SYNOPSIS

KEY POINT SUMMARY

OBJECTIVES

The objective of this study was to study the acoustic variance in the open bay unit and the single room unit. The study had two hypotheses: (1) that sound in the open bay NICU would be constant with no significant peaks or troughs; (2) that quiet sound levels in the single room NICU would be abruptly disturbed by staff, equipment or visitors.

Impact of NICU Design on Environmental Noise

Szymczk, S.E. & Shellhaas, R.A. 2014 | *Journal of Neonatal Nursing Volume 20, Pages 77-81*

Key Concepts/Context

