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Research Article

The Impact of Dietery Intervention on the Symptoms of Sleep Apneea and Stress Intake in Patients with Chronic Pulmonary Diseases

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Abstract

The growing prevalence of Sleep Apnea Syndrome (SAS) and obesity world wide is becoming a big burden on the medical systems all arround the globe, increasing the costs of public health services and also incresing the mortality of this patients. The correlation between this two diseases and stress levels is well established and we wanted to see if by creating a dietary plan to reduce weigh wil have beneficial effects on SAS symptoms and stress levels as well. We designed an observational study in which we evaluated patients initially and after the nutritional intervention. The results showed that by dietary inetrevention only we can achieve possitive effects on life quality, reduction of SAS symptoms, increasing respiratory functional parameters, reducing stres levels and also reducing mortality in the end.

Keywords: Dietary intervention; Obesity; Stress; Sleep Apnea Syndrome

Intoroduction

Sleep apneea syndrome (SAS) prevalence has beeng growing at an alert rate in the past years mainly due to the rising of obesity rates arround the world. In a recent meta-analysis, almost one billion persons between 30 and 69 years old are suffering from a form of sleep apneea [1]. In regards to the patients that need treatment, the ones suffering from severe and moderate forms, the number is estimated to be 425 milion patients [1]. SAS in more commonly seen in men, arround 13% of the general population, and less in women, arround 6% [2].

Obesity is in it`s self an ongoing "pandemics" with a prevalence of 764 milion persons that suffer from obesity in 2022, with an estimate of one billion by the year 2030 [3,4]. By that time 1 in 5 women and 1 in 7 men, will have a body mass index (BMI) over the value of 30kg/m² [5].

In Romania, recent studies have shown a prevalence of SAS of 47.1% [6] and of obesity of 22.5% [7,8].

The bidirectional connection between SAS and obesity is well know, some authors name this a "cause-effect" disease, also in recent years studies have show an increase in public health costs and also an increase in mortality in patients associating this two conditions [9].

Another problem that our patients are facing is stress, often patients report high levels of stress. If we take a look at this problem globally, in 2019, one-third of the entire population, reported symptoms related to stress [10].

Aims: The main objective of this research was to show concrete evidence that by loosing weight the symptomatology os SAS will decrease in intensity, also the levels of stress of patients will drop and in the end the quality of life will be increased and the rates of mortality will fall.

Matherial and Method

We selected a number of 17 pateints, 6 women and 11 men, that presented in our department of Diabetes and Nutrition Diseases with SAS and obesity starting from march 2023 until october 2023.

SAS diagnosis was established in the pneumology ward following a polysomnogram evaluation, with and Apneea Hypopneea Index (AHI) greater than 5 and obesity was diagnosed after the physical examination thatresultes in an BMI ≥30kg/m².

The levels of stress were determined a questionaire PPS-10 (Precived Stress Scale); a score between 0-12 showed a low level of stress, 13-19 medium-high level and over 20 a high level [11,12].

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All patients were initially anthropometrically evaluated by mesuring their weight and calculating the BMI and they were also evaluated from a pulmonary perpective and a Peak Exploratory Flow (PEF) was mesured. The levels of stress were determined by completeing the questionaires and the stage os SAS was also determined by AHI.

After the initial evaluation of the patients, a dietary plan was predented to the patients, along with the reccomandations to lose weight and adopt helthier life styles. For each patient a nutritional plan was created with a lower intake in calories, carbohydrates and a high proportion in proteins and fibres from vegetables. The patients received nutrition plans between 1200 and 1800 calories per day divided into 5 meals per day.

All patients recived also an exercise plan that they had to adhere to in order to help tham loose the weight, the exercises were adapted to each individaul and they were within their limit of pysical tolerance to effort. After a 6 month period a follow-up evaluation was performed with the initial tests in order to be able to compare the results form day 1 to those after the nutritional intervention.

Results

Our group was formed form 11 men, with an avarage age of 49 years old (min 33-max 74) and 6 women with an avarage age of 52 (min 40-max 65); overall the age avrage in the hole gropu was 53.5 yers old.

Avarage initial weight in our group was 135 kilograms (min 85-max 185) and after 6 months of dietary intervention the avarage weight was 118 kilograms (min 80-max 156), this means a reduction of 12.6% in body weight **(Figure 1)**.

Initial BMI avarage was 43,52kg/m2² (min 31-max 58,62), at the follow-up evaluation avarage BMI was reduced by 29.23% beeing 30.8kg/m² (min 26.75–max 46.19) **(Figure 2)**.

