

Primary Care Sleep Studies Audit

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Introduction

Obstructive Sleep Apnoea Syndrome is a sleep-related breathing disorder leading to recurrent partial or complete obstruction of the upper airways. Clinically, an overnight sleep study is used to confirm the diagnosis and Continuous positive airway pressure (CPAP) is the mainstay of treatment. (BPAC NZ, 2012) Obstructive Sleep Apnoea is well known to be associated with hypertension, arrhythmias, stroke, coronary heart disease, atherosclerosis, metabolic dysfunction, and an overall increase in cardiovascular mortality. (Lévy, P., et al, 2015)

In New Zealand, Māori are 4.3 times more likely to have Obstructive Sleep Apnoea than non-Māori, and are more likely to present with Severe disease. (Mihaere, K., et al. 2009) It is also known that adults with untreated OSA are high users of health care services, and early diagnosis and treatment reduces morbidity and significantly decreases overall health care costs. (Wittman, V., Rodenstein, D. 2004)

In 2021, Fast Pace Solutions was successful in obtaining a Ministry of Health Telehealth Initiative funding to provide diagnostic testing directly to Primary Care. This led to high level diagnostic equipment being placed or made available at Opunake Medical Centre.

Opunake Medical Centre is Rural General Practice located in Opunake, 50 minutes south of New Plymouth. The practice has 3950 enrolled patients. Opunake Medical Centre is a Very Low Cost Access practice, which reflects the high need and complexity of its patients.

In Taranaki there is limited access to a primary care ordered, publicly funded, Sleep Study which is a major health equity and health equality issue.

Aim

This pilot was run to look at the outcomes when pre-emptive, high quality diagnostic testing was made readily available to a rural community.

Hypothesis

The hypothesis was that this will lead to more directed diagnoses of Obstructive Sleep Apnoea whilst improving equity and health outcomes in a rural community.

Method

The patients were enrolled in Opunake Medical Centre. They required a GP referral with an appropriate indication which included symptoms of Obstructive Sleep Apnoea, or Risk Factors +/- Co-Morbidities of Obstructive Sleep Apnoea. A list of the common indications is shown in Table 1., however this list was not exhaustive and the General Practitioner was able to use their own clinical discretion whilst referring patients.

Symptoms	Risk Factors +/- Co-Morbidities
Apnoea	Obesity
Snoring	Ischaemic Heart Disease
Daytime Somnolence	Smoking
Non-refreshing Sleep	Excess Alcohol Intake
Choking During Sleep	Hypertension
Morning Headaches	Cardiomyopathy
Dry Mouth	Diabetes

Table 1. Indications for a Sleep Study

The patients need to identify as Māori or Pacific in ethnicity, and/or live in an area with a deprivation index of >6. Patients who could not tolerate the monitor were excluded.

Fast Pace Solutions supplied the training to the Ōpunake Healthcare team around fitting the device and educating the patients, and also the equipment which was placed in the Ōpunake Medical Centre. The Ōpunake Medical Centre rooms were used for patient contact. The patients wore the device for 24 hours and then returned this to the medical centre. The information from the device was then downloaded and sent to Fast Pace Solutions for reporting, a following this a review from a cardiologist with recommendations for ongoing treatment. The information was sent back to the referring GP who continued the ongoing management.

Background information was retrieved from the patient's file on Medtech through the Ōpunake Medical Centre. The information regarding the Ambulatory Blood Pressure Monitors was sourced through Fast Pace Solutions.

Findings

The pilot started in September 2021 until March 2023. As shown in Table 2., The pilot included 33 patients, with 16 Males and 17 Females. There were 9 patients who identified as Māori and 23 as New Zealand European. The age distribution was reasonably evenly spread. All patients were in a Deprivation index area >6. All patients had a least one long term medical condition.

		2021	2022	Total
Gender	Male	5	11	16 (48%)
	Female	1	16	17 (52%)
	Total	6	27	33 (100%)
Age	20 - 29 yrs	0	3	3 (9%)
	30 - 39 yrs	1	5	6 (18%)
	40 - 49 yrs	0	9	9 (27%)
	50 - 59 yrs	2	3	5 (15%)
	60 - 69 yrs	0	4	4 (12%)
	70 - 79 yrs	2	3	5 (15%)
	80 - 89 yrs	1	0	1 (3%)

	Total	6	27	33 (100%)
Ethnicity	Maori	3	6	9 (27%)
	NZ European	2	21	23 (70%)
	Samoan	0	0	0 (0%)
	Other European	0	0	0 (0%)
	Other Asian	1	0	1 (3%)
	Total	6	27	33 (100%)
Number of Long Term Medical Conditions	1 - 3 conditions	0	12	12 (36%)
	4 - 6 conditions	2	7	9 (27%)
	7 - 9 conditions	2	7	9 (27%)
	10 or more	2	1	3 (9%)
	Total	6	27	33 (100%)

Table 2. Patient Demographics

As shown in Table 3., the most common indication for a sleep study was symptoms of Obstructive Sleep Apnoea. Only one sleep study was recorded as normal and one was not acceptable as this was not tolerated by the patient. An abnormal sleep study was recorded in 94% of patients with Severe Obstructive Sleep Apnoea accounting for 43% of the results.

