

AI-assisted HSAT scoring increases OSA severity classification without reducing patient treatment initiation

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Introduction

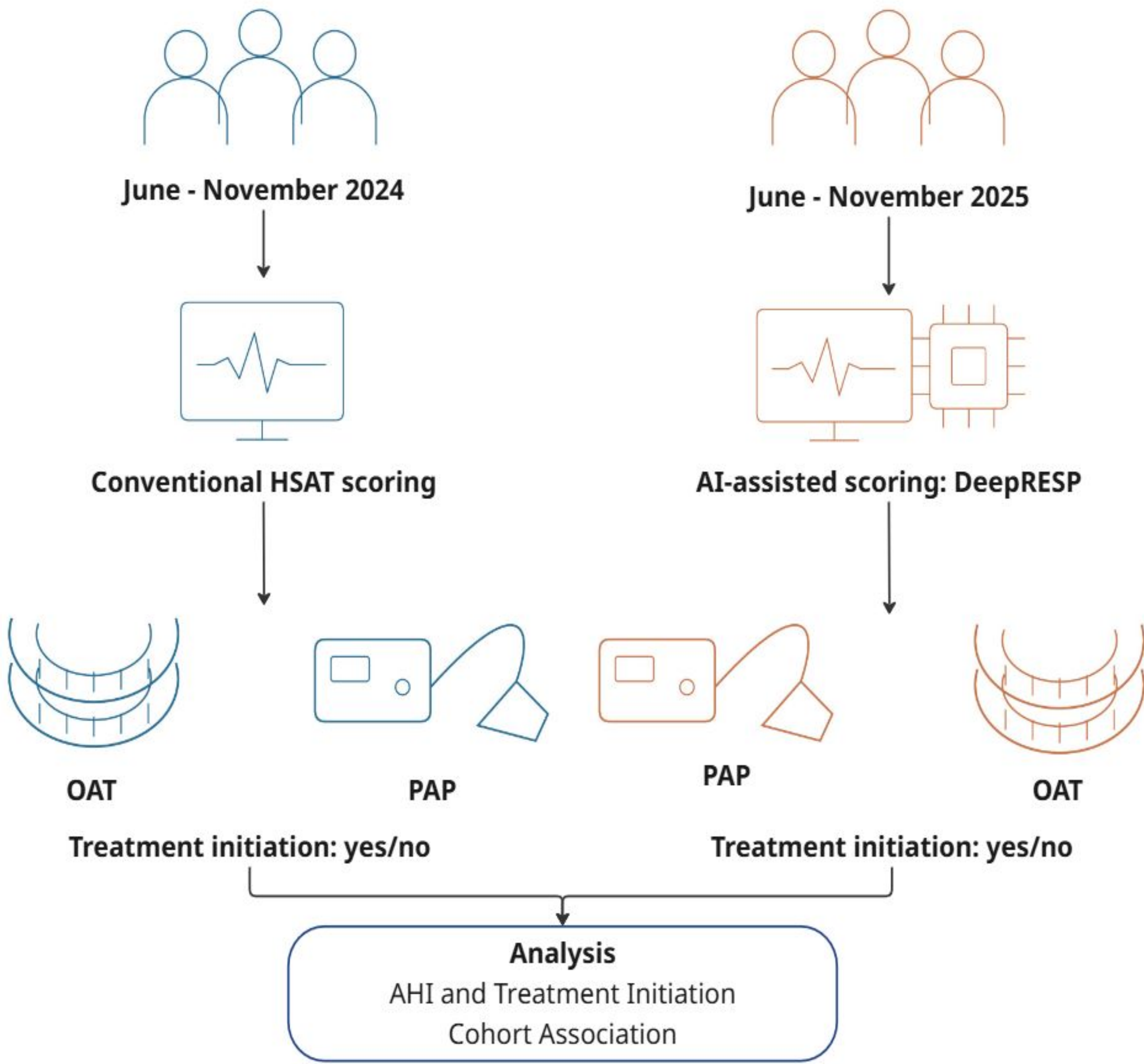
Home sleep apnoea testing (HSAT) is widely used to diagnose obstructive sleep apnoea (OSA), but conventional scoring may underestimate OSA disease severity. AI-assisted scoring (DeepRESP) incorporates sleep and arousal information to detect breathing events and results in higher apnoea-hypopnoea index (AHI). The impact of this change on patient treatment decisions is unclear.

We evaluated whether AI-assisted scoring influences patient initiation of therapy.

