Title: Seasonal variability of at-home pulse oximetry in children with obstructive sleep apnea

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Body: Introduction: nocturnal pulse oximetry has a high positive predictive value for polysomnographically-diagnosed obstructive sleep apnea (OSA) and is increasingly used as first screening test. Objectives: the aim of this study was to evaluate the intersubjects seasonal variability of at-home pulse oximetry in children. Methods: at-home nocturnal pulse oximetry recording was consecutively performed on children referred for suspected OSA from February 2009 and October 2011. Patients with significant comorbidities were excluded. For each exam the McGill Oximetry Score (MOS) was also categorized. Results: 270 children (169 males), aged 4.5 yrs ± 2.5 (mean ±SD), were included. A significant difference was found between winter (Wi) vs spring (Sp), and winter vs summer (Su) for percentage of total effective recording time spent (TERT) with SpO₂ < 90% (respectively, p<0.01 and p<0.01); for lowest SpO₂ [Wi vs Sp p<0.01, Wi vs Su p=0.03 and Wi vs Autumn (Au) p=0.04]. Moreover, mean pulse rate (PR) showed seasonal difference especially comparing Wi and Sp (p<0.01) and similarly, highest PR between Wi vs Sp (p<0.01) and Wi vs Su (p<0.01). Interestingly, PR variability (PRV) showed significant seasonal difference comparing Wi vs all other seasons (Sp_p<0.01, Su_p<0.01, Au_p=0.01). Similar difference between seasons was found for the oxygen desaturation index (n° of desaturation ≥ 4%/TERT) (Wi vs Sp_p<0.01, Wi vs Su_p<0.01, Wi vs Au_p<0.01). Conclusions: Our data suggest the presence of seasonal differences in pulse oximetry study with winter identified as the most critical period. Seasonal differences need to be taken into account when nocturnal pulse oximetry is used to guide clinical decisions in children with suspected OSA.