Sleep Apnea: Adherence and Home Respiratory Therapy Companies Performance

Ana Ferreira[1]*, Vitor Rodrigues[2], Teresa Correia[3], Artur Vale[4] and Noélia Vilas Boas[5]

[1]Master's Degree in Management of Health Services, European Sleep Technologist, Respiratory and Sleep Clinical Physiologist, Centro Hospitalar de Trás-os-Montes e Alto Douro, Rua da Levada, Portugal

[2]Coordinating Professor with Aggregation, Universidade de Trás-Os-Montes e Alto Douro, Universidade de Trás-os-Montes e Alto Douro, UTAD, ESEnfVR e Centro de Investigação em Desporto, Saúde e Desenvolvimento Humano, CIDESD, Portugal

[3]Coordinating Professor, Instituto Politécnico de Bragança, Instituto Politécnico de Bragança, Bragança, Portugal

[4]Pulmonologist, Centro Hospitalar de Trás-os-Montes e Alto Douro, Avenida da Noruega, Lordelo, Portugal

[5]Cardiology and Respiratory Physiologist, Cardio MaisPerto, Portugal

*Corresponding Author: Ana Ferreira, Master's Degree in Management of Health Services, European Sleep Technologist, Respiratory and Sleep Clinical Physiologist, Centro Hospitalar de Trás-os-Montes e Alto Douro, Rua da Levada, Portugal.

Abstract

Continuous Positive Airway Pressure (CPAP) is recognized as the Obstructive Sleep Apnea treatment of choice, in Portugal; it is provided by Domiciliary Respiratory Therapy companies, who are responsible for providing the equipment, it´s maintenance and monitoring treatment related issues.

These investigation focuses in evaluate Sleep Apnea patients satisfaction with the domiciliary care provided by Home Respiratory Therapy Companies, and its influence in therapy adherence. A survey was developed and applied in Hospitalar de Trás-Os-Montes e Alto Douro, to all the patients diagnosed with Sleep Apnea, using Automatic Positive Airway Pressure therapy for more than 6 months. Adherence was verified by consulting the domiciliary equipment memory card. We also reviewed the institutional clinical process. IBM SPSS 20 was used for statistical analysis.

The sample consisted of 191 individuals, 145 men and 46 women, with average age 62 ± 9.9 years. Most patients had severe Sleep Apnea, and adherence registration showed that 73,1% properly complied with treatment. On a scale from 0 to 100, Home Respiratory Therapy Company related satisfaction was 62.2296 ± 20.29909. We found positive correlations between the company performance on the first visit, general satisfaction and adherence to treatment. Satisfaction with the company and adherence superior to 4h/night are correlated. Explanation on equipment handling and interface adjustments were related to adherence. Adherence was also related to improvement of symptoms.

Sleep Apnea patients are satisfied with the performance of Home Respiratory Therapy companies. However, it is imperative to standardize the company's procedures and perform the first domiciliary visit as soon as possible, after starting CPAP treatment.

Keywords: Sleep Apnea; Satisfaction; Home Respiratory Therapy; Treatment; Adherence

Abbreviations

CPAP: Continouos Positive Airway Pressure; APAP: Automatic Positive Airway Pressure; CHTMAD: Centro Hospitalar de Trás-Os-Montes e Alto Douro; SAS: Sleep Apnea Syndrome; HRTC: Home Respiratory Therapy Companies; NCHRC: National Committee for Home Respiratory Care; BMI: Body Max Index

Introduction

In Portugal, more than 10% of population requires Home Respiratory Therapies due to severe chronic respiratory diseases, respiratory sleep disorders and neuromuscular disorders [1]. Sleep Apnea Syndrome (SAS) affects about 5% of adults and 1 to 3% of children [2]. Continuous Positive Airway Pressure (CPAP) is still the dominant therapy in SAS patients. Despite the effectiveness of this treatment, several studies describe non-adherence rates between 20% and 50% [3].