Methods

We conducted a retrospective analysis of consecutive HSATs before and after implementation of AI-assisted scoring (June-November 2024 [conventional] and June-November 2025 [AI-assisted]). All patients undergoing HSAT were included. The primary outcome was treatment initiation (positive airway pressure [PAP] or oral appliance therapy [OAT]), defined as patient acceptance and initiation of prescribed treatment. Logistic regression evaluated associations between AHI and treatment initiation, adjusting for age, sex, and body mass index (BMI). In addition, we evaluated whether these associations differed between groups (i.e., before and after implementation of AI-assisted scoring). Finally, we examined treatment modality.

Figure 1: Study design and analysis. Consecutive patients undergoing HSAT were compared before (June–November 2024; conventional scoring) and after (June–November 2025; AI-assisted scoring with DeepRESP) implementation. The primary outcome was acceptance and initiation of prescribed PAP or OAT. Logistic regression assessed association between AHI and treatment initiation, adjusting for age, sex and body mass index. An AHI-by-group interaction assessed whether this association differed between cohorts. Treatment modality was also examined. HSAT: Home sleep apnea testing, AHI: Apnea Hypopnea Index, PAP: Positive airway pressure, OAT: Oral appliance therapy, AI: Artificial Intelligence



Results

A total of 1,648 patients were included (675 conventional; 973 AI-assisted). Mean AHI increased from 26.0 events/hour before to 33.9 events/hour after implementation of AI-assisted scoring, and more patients were classified as moderate or severe OSA. No differences were observed in the proportion of diagnosed patients initiating treatment before compared to after AI-assisted scoring implementation (47.6% vs 47.0%). AHI was positively and age negatively associated with treatment initiation (OR 1.008–1.011 per unit increase, $p \leq 0.04$; OR 0.97, $p < 0.001$, respectively). AI-assisted scoring was not independently associated with treatment initiation (OR 0.81–0.91, $p \geq 0.29$), and no interaction between AHI and group was observed ($p \geq 0.76$). In both conventional and AI-assisted groups, PAP use was positively associated with AHI, and OAT use negatively associated with AHI.

Treatment Modality as AHI Increases

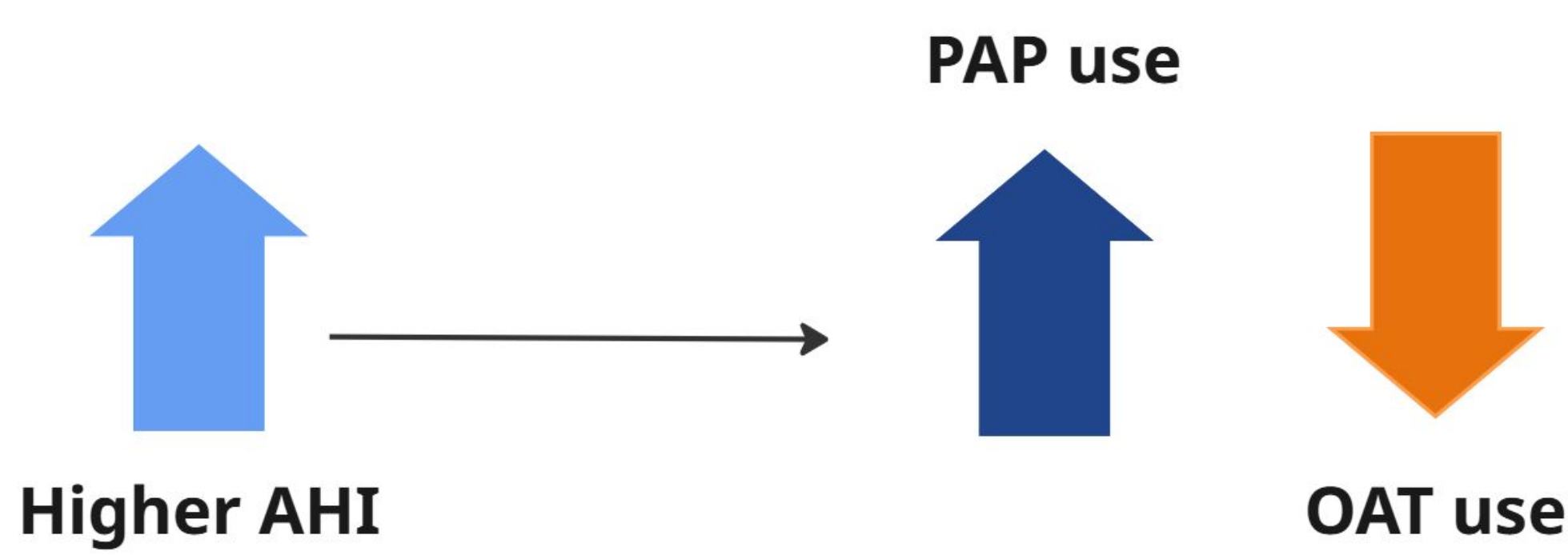


Figure 2: In both conventional and AI-assisted groups, PAP use increased with higher AHI, while OAT use decreased. Arrows show direction only, not effect size or predicted probability. PAP = positive airway pressure, OAT: oral appliance therapy

Conclusions

AI-assisted HSAT scoring increased OSA severity and reclassified patients into higher severity categories without altering patient treatment initiation. Thus, following implementation of AI-assisted scoring, more patients ultimately agreed to initiate OSA treatment. Future research should examine long-term outcomes associated with AI-assisted scoring. Overall, present results suggest that following AI-assisted scoring, patient decisions remain aligned with OSA disease severity.

