressure across the palate until the rinofarynx (Chaban et al., 1988; Onen and Onen, 2010).

In order to choose the appropriate way of management, the

severity of the clinical picture, the study's findings in sleep centers, as well as patients' severity of COPD must be taken into account (Jelic, 2010). The treatment of sleep apnea syndrome targets to the increase of the diameter of pharynx's lumen during sleep. These remedies may be generic, non-intrusive, and in many difficult cases, surgical. These include (Zamarron, 2008):

- Reduce of body weight, because obesity is an aggravating factor in the obstruction of the upper airway, during sleep.
- Avoid alcohol consumption by patients with COPD and Syndrome of Obstructive Sleep Apnea, especially before bedtime.
- Education of the patient to take sides rather than supine position during sleep.
- Continuous Positive Airway Pressure (CPAP): It consists the continuous provision of positive air pressure in the upper airway through the nose, by a special device. The result is to prevent the collapse and therefore a narrow. The CPAP device is causing the operation of the entire airway, using pressure bigger than atmospheric pressure, so that at no stage and point becomes negative, creating thus a respiratory "splint" that keeps upper airway open
- Nasopharyngeal Tube: It can help directly, simply and safely, cheaply and effectively all patients, bypassing the airway obstruction during sleep.
- Surgical interventions often take place is permanent tracheostomy, and surgery of the nose, jaws and throat, aiming at the opening the upper airway.

Quality of life is an important factor of assessing recovery in patients suffering from Chronic Obstructive Pulmonary Disease and appear Obstructive Sleep Apnea Syndrome. The recovery can take place either in specialized medical units, whose primary purpose is addressing the problem, such as sleep centers, or through properly designed programs implemented at home by a group of health professionals, whose main concern is the location, recording and dealing with the problem, along with applying appropriate techniques, teaching the patients and their carers, with a view to active participation in the selection and application of therapeutic approach.

Material and Methods:

Material in this study were 500 individuals (274 men and 226 women), chosen from the Open Centers for The Elderly, existing inside the municipalities of the county Attica. Data collection was based on the rules of random sampling, by completing a specialized anonymous questionnaire, with a personal interview with the investigator, and after having clearly explained the purpose and objectives of the investigation.

During the investigation, spirometry was carried out by using a portable spirometer, MIR SPIROBANK, while the parameters examined were FEV1, FEVC, and particularly the relation FEV1/FEVC, under which was also the classification of the disease. To investigate the occurrence of apnea in people suffering from COPD were also used, specialized and standardized questionnaires, such as the Berlin Questionnaire and Epworth Sleepiness Scale.

For presenting the qualitative-categorical variables, frequency tables and pie charts were used, while for the display of continuous-numerical variables, used descriptive statistics (mean, standard deviation, median, etc.). Furthermore, contingency tables were used for the relationship between categorical variables, using Fishers' exact test (for tables 2x2) and Person's Chi square test (for all other dimensions of contingency tables), as appropriate.

Data processing, along with statistic analysis and visualization was done by using the statistical package SPSS 17.

Results:

Table 1 Distribution of Sex

	Sex	
	N	%
Men	274	54.8%
Women	226	45.2%
Total	500	100.0%

From Table 1 it is shown that men of the sample have as light advantage over women, 54.80% versus 45.20%.

Table 2 Classification of the COPD, regarding the Sex, by using GOLD sca

		Classification of COPD (GOLD)									Total		
		MILD			MODERATE			SEVERE			N	Row %	Col %
Sex		N	Row %	Col %	N	Row %	Col %	N	Row %	Col %			
	Men	46	16.8	37.4	221	80.7	61.0	7	2.6	46.7	274	100.0	54.8
	Woman	77	34.1	62.6	141	62.4	39.0	8	3.5	53.3	226	100.0	45.2
Total	123	24.6	100.0	362	72.4	100.0	15	3.0	100.0	500	100.0	100.0	

According to table 2, a statistically significant difference in the stratification of mild COPD between the sexes is observed, with women greater men, 62.6% versus 37.4%. The opposite is shown in the case when older people suffer from moderate COPD, where men have higher rates, 61% versus 39% of women. There is no statistically significant difference between the sexes in terms of severe COPD.

Table 1 Level of Daily Sleepiness using Epworth Sleepiness Scale

	Sleepiness	
	N	%
Normal	490	98.0
High Risk	10	2.0
Total	500	100.0

Almost all elderly people of the sample, 98.0%, exhibit nosleepiness during the day.