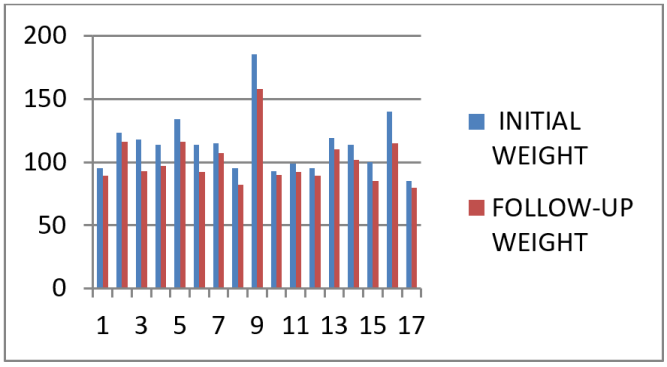

Figure 1: Weight (initial and follow-up).

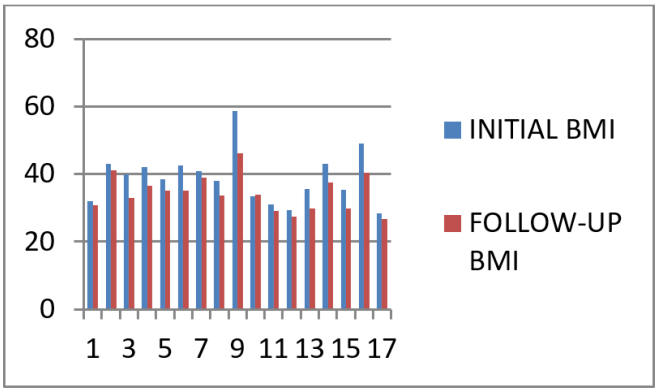

Figure 2: BMI (initial and follow-up).

PPS-10 scores at the initial evaluation showed 1 patient with a low level of stress (0-12 points), 11 with medium-high level (13-19 points) and 5 with high level of preceived stress (over 20 points). After the 6 monts period of diatery intervention, the follow-up evaluation revealed total changed numbers in regards to this evaluation 10 patients described a low level of stress and 7 medium-high; in our group there were no more evaluations reading over 20 points, meaning high levels of stress **(Figure 3)**.

Another parameter that was analyzed was PEV to see if there is an improvement in the breating capacity of these patients. Initially PEV was between 37.9% and 134.10%, with a mean of 86%, after the 6 months period avarage PEV was 96.55% ranging from 63.3% up to 129.80% **(Figure 4)**. This was an improvement of respiratory functional parameters of over 10%, that traslated also in a definite improvent in the quality of patient`s lifes.

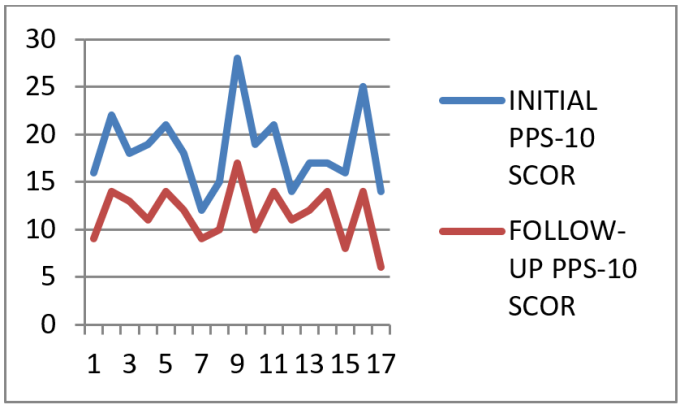

Figure 3: PPS-10 Scores (initial and follow-up).

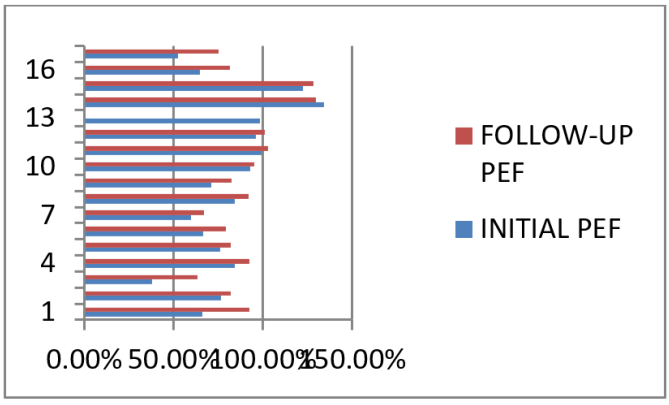

Figure 4: PEV evaluation (initial and follow-up).