Home Respiratory Therapy Companies (HRTC) provide oxygen, aerosol or ventilation therapy. In Portugal, there are several Home Respiratory Care Companies, whose function is not only to provide the equipment, but also to replace it in case of failure, handling education, evaluation of adherence and providing information to the clinician; therefore, they play an important role in SAS patient monitoring.

According to the National Committee for Home Respiratory Care (NCHRC) [1], the median annual cost per patient, for ventilation therapy, in North Health Regional Administration was 94.92 euros, in 2009, and it represents 49% of the total outlay with Home Respiratory Therapy.

Nowadays, with the increased prevalence of SAS and, consequently, the prescription of Automatic Positive Airway Pressure (APAP) and use of domiciliary services, it´s sorely important to inquiry evaluate the patient satisfaction with the HRTC, and evaluate efficacy parameters. It is also important to correlate this satisfaction with the treatment adherence, since this therapy implies great expenses, which can be even higher in case of non-adherence due to the consequences of symptoms disease.

Aim of the Study

The aim of this investigation is both evaluation of SAS patient satisfaction with the HRTC services, and to analyze the relation of this satisfaction with therapy adherence.

Methods

We designed a descriptive-correlational study. Data was collected from Pulmonology department of Centro Hospitalar de Trás-Os-Montes e Alto Douro, from patients with diagnosed SAS, which were treated with APAP for, at least, 6 months. This happened from January to November, 2013. The patients suitable for investigation were invited to participate and were completely informed about the study methodology. The diagnostic examinations and domiciliary equipment memory card were reviewed.

The author elaborated a questionnaire with 6 strands with questions regarding the sociodemographic characteristics, clinical situation, APAP adherence, the home respiratory therapy company and its assistance, patient satisfaction and knowledge of the firm.

IBM SPSS (Statistical Package for the Social Sciences) 21.0 was used for statistical analysis. We also used AMOS software for structural equations analysis.

The present study was submitted for approval and authorization by the CHTMAD Administration board, on 30/11/2012.

The informed consent of participants was obtained before filling the questionnaire, which guaranteed the confidentiality of personal information.

The rules of conduct of the Helsinki Declaration and the national legislation were fulfilled. Conflicts of interest: none.

Results and Discussion

The sample consisted of 191 individuals, 145 (75.9%) men and 46 (24.1%) women, with average 62 ± 9.9 years, with the predominant age group from 61 to 70 years old. The majority of the individuals had the fourth grade (73.3%). The mean Body Max Index (BMI) was $32.27 \pm 5.1 \ kg/m^2$, ranging from 20.0 to 51.6 kg/m^2. Most patients had been diagnosed with severe Sleep Apnea (67%), 26.8% had moderate and 6.1% mild disease.

Regarding the treatment adherence, assessed by the equipment memory cards, we verified that 73.1% of the individuals fulfilled the adherence criteria (70% of the nights, more than 4 hours per night). This data slightly differs from the obtained by the question "do you think you have good treatment adherence?" in which 86.4% of the patients answered "yes".

The average percentage of more than 4hours/night adherence was 73.82 ± 27.38 and the mean hours per night utilization was 6.14 ± 1.78. On the other hand, the mean hours/night that the patients affirmed to use the APAP was 6.60 ± 1.77 (Table 1), a slightly superior value when compared to the given by the APAP card. Several studies identified the adherence measure given by the patients has no reliable, with CPAP utilization hours overestimated in about 1 hour [4,5]. Adherence slightly differing values referred by the patients in comparison with the ones given by the APAP card, can be explained by this referred overestimation of utilization. Weaver and Grunstein [6] said that in the studies which used the 4 hours per night reference to define adherence, 29 to 83% of patients reveled lack of adherence to the treatment, showing the great importance in defining adherence and explaining it to the patient.

We found significant statistic values for Adherence and improvement of daytime sleepiness, snoring, respiratory pauses, sleep quality and daytime activities. A logistic regression was carried out and the improvement of the symptom "snoring" was the one who obtained stronger relationship with adherence. 91.1% of the individuals recognize the treatment benefit.

