New Prediction Score for Obstructive Sleep Apnea among High Risk Pregnancy during First Trimester

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**Background:** Meta-analysis has demonstrated that conventional screening questionnaire for obstructive sleep apnea (OSA) during pregnancy yields poor performance, especially in high risk pregnancy and during early pregnancy.

**Objective:** This study aimed to construct a prediction score for early detection of obstructive sleep apnea (OSA) among this target group.

**Methods:** Pregnant women with gestational age (GA) < 16 weeks in high-risk pregnancy clinic from Ramathibodi Hospital were recruited to complete clinical evaluations and conventional sleep questionnaires. All subjects underwent overnight polysomnography for diagnosis of OSA.

**Results:** One hundred and twenty-nine patients were included (obesity 31%, chronic hypertension 10.1%, history of preeclampsia 5.43%, and gestational diabetes 46.51%). Baseline characteristics showed mean age of 33.7 years, GA of 10 weeks, pre-pregnancy BMI of 27kg/m², and median AHI of 7.1, respectively. Prevalence of OSA was 62%. Compared to non-OSA group, pregnant women with OSA had higher pre-pregnancy BMI (28.6 ± 5.4 vs 25.4 ± 4.2kg/m², p=0.001), neck circumference (35.8 ± 3.8 vs 33.9 ± 2.7 cm, p=0.001), waist circumference (96.9 ± 11.3 vs 88.5 ± 10.3 cm, p=<0.001), systolic blood pressure, SBP, diastolic blood pressure, and abnormal nasal turbinate (47.5% vs 27.1, p=0.022). Also, pregnant women with OSA had higher AHI and lower minimal desaturation (89.2 ± 5.1 vs 92.4 ± 2.4). Multivariate logistic regression analyses of 46 variables were used to construct a model. Only four variables - SBP >112 mmHg (5.87; 95%CI:2.3,14.9), pre-pregnancy BMI >30 kg/m² (6.4;95%CI:2.2,18.8), weight gain (1.37; 95%CI:1.1,1.7), and history of allergy (4.27;95%CI:1.4,13.3) were predictors of OSA (p=<0.001). A scoring scheme was developed and trichotomized into low-, moderate-, and high-risk groups for OSA with cut-off scores of 5.54 (sensitivity 87.5%, specificity 76.35%), and 10.18 (sensitivity 45%, specificity 85.71%), respectively. Overall, the prediction score performed well with AUC 0.81 (95%CI: 0.7, 0.9).

**Conclusion:** OSA among high risk pregnant women is highly prevalent even during first trimester. Despite adverse effects of OSA on maternal-fetal outcomes and potential benefit of early intervention, accurate screening strategy is still lacking. A new prediction score shows high predictive ability to classify risk of OSA compared with prior reported questionnaires, and it can expedite early treatment in high risk pregnancy.

**Keywords:** OSA, High risk pregnancy, Screening questionnaire