understand. The subtle features of states 2AA and 1AA may need to be clarified for NIDCAP Trainers.

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Help Us Support Healing (HUSH): A Preliminary Assessment of Staff's Estimates of Acoustic Noise in their Level 4 NICU

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Aims

Maintaining a sensory environment appropriate for prematurely born infants is essential to NIDCAP practice. Reflecting such priorities, the American Academy of Pediatrics recommends baseline noise levels in a NICU at <45 decibels (dB) with allowable transient events <65 dB.

We assessed levels of acoustic noise within the incubators of an open-bay, Level 4 NICU resulting from identified sources of equipment and procedures. In parallel to these measures, we sought via a survey of NICU staff, to measure their understanding of the NICU acoustic emissions.

Methods

We assembled a Sensory Group consisting of 15 nurses from both the day and night shifts, who were trained to use the NIOSH Sound Level Meter Application (app) for iOS devices, which is free from the National Institute for Occupational Safety and Health. We then enrolled a diverse group of preterm babies (24 – 36 weeks GA) as HUSH subjects. The HUSH cohort was updated every week to record their status and screen for any changes in patient condition and hemodynamical instability.

Sensory Group members recorded the acoustic measurements with the NIOSH app during times designated for protected sleep or "quiet time". Recordings were made for one hour each time. The monitoring device was placed in the incubator, approximately 25-30 cm from its ears as a means of characterizing the acoustic environment experienced by the baby that is transduced into the incubator.

A survey was circulated among the NICU staff, mostly nurses, and 87 (> 73% of those invited to participate) completed the multiple-choice survey. They estimated noise levels associated with a variety of NICU events and procedures. Their responses were compared to the measured values collected by the Sensory Group.

Results

The average noise level within the incubators exceeded the recommended baseline maximum of 45 dB. Of the various sources of NICU noise exceeding recommended levels, alarms from the cardiac monitors were the loudest. In addition, common procedural events such as closing a port hole door produced transient sounds in excess of 100 dB, also exceeding recommendations.

Many respondents (one-third or more) to the survey correctly estimated several sound levels in decibel units. When the estimates made by the respondents deviated from the actual values, they often underestimated the noise levels experienced by the babies. Yet, only about 21% of the 87 respondents had an accurate idea of the acceptable maximum decibel level for NICU noise (40-45 dB). The respondents offered a variety of appropriate suggestions for limiting NICU noise.

Relevance to NIDCAP

Our findings identify sources of acoustic noise in an open bay NICU that regularly penetrate incubators and expose infants to dB levels deemed excessive by current medical standards and which are typically identified as reducible through NIDCAP practice.

Conclusions

There are numerous identifiable sources of baseline, ambient noise in the NICU, and several sources of transient sounds that vastly exceed acceptable levels. Many of these sounds can be reduced or eliminated by resetting equipment and making minor adjustments to procedures. Only a minority of NICU nurses in our sample were aware of the quantitative threshold of acceptable NICU noise, but they can be readily equipped to measure and understand it. The results of this preliminary study help clarify staff awareness of noise levels and sensitize us to other non-acoustic factors that affect babies. These exercises demonstrate the importance of research for improving practice.