	N	Minimum	Maximum	Mean	SD
Adherence > 4h/night	182	0	100	73.82	27038
Utilization sleep hours/night	182	1.13	11.5	6.14	1.78
Utilization hour/every day	182	0.48	11.5	5.45	2.08
Hours/night (questionaire)	191	2.0	10.0	6.60	1.77

Table 1: *APAP Adherence.*

Regarding the adaptation period, 49.5% of the patients adapted to APAP in one week and 24.7% took from one week to a month to get adapted. According to NCHRC [7] the CPAP adherence pattern has the particularity of being defined in the first weeks of the treatment. The present results agree with this statement.

Regarding to what contribute the most to their APAP adaptation, the answer "the explanation of the disease by the hospital staff team", comes first. The second was "the will to fell better". According to Golay., *et al.* (2006), the patients knowledge and beliefs of their chronicle disease, like SAS, have an influence on a range of health related variables, including the treatment adherence. The CPAP initial perception has a desirable and effective treatment may be a critical factor in CPAP acceptance [8], which we consider has a connection to our patients answer, since the hospital staff explanation addresses the benefits of CPAP adherence. According to Weaver and Sawyer [4], an educational intervention focuses in educating the patient for SAS diagnoses and treatment. The mixed strategy is a combination of support and education. Applied to the SAS patient has a great efficacy probability. In our Hospital (CHTMAD), the physiological mechanisms of SAS, implications, consequences and treatment options of the disease are very carefully explained to the patient. Some researchers suggest that the CPAP initial contact in a controlled and supportive environment can influence the adherence results [9].

Regarding the HRTC performance, we verified that 75.4% of the inquired claimed that the company services helped in treatment adaptation. More than a half of the patients contacted the company for some reason (problem/complaint) and most of the situations were solved in just one day.

According to NCHRC [7], all CPAP patients must have a home visit by the Home Respiratory Therapy Company, in 4 weeks after the beginning of the treatment In our study, the first visit by the company to the patient was made in the first week of treatment, in half of the situations. However, we verified that in the case of 18 individuals, this visit was made after more than one month.

Most of the inquired patients answered that all explanation where given in this first visit. The domiciliary support in the first weeks of treatment increases the adherence and the accountability of the patient towards it, and brings an indisputable benefit [10]. It also reveals a good compliance of protocol by the HRTC.

Concerning the knowledge of the patient about the HRTC, the results were divided; about a half said not knowing if it works at a national level and has no cognition about the firm obligations. Half claimed not knowing where the firm office is situated, in their residence area; about 10% didn't know what the maintenance interval of the APAP equipment was. This data suggests lack of information concerning the Home respiratory care companies, situation that can be addressed to and rectified by the professionals.

The interface exchange/adjustment was the company most referred service, followed by "equipment substitution" (Table 2). The patient gave the "kindness/sympathy of the staff", greater importance regarding the home respiratory care company services. Schoenfelder [11] said that interpersonal characteristics are what matter the most in health care, rather than technical or organizational aspects. Most of the patients who were inquired didn´t want to change firm and would recommend their company to other people.

		N	%
Which were the HRTC most provided services?	Interface exchange/adjustment	93	50.8
	Pressure adjustment	8	4.4
	Equipment substitution	32	17.5
	Noise recognition	14	7.7
	Adherence registration	14	7.7
	Equipment maintenance	1	0.5
	Other	21	11.5

Table 2: *Most provided services by the HRTC.*

Regarding the SAS patient Satisfaction with the home respiratory care company, we concluded that the inquired patients were satisfied with the services, with a satisfaction average value of 62.23 ± 20.23, in a 0 to 100 scale. However, we found no studies in this area to compare with our results.

We found no statistic relationship between company satisfaction and SAS patient social-economic characteristics (gender, age, profession or education).

