POSITIVE AIRWAY PRESSURE THERAPY ADHERENCE AND OUTCOMES IN OBSTRUCTIVE SLEEP APNEA: AN EXPLORATORY STUDY

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Introduction

- Positive airway pressure (PAP) therapy is frequently administered by respiratory therapists to patients with obstructive sleep apnea (OSA).
- In patients with OSA, PAP therapy has shown to significantly reduce daytime sleepiness and hypertension; improve quality of life measures;[1] [2] and decrease morbidity and mortality in patients with coexisting heart failure, hypertension, and myocardial ischemia and infarction.[3] [4]
- PAP therapy adherence is often defined as PAP usage of ≥ 4 hours per night on 70% of nights, for at least 30 consecutive days[5].
- Little evidence exists to support this definition for PAP therapy adherence.
- Advances in PAP therapy devices have allowed more accurate and detailed data to be recorded and downloaded by the clinician with removable data cards and/or Bluetooth technology.
- Despite widespread usage of PAP therapy in the clinical management of OSA, there are no established guidelines regarding the wear time duration needed to discern meaningful patient benefits.[6]

Objectives:

- Primary: to compare outcomes including mortality, hospitalizations, and development of comorbidities over an 8-year period, between OSA patients who are adherent (PAP usage ≥ 4 hours on ≥ 70% of nights) and non-adherent (PAP usage ≤ 3 hours on ≤ 50% of nights) to PAP therapy treatment.
- Secondary: to investigate the associations between PAP adherence and patient characteristics and outcomes.

Methods

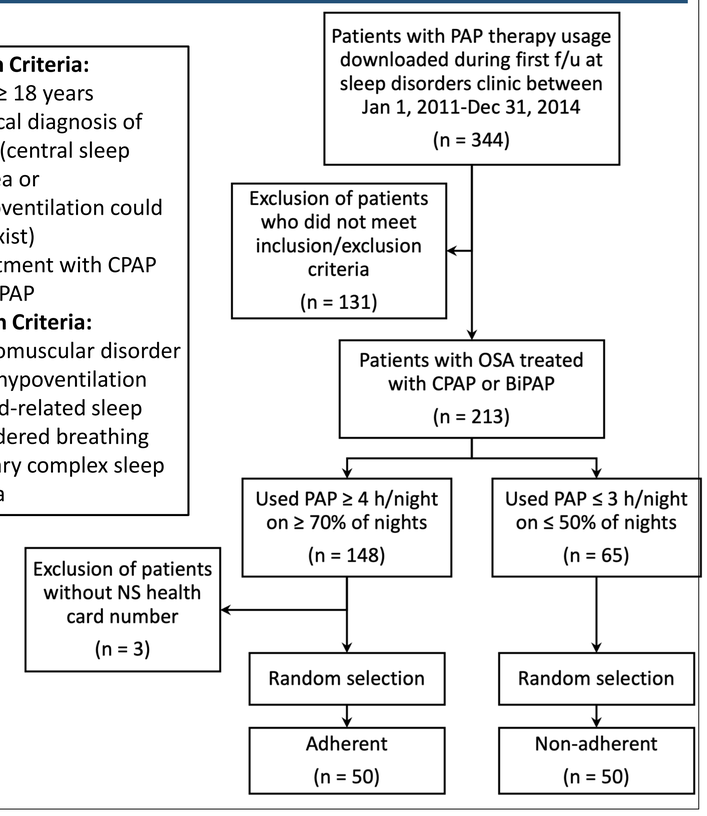
- Longitudinal retrospective randomized chart review of 100 patients with OSA treated with either continuous PAP (CPAP) or bilevel PAP (BiPAP) therapy

Data Extraction/Analysis:

- PAP data downloaded in Encore Pro (Version 2.24.0.1)
- Review of clinical charts and EMR - QEII Health Sciences Centre (Table 1)
- Linkage with Health Data Nova Scotia databases: Nova Scotia Vital Statistics, Insured Patient Registry, and Canadian Institute for Health Information Discharge Abstract Database

Inclusion Criteria:
1. Age ≥ 18 years
2. Clinical diagnosis of OSA (central sleep apnea or hypoventilation could co-exist)
3. Treatment with CPAP or BiPAP

Exclusion Criteria:
1. Neuromuscular disorder
2. Pure hypoventilation
3. Opioid-related sleep disordered breathing
4. Primary complex sleep apnea



Results

Table 1. Characteristics of PAP therapy adherent and non-adherent groups at first follow-up

