

**Aims of the study**

Clinical prediction models have been developed to help the clinician to find the patients at high risk of having obstructive sleep apnoea syndrome (OSAS). The clinical prediction models have been found to have fairly high sensitivities but low specificities (Rowley et al., 2000).

The aim of this study was to develop a clinical model to predict the probability of sleep apnea in primary care patients. This model may help the clinician to choose the right patients for further sleep studies.

**Patients and methods**

Home-based overnight sleep study was performed in 3043 consecutive primary health care patients (2140 males, mean age 48.9 years and 903 females, mean age 51,3 years). All patients filled out an extensive questionnaire concerning living habits, health status and various symptoms.

In this study we used a novel type 3 ambulatory device (APV2, Picture 1.), which is in wide use in Finland. The device records blood oxygen saturation, nasal and oral air flow, breathing movements, body position, snoring and heart rate (Remote Analysis Inc., Helsinki, Finland) (Tiihonen et al., 2009).

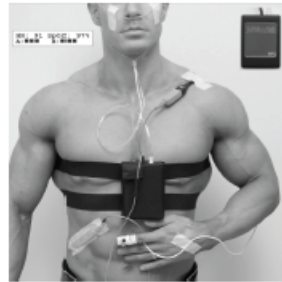


Figure 1. The APV2 ambulatory device installed

The device includes pulse oxymeter (Nonin XPOD 3011, Nonin Medical Inc., USA) recording blood oxygen saturation and heart rate. Nasal and oral air flow as well as snoring is measured by a pressure cannula (Pro-Flow Plus Nasal Oral Cannula, Pro Tech Services, USA). For the recording of abdominal movements, a special strain gauge transducer is taped onto patient's skin over the lowest rib on the right. The body position sensor is inside the device.

Multivariate methods were used to develop a simple model for the clinician to identify patients at risk of having sleep apnoea.

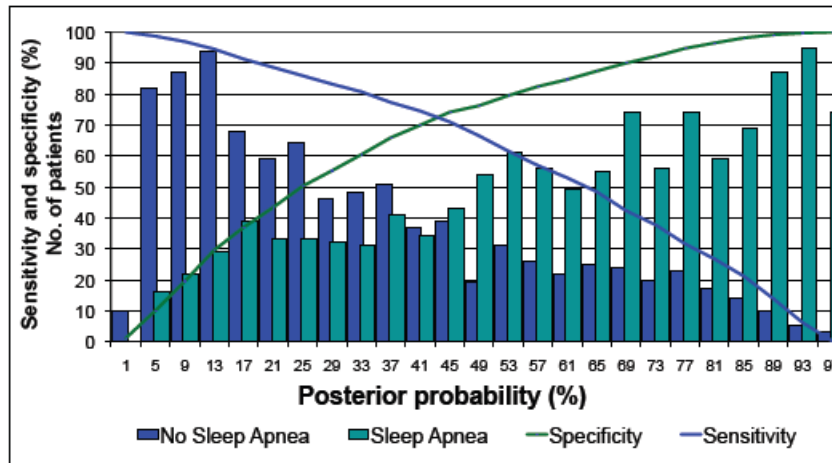


Figure 2. Distribution of posterior probability of sleep apnea in 2141 men with and without sleep apnea.

**Results**

The statistical testing obtained a separate predictive model for men and women. The best model for both included six variables (Table 1.). Both models are expressed in an additive form as a practical sum value. The result can be interpreted as probability of sleep apnea. The sensitivity and specificity of the prediction model in men was 65 % and the 75 % and in women 75 % and 71 %, respectively. Figure 2.

Table 1. Variables of the predictive model for sleep apnea.

Men	Women
*Age	*Age
*BMI	*BMI
*Likeliness to doze or fall asleep while watching TV	*Likeliness to doze or fall asleep as a passenger in a car for an hour without a break
*Likeliness to doze or fall asleep while sitting quietly after a lunch without alcohol	*Emotional stress
*History of concentration difficulties	*Loss of appetite
*History of snoring	*History of apneas

**Conclusion**

The present study develops a clinical prediction model to better distinguish the patients in risk of having sleep apnoea. This practical prediction model may help the clinician to choose the right patients for further sleep studies.

**References**

Rowley JA, Aboussouan LS, Badr MS. The use of clinical prediction formulas in the evaluation of obstructive sleep apnea. *Sleep* 2000;23:929-938

Tiihonen P, Hukkanen T, Tuomilehto H, Mervaala E, Töyräs J. Evaluation of a novel ambulatory device for screening of sleep apnea. *Telemedicine and e-Health* 15(3): 263-269, 2009