Table 4 Investigation of Apnea using Berlin Questionnaire

	Apnea	
	N	%
No apnea	177	35.4
Low risk	180	36.0
High Risk	143	28.6
Total	500	100.0

Table 5 Providing Home Care to the Elderly Suffering from COPD and Apnea

Home Care		
	N	%
I did receive home care for my disease and it quite helped	52	10.40%
I did receive home care for my disease and it helped my very much	56	11.20%
I didn't receive home care but I think it would help me with my health problem	332	66.40%
I didn't receive home care but I think it wouldn't help me with my health problem	60	12.00%
Total	500	100.00%

According to Table 5, a large proportion of the respondents, 66.4%, stated that they have not received home care in order to confront their disease, but they believe that such an option would help to manage their health problem, while, 12.0 % believe that even the home care cannot alleviate symptoms resulting from health problems. On the other hand, 21.6% of participants received home help, and found that they were helped in a satisfactory level.

Table 6 Classification of COPD (GOLD) in correlation with the appearance of Apnea

		Classification of COPD (GOLD)									Total		
		MILD			MODERATE			SEVERE			N	Row %	Col %
		N	Row %	Col %	N	Row %	Col %	N	Row %	Col %			
Apnea	No apnea	48	27.1	39.0	126	71.2	34.8	3	1.7	20.0	177	100.0	35.4
	Low Risk	40	22.2	32.5	129	71.7	35.6	11	6.1	73.3	180	100.0	36.0
	High Risk	35	24.5	28.5	107	74.8	29.6	1	.7	6.7	143	100.0	28.6

By comparing the possibility of apnea and the classification of COPD, there was no statistically significant difference between different forms of COPD. The only exception was the existence of severe COPD among elderly people who have low risk of apnea.

Table 7 Daily Sleepiness by Sex

		Sex						Total		
		Men			Women			N	Row %	Col %
		N	Row %	Col %	N	Row %	Col %			
Sleepiness	Normal Sleepiness	273	55.7	99.6	217	44.3	96.0	490	100.0	98.0
	High Risk Sleepiness	1	10.0	0.4	9	90.0	4.0	10	100.0	2.0
Total		274	54.8	100.0	226	45.2	100.0	500	100.0	100.0

As it is shown from the table above, there is no statistically significant difference between the two sexes, both in normal as well as in high-risk sleepiness the elderly appearing during the day.

Table 8 Appearance of Apnea by Sex

		Sex					Total			
		Men			Women		N	Row %	Col %	
	N	Row %	Col %	N	Row %	Col %				
Apnea	No Apnea	77	43.5%	28.1%	100	56.5%	44.2%	177	100.0%	35.4%
	Low Risk	109	60.6%	39.8%	71	39.4%	31.4%	180	100.0%	36.0%
	High Risk	88	61.5%	32.1%	55	38.5%	24.3%	143	100.0%	28.6%
Total	274	54.8%	100.0%	226	45.2%	100.0%	500	100.0%	100.0%	

From table 8, regarding who are a thighter risk for apnea, it is observed that men are more likely to face such situation, than women

According to Berlin Questionnaire, which was used on whether the population sample showing apnea, 28.6% of the elderly appear a dangerous level of apnea for their health, 36.0% a lower risk of apnea, and 35.4% noapnea at all.

Discussion-Conclusions:

As shown in this study, individuals in our sample consist avulnerableagegroupwithsignificanthealthproblemsandwithdif ficultiesintheir daily lives, preventing them from having a quality living.

Regarding the sample of the survey, no significant statistical difference between the two sexes is observed, 54.8% men versus 45.2% women. One possible interpretation is that women develop, through time, a higher life expectancy than men, following the general trend around the world. According to a report published by G.S.V.E.E., in Greece, in 2003, life expectancy stood at 76.5 years for males and 81.3 years for females (G.S.V.E.E. 2008).

According to the results obtained from Table 2, regarding the stratification of COPD in relation with the gender of participants, it is shown that women suffer from COPD more frequently than men, 53.3% versus 46.7%, and even more often suffer from mild COPD, 62.6% versus 37.4%, while men appear more often symptoms of moderate COPD, 61.0% versus 39% respectively. There is no any statistically significant difference concerning severe COPD.

In a similar survey, conducted in Beijing by Zhou YM, Wang C. et al. and published in 2009, among 9.434 elderly people, coming from 7 provinces of China, it was found that 30% of the sample were patients diagnosed with COPD, while from the total sample, at a rate of 12.8% COPD was diagnosed in men, with only 5.4% in women (Zhou et al. 2009).

From an other survey, held in Poland from Nizankowska-Mogilnicka E et al., in 2007, it is shown that among 603 elderly people, 22.1% suffered from COPD, with 10.9% of them suffering from COPD of moderateto severe type (Nizankowska-Mogilnicka 2007). The disease

occurredd more frequently in malesmokers,34%versus22% in women.

From these studies above, it is shown that gender plays an important role in the occurrence of COPD, and along with smoking, exposure to in appropriate weather conditions and age, a configuration hatleads to a large extentontheexistenceofCOPD in thee lderly.