	Adherent (n=50)	% or Std	Non-adherent (n=50)	% or Std	*p*-value
Age (y)*	59.5	13.1	57.8	12.1	0.400
Sex, men	38	76	29	58	**0.056**
BMI (kg/m^2)*	36.2	9.1	35.1	8.6	0.746
Obese	37	74	33	66	0.383
Charlson index*	1.1	1.8	0.6	1.0	0.638
Smoking history	32	64	26	52	0.224
Past tonsil/ adenoidectomy	11	22	13	26	0.640
ESS score*	9.2	5.8	11.8	6.0	**0.030**
OSA diagnosis method					0.880
PSG	16	32	13	26	
PM COMM	23	46	27	54	
PM LAB	7	14	6	12	
Events/hour*	43.7	40.4	37.8	27.4	0.552
PAP therapy type					0.656
BiPAP	13	26	15	30	
CPAP	37	74	35	70	
Location at start of therapy					0.545
Home	29	58	33	66	
Hospital/Lab	20	40	15	30	
Time to first f/u*	22.2	51.6	16.7	23.3	0.814

*Denotes continuous variables; Bold font denotes significance (p<0.05); ESS, Epworth Sleepiness Scale; OSA, obstructive sleep apnea; PSG, polysomnography; PAP, positive airway pressure; BiPAP, bilevel positive airway pressure; CPAP, continuous positive airway pressure.

Figure 1. Comorbidities of PAP therapy adherent and non-adherent groups at first follow-up

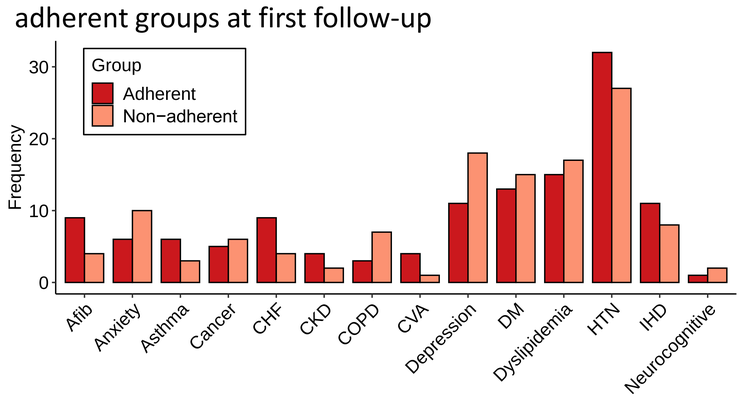


Table 2. Outcomes of the PAP therapy adherent and non-adherent groups during the 8-year study duration

	Adherent (n=50)	% or Std	Non-adherent (n=50)	% or Std	*p*-value
Death	7	14	<5	<10	0.338
Death in hospital	6	12	<5	<10	0.269
Number of hospitalizations*	2.9	4.5	3.1	4.2	0.647
Length of stay in hospital (days)*	6.4	10.5	4.5	4.7	0.944
Number of co-morbidities*	3.2	2.0	3.1	2.0	0.769

*Denotes continuous variables

- Epworth sleepiness score and sex were significantly different between groups at first follow-up (Table 1).
- No significant differences were shown between groups for mortality, hospitalizations, or development of co-morbidities during the 8-year observation period (Table 2).
- Male patients had a significant increase in odds of being adherent (Table 3).
- Adherent group showed a significant decrease in odds of reporting higher normal daytime sleepiness (Table 3).
- An increasing number of hospitalizations corresponded with a significant decrease in odds of being adherent (Table 3).

Table 3. Logistic regression analysis (PAP therapy adherent vs. non-adherent)

	Odds Ratio	95% CI	*p*-value
Sex (male)	8.519	1.301–55.756	**0.025**
ESS Score [Ref 0-5 (Lower Normal Daytime Sleepiness)]			
Higher normal daytime sleepiness (6-10)	0.039	0.005–0.392	**0.003**
Mild excessive daytime sleepiness (11-12)	0.039	0.003–0.517	**0.014**
Severe excessive daytime sleepiness (16-24)	0.088	0.012–0.635	**0.016**
Hospitalization counts	0.741	0.551–0.995	**0.046**

Bold font denotes significance (p<0.05); ESS, Epworth Sleepiness Scale

Conclusions

- One specific definition of PAP adherence may not be appropriate for various phenotypes of OSA.
- Different clinical outcomes may require different PAP usage times and patterns.
- Due to retrospective analysis and small group size, further studies are necessary to investigate clinically meaningful criteria for PAP therapy adherence.

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