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

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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.