From the information gathered and assessed, it is observed that the vast majority of the sample does not show the main symptom for the existence of sleep apnea, as daytime sleepiness, at a rate of 98% (Table 3) . This does not mean that they don't appear sleep apnea, as 36.0% of older people have sleep apnea of low risk to their health, 28.6% of them appear apnea of high risk to their health, while one out of three seniors do not suffer at all from sleep apnea, 35.4% (Table 4). There is no statistically significant difference between the existence of sleep apnea among the various forms of COPD, except the occurrence of severe COPD in people with low risk of apnea (Bixler et al. ,1998).

From 2 similar surveys carried out by E. Bixler et al, in 1998 and 2001, in Pennsylvania, it was found that among 1741 adults, aged up to 99 years of age, obstructive sleep apnea syndrome occurs at a rate of 24.0% among men and 9.0% among women (Bixler 2001).

Another study conducted by Duran J. et al, in 2001, in Spain, showed that at a sample of 400 elderly people, with a maximum age limit of 70 years, sleep apnea syndrome occurs at a rate of 26.0% among men, while the rate for women is 28.0% (Durán, et al. 2001).

According to what has been previously been reported, it is easily seen that there is not a limiting factor in the occurrence of apnea between the two genders. The obstructive sleep apnea syndrome may occur with the same frequency in both men and women in old age, and occurs more frequently in people who suffer from COPD and other obstructive airway diseases.

Regarding the rehabilitation and participation in a program of home care (Table 5), the majority of the sample, 66.4%, stated that they do not take part in a specialized program, but they do believe a program

like this would help considerably, with only 21.6% of the respondents, participating in a program and have already seen positive changes in their health problems. It is striking though, that 12.0% of the elderly state that neither participate in a rehabilitation program, nor they think that a specialized program would help the relief of their disease's symptoms.

In a similar survey conducted by Maltais F. et al., in Canada and published in 2005, it was found that among 240 elderly patients who were divided into two groups (a group participating in a home care rehabilitation program and a group following inpatient rehabilitation), after three months of intervention, imports in hospitals and emergency departments were decreased significantly to those who had followed the home care program (Maltais, 2005). Also, these people appeared to be more happy with the choice of such a program of managing their health problem.

Similar are the results of another investigation that took place in Australia, by Boxall AM et al., in 2005, among 60 persons aged 60 years old and more. In particular, the elderly people who consisted the survey sample attended a specialized home assistance program, lasting 12 weeks, which included specific exercises and education of patients and their carers, on issues related to COPD and apnea syndrome. The result of the project was the improvement of patients resistance to the treatment of painful symptoms, as well as their satisfaction, while being informed of the status of their health problems (Boxall et al. 2005).

All the above indicate how important is not only for elderly patients, but also for their attendants and carers, the existence of specialized programs, competent of dealing with their disease, either on an in-patient level of intervention, or through a program of home monitoring and care (Bowns et al., 1991; Hinohara, 1979).

Suggestions:

In conclusion, it is understood that as the number of the elderly people, and their proportion to the general population increases, it is important to understand the changes that must be made in order to support their efforts to integrate into society. Furthermore, most of them want to deal with their daily problems by their own, but also having the necessary support by the state (Forbes et al., 1991; Murphy, 2006; Lang, 2001).

An important step is the creation of additional social support structures and monitoring of the elderly, in order to detect, prevent and confront their daily problems (Tsentelierou, 2005). Furthermore, it is important and that they are being given the opportunity to feel the presence of someone who has the knowledge, the skills and the mood to listen to their experiences, problems and vicissitudes of daily life (Chaikovskaia and Vialyk, 2000; Basta et al., 2007). Such structures

are the centers of sleep, in which takes place the diagnosis of sleep apnea syndrome, rehabilitation centers for patients with COPD, Open Care Centers for the Elderly, along with and specialized pulmonary rehabilitation home care programs, very important for people with disabilities or who have not access to primary health care services (Cantor and Little, 1985).

Imperative, however, is considered the staffing of these special social support structures with sufficient health professionals, who will have the appropriate knowledge and skills, in order to be able to plan, organize and implement strategies of approaching older people, aiming to emotional rehabilitation and social reintegration (Chappell, 2000). Another significant duty of the group of health professionals, who will staff these structures, is the teaching of educational techniques in elderly patients and their carers, in order to ensure continued care even after removal of the group, and a better quality life (Sissouras et al., 2002).

It is also important the social policy of the state to move in new directions. In particular, imperative must be the participation volunteers, others than health professionals, in social support networks (Penning, 2000). These people will be able to offer their services after attending special training promoting health programs, which will take place within the community and aiming to the awareness and change of attitudes toward the diverse needs of elderly people. These programs must be put into practice by specially trained individuals such as community nurses, social workers and other health professionals, with expertise in the technical understanding of the dynamics and functioning of family and social environment of the elderly (Okun, 1993).

Since aging is directly related to physical illness, and loss of independence and self-care, entering the group of the elderly is an important area of studying the current health system (Kumari, 2001). Living conditions, social and emotional status of the elderly and their participation in society, are issues that should be studied further, and so future studies are needed, as the main purpose is not only to add extra years in the life of older people, but also quality of life in their remaining years.

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