

## EVALUATING FURTHER THE AUDITORY SENSITIVITY OF INFANTS BORN VERY PRETERM : PHYSIOLOGICAL, CEREBRAL AND BEHAVIORAL RESPONSES TO ENVIRONMENTAL SOUNDS IN INCUBATORS

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**Aims:** To evaluate the sensitivity of infants born very preterm (IBVPs) to sound pressure levels (SPL) increments below 70 dBA Leq in their "naturalistic" acoustic environments and to determine their impact on the well-being of IBVPs.

**Methods:** Environmental (SPL and audio recording), physiological (heart and respiratory rates; systemic oxygenations), cerebral oxygenation (by NIRS) and behavioral data were prospectively collected over 10 hours in 26 IBVPs (median gestational age (GA), 28 weeks; range 26-31 weeks) on postnatal day 17 [4-50]. Sound peaks (SPs) emerging from background noise during nonhandling periods were identified and classified. Newborns' arousal states were determined. Changes in parameters were compared over 5 sec periods between baseline and the 40 sec following the SPs.

**Results:** A total of 1369 SPs (5 to 15 dBA above background noise) were identified. Among the 598 SPs occurring during sleep, physiological values varied significantly, indicating that IBVPs clearly detect these SPs. Exposure to 10-15 dBA SPs during active sleep significantly increased mean heart rate +3.6 beats/min ( $p=0.03$ ), and significantly decreased mean respiratory rate -6.2 breaths/min ( $p=0.02$ ), and mean systemic (-2.5%,  $p<0.001$ ) and cerebral (-1.3%,  $p=0.006$ ) saturations relative to baseline. Exposure to 10-15 and 5-10 dBA SPs during active sleep led to awakening in 46.7% and 30.6% of cases, respectively.

**Conclusions:** IBVPs are sensitive to changes in their auditory environment, with a minimal signal-to-noise ratio threshold of 5-10 dBA. These auditory changes can alter their well-being and disrupt their sleep. These findings emphasize the importance of sound abatement for IBVPs in NICU.