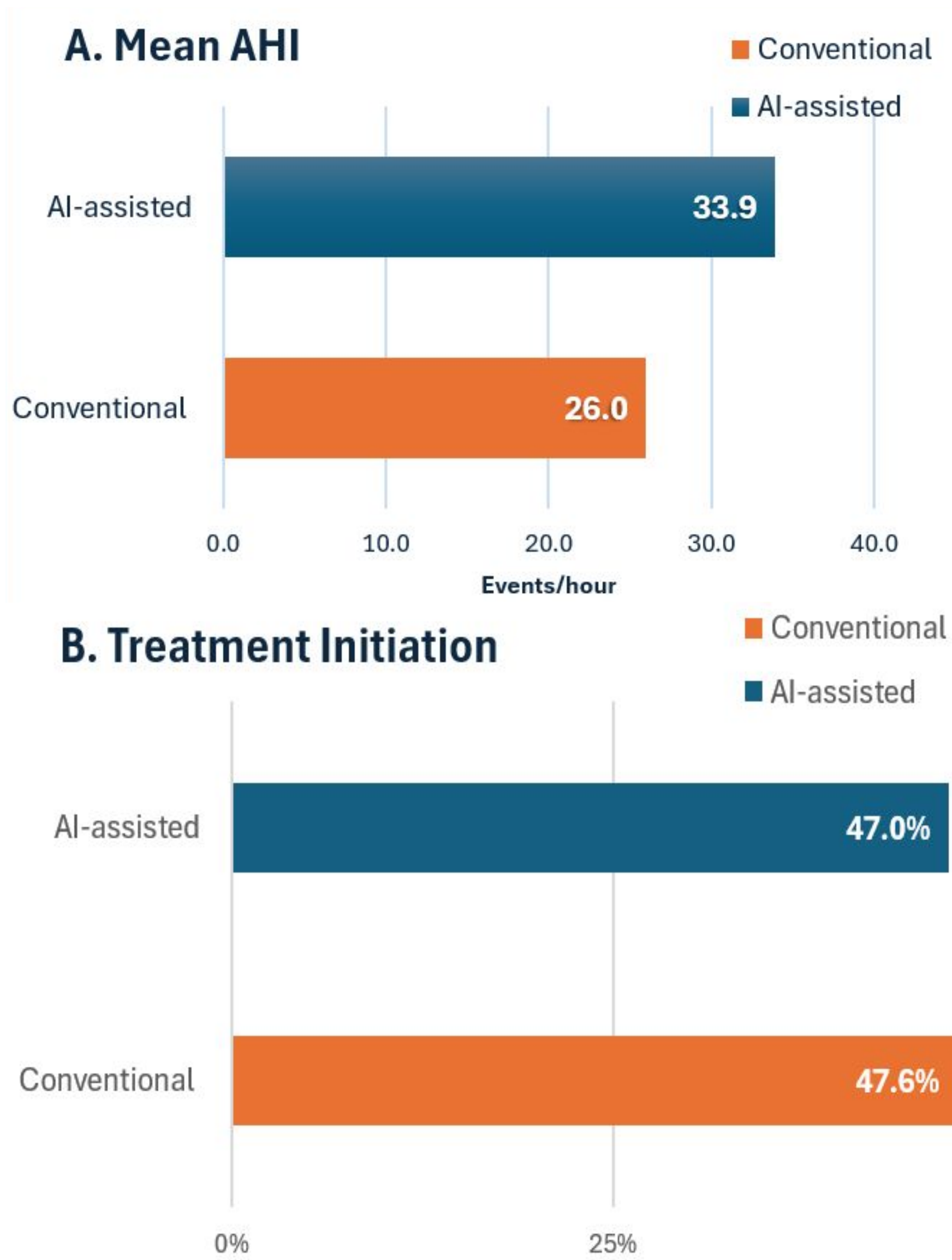


Figure 3A: After implementation of AI-assisted scoring, mean AHI was 7.9 events/hour higher with more patients classified as having severe OSA rather than moderate. Figure 3B: No significant difference was observed in the proportion of diagnosed patients that initiated treatment after incorporating AI-assisted scoring. (AHI = Apnea Hypopnea Index, Conventional n = 675, AI-assisted n = 973)

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