The severity of SAS was evaluated also and the results showed at the firs evaluation 8 patients had severe SAS, 6 moderate SAS and only 3 had mild SAS **(Figure 5)**. At the follow-up evaluation the number of severe SAS was reduced by 50% and it was 4, in regards to the moderate SAS there were no changes, but the number od mild SAS went up by more than double from 3 to 7 **(Figure 6)**.

Discussion

The American Thoracic Society has stated that even a small reduction of body weight, such as 5-10%, can improve the symptoms of SAS or even cure this syndrome [13]. European Association for the Study of Obesity (EASO), throug EASO Guidelines states that a reduction of 7-11% from initial body weight has a significant reduction on AHI [14]. In our group the reduction in mean weight was 12.6% and this correlated

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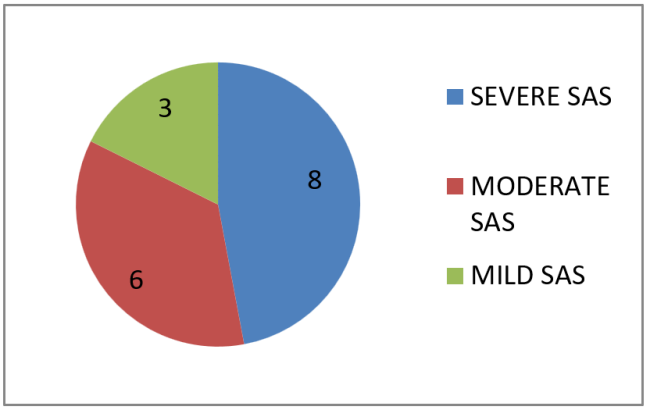

Figure 5: Initial SAS evaluation.

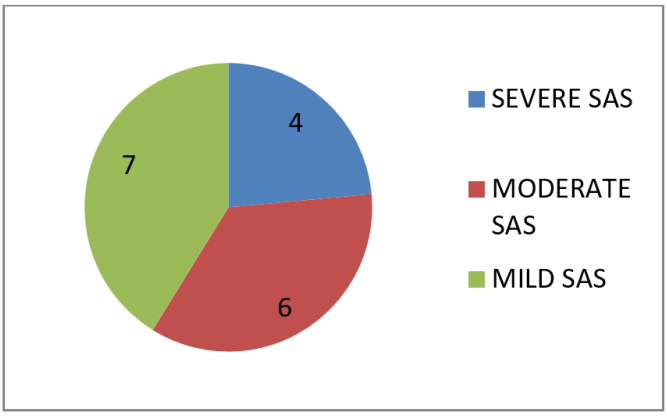

Figure 6: Fallow-up SAS evaluation.

with the reduction of the symptoms of SAS and of the severity od SAS; the severe SAS was reduced by half and the mild form was incred by more than half.

The relationship between obesity and stress and SAS can probably be explained by the distruption in the circadian rhytms that often appear in sleep apneea syndrome. This contributes to a lower quality of sleep, to night eating and sometimes even to binge eating and gaining weight. Poor quality of sleep has been linked in the past to metabolic disorders, obesity beeing one of them [15]. Regulating sleep, after loosing weight through dietary intervention, leads to a reduction in the level of stress that the patient perceives. The same happened in our group, after loosing weight, at the follow-up evaluation no patient reported high levels of stress, most of them reporting low levels, while in the beging most patients reported medium and high levels of stress.

A De Lorenzo at all. have shonw in a small group study that by reducing weigh you significally improve all respiratory functional parameters. This weigh reduction was determined by dietary interventions, patients undergoing the Mediterranean-style restricted diet. In our group we only used nutritional intervention in regards to weight loosing and our results regarding respiratory functional parameters were similar, this got better as the patient got thinner [16].

Many studies have show that the reduction of weight has a benefical effect on the reduction of mortality, for instance, in a meta-analysis regarding this topic, it is shown that weight loss reduces mortality of all causes by 15% [17].

Conclusion

All our results combined show that the nutritional intervention that led to loosing weight has had benefical contribution in reducing the stress levels, severity of SAS symptoms and in improving respiratory functional parameters and quality of life overall; and last but not least by extrapolating from this data we can conclude that this intervention has reduced also the mortality risk of this patients.

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