**Title:** Nasal pressure variation measurement with a microphone: A new low cost tool for diagnosis of obstructive sleep apnoea in a resource poor setting

**Body:**

**Background**

Lack of polysomnography in Sri Lanka leads to under investigation of OSA. Nocturnal saturation ($SPO_2$) was used instead. Pressure variations due to turbulent flow through nose measured by a microphone fixed to a nasal cannula can be demonstrated to be proportional to nasal air flow, which allows calculation of apnoea hypopnea index (AHI).

**Objective**

To test if nasal pressure variation measurement increases accuracy of diagnosis of OSA than $SPO_2$ alone.

**Method**

31 patients with clinical features of OSA were enrolled. Their overnight nasal pressure variations were picked up by a microphone fixed the distal end of a nasal cannula. The microphone signal was processed with elimination of baseline noise, and airflow measurements were derived. Airflow was analyzed together with $SPO_2$ to calculate AHI. Results

The Epworth sleepiness scale (ESS) of patients ranged 0 to 19 (mean 8) and Mallampati grade (MG) ranged 1 to 4 (mean 2). The mean BMI was 28.4 kg/m$^2$ (range 20.44 to 40.48). The oxygen desaturation index (ODI), the number of desaturations per hour, ranged 0 to 15 (mean 2). The mean AHI was 8 (range 0 to 40). AHI significantly correlated with ODI (Pearson correlation coefficient = .63 p= .00). 13 patients were diagnosed with OSA using AHI. ODI alone would result in 4 true positive, 9 false negative and 2 false positive diagnosis of OSA. Conclusions

Nasal pressure variation measured by a microphone can be combined with $SPO_2$ to increase accuracy of diagnosis of OSA in patients with clinical likelihood, in a resource poor setting. With further validation this technique may be used for a low cost portable home based apparatus to derive AHI.