		2021	2022	Total
Indication	Symptoms	2	23	25 (76%)
	Risk factors +/- Co-Morbidities	4	4	8 (24%)
	Total	6	27	33 (100%)
Sleep Study result	Normal	0	1	1 (3%)
	Mild OSA	1	9	10 (30%)
	Moderate OSA	2	5	7 (21%)
	Severe OSA	3	11	14 (43%)
	Study not acceptable	0	1	1 (3%)
	Total	6	27	33 (100%)
Treatment	CPAP	4	15	19 (58%)
	Sinus treatment	0	4	4 (12%)
	Lifestyle advice only	0	3	3 (9%)
	Not applicable	1	3	4 (12%)
	Lost to Follow-up	1	2	3 (9%)
	Total	6	27	33 (100%)

Table 3. Indications and Results from the Sleep Studies

When comparing the severity of Obstructive Sleep Apnoea for each ethnicity, outlined in Table 4., Māori were more likely to present with Moderate Sleep Apnoea. NZ European patients were more likely to present with Severe Sleep Apnoea at 53% of studies.

Sleep Study - Severity	Maori	NZ European	Other Asian
Normal	0 (0%)	1 (4%)	0 (0%)
Mild	3 (33%)	7 (31%)	0 (0%)
Moderate	4 (45%)	2 (9%)	1 (100%)
Severe	2 (22%)	12 (52%)	0 (0%)
Not acceptable	0 (0%)	1 (4%)	0 (0%)
Total	9 (100%)	23 (100%)	1 (100%)

Table 4. Severity Outcome of the Sleep Study for each Ethnicity

The most common treatment option was for CPAP, shown in Table 3., with 58% of patients in total. Three patients have been lost to follow-up and 4 patients are recorded as not applicable as they either had a normal or not applicable result, or they died prior to treatment starting.

Table 5. shows results and treatment for those whose indication was Risk Factors +/- Co-Morbidities, without any symptoms. Eight patients were entered into the study with Risk Factors +/- Co-Morbidities and all patients were found to have Obstructive Sleep Apnoea, with 62% of those diagnosed with Severe disease. CPAP was started in 75% of those patients.

Sleep Study Result	Mild	2 (25%)
	Moderate	1 (13%)
	Severe	5 (62%)
	Total	8 (100%)
Treatment	CPAP	6 (75%)
	Lost to Follow-up	1 (12.5%)
	Died	1 (12.5%)
	Total	8(100%)

Table 5. Results in Patients whose indication was Risk Factors +/- Co-Morbidities.

Conclusions

Māori were over-represented in testing for OSA when compared to general population, which may reflect our recruitment priorities, or may be due to the higher prevalence of OSA in Māori.

In total, 31 new cases of OSA were diagnosed, this was almost the entire study population suggesting that patient symptoms are highly indicative of OSA. Almost half of the patients were diagnosed with severe OSA, requiring urgent CPAP.

Of those patients whose indication was Risk Factors +/- Co-Morbidities, all were diagnosed with OSA and the large majority diagnosed with severe OSA requiring urgent CPAP. Although the numbers are small this is a significant finding suggesting that there are many patients who have unrecognised symptoms or are asymptomatic of OSA.

Testing and the treatment of Obstructive Sleep Apnoea is a health equity issue, not only for Māori but also for rural areas. It is also known to be more cost-effective to diagnose and treat OSA, in addition to reducing morbidity. Ongoing funding is needed to continue to offer sleep studies in Ōpunake, particularly looking at the patient population with Risk Factors +/- Co-Morbidities of OSA.

During the pilot the Level 3 sleep studies were carried out within the medical facility removing the requirement to travel to the Secondary Care Facility. Normally referral to the Secondary Service would require 2 return trips(49 km one way) which saved over 6,468 kilometres of travel which equates to 196 minutes (3 hours 27 minutes) of travel time per patient ; a total travel time of 6,468 minutes (107 hours).

Using a calculation for a medium petrol vehicle (1.4L – 2.0L) This would be expected to have saved in excess of 1,205.01 kgCO₂e *

This excludes any travel for Specialist follow up.

General Practitioners Comment; “ probably the most significant test. These were just not getting done for patients due to financial barriers. We picked up loads of OSA which I think would’ve never been picked up, particularly in our Māori patients.”

- <https://blocicarbon.com/vehicle-calculator/>

References

1. BPAC NZ. (2012) Obstructive Sleep Apnoea in Adults. <https://bpac.org.nz/bpj/2012/november/apnoea.aspx>
2. Lévy, P., et al. (2015) Obstructive sleep apnoea syndrome. *Nature Reviews Disease Primers*.
3. Mihaere, K., et al. (2009) Obstructive Sleep Apnea in New Zealand Adults: Prevalence and Risk Factors Among Māori and Non-Māori. *Sleep*, 32(7), 949-956.
4. Wittman, V., Rodenstein, D. (2004) Health care costs and the sleep apnea syndrome. *Sleep Medicine Reviews*, 8(4), 269-279.