We also analyzed the relation between Adherence and social-economic characteristics and found no statistic results. We only inferred that male patients, no qualified workers, with the first degree of education, have best treatment adherence

A structural equation analysis was made (Figure 1), with an observed relation between HRTC Satisfaction and more than 4h/night Adherence. This proved relation is extremely important, since it confirms the relevant role of the company performance in SAS patient adherence to treatment.
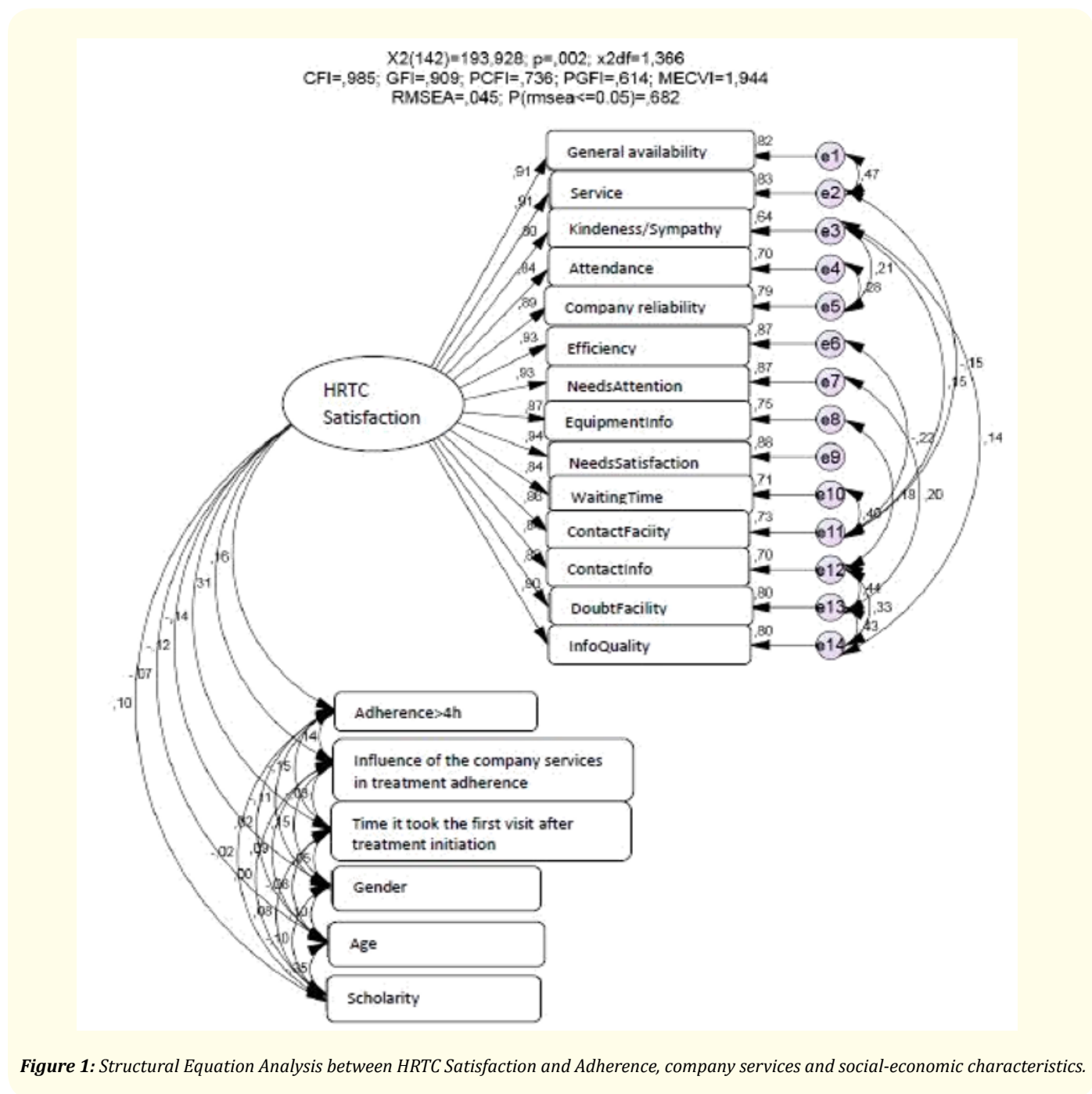

Figure 1: Structural Equation Analysis between HRTC Satisfaction and Adherence, company services and social-economic characteristics.

We also tested the relationship between variables "HRTC satisfaction" and "HRTC performance in the first visit" and got a positive correlation (p = 0.014) (Table 3). This proves that the first visit widely contributes to the patient satisfaction level with the company.

		HRTC Performance in the first visit
HRTC Satisfaction	Pearson Correlation	0.177
	p	0.014
	N	191

Table 3: *Satisfaction and Company Performance in the first visit.*

Regarding the relationship between "HRTC performance" and "adherence to treatment", the values were statistically significant for adherence and performance on the first visit. This reinforces the importance of this first visit by the company, not only for the patient satisfaction but also as far as their treatment adaptation is concerned. In Budhiraja., *et al.* [12] study, the results suggest that SAS patients with CPAP must have a visit or a hospital appointment as early as possible after initiating therapy, so that problems that can affect adherence can be solved.

We also studied the importance of every procedure for treatment adherence, in the company first visit; the variables "technical aspects of equipment explanation" and "interface adjustment" had statistically significant values. The "equipment operating mode explanation", "treatment interest", "hygiene care explanation" and "humidifier operation explanation" aren't related to adherence. According to Epstein., *et al.* [13], the principal components of CPAP treatment include the interface proper adjustment. For Budhiraja., *et al.* [12], an intensive follow-up and patient education, contributes for an increased CPAP adherence.

Conclusion

The EUROVENT study [14], concluded that the need for rules on quality control domiciliary NIV was urgent. It is know that SAS treated patients with NIV reduces health expenses in a 2 year period after CPAP therapy [15]. However, these expenses are only reduced if there is an optimal adherence to the treatment. To improve adherence, it is necessary a domiciliary visit by the home respiratory care company, as early as possible (once the treatment begins), a proper interface adjustment and a correct and incisively equipment explanation. This was statistically proved in our study, since we found statistically significant relationships between these points and adherence. The first company visit is extremely important for treatment adherence and patient satisfaction [16-22].

Also worth mentioning is that the patients opinion about their adherence is different from the APAP card data. The using hours overvaluation by the patient has been proved in several studies and it's something that must be present in an assessment without concrete data.

SAS patients impute a great deal of importance to kindness/sympathy of the company staff and classify the company services has gracious. We think it is important to highlight this interpersonal aspect in the domiciliary visit.

The study of users Satisfaction is important to Home Care improvement. The general satisfaction level with the Home Respiratory Care Company was 62.2 in a 0 to 100 scale, which leads us to say that SAS patients are Satisfied with the firms. However, this value also indicates that a lot can be made to upgrade the satisfaction level in these patients.

A relation between patient satisfaction with the company and treatment adherence has been proved in our study. This finding seems very important, not only because it highlights the important role of these companies in therapy compliance, but also as it draws attention to good management services, essential to good satisfaction results and consequent adherence and improvement in SAS symptoms. This "spiral" relationship was statistically proven in our study.

The explanation of the disease given by the hospital staff is important in treatment adaptation. This adaptation mixed strategy, with information about the disease and the equipment in a hospital environment, and latter with the support of home respiratory care company, seems to translate good results, since the majority of patients in our study had good APAP adherence results.

As suggestions, we think it is important to have more studies in this relevant field, the Home Respiratory Therapy Care. We consider urgent the disclosure of new data about averages and expenses, since the only existing for consultation are from 2011 (NCHRC).

Author's Contribution

Ana Ferreira conceived this study, collected the data and carried out the analysis. Vitor Rodrigues and Teresa Correia supervised all aspects of the study implementation.

Artur Vale collaborated in the inception of the study. Noélia Vilas Boas collaborated in the analysis of the data.

All the authors contributed to the interpretation of the results and the proof reading of the manuscript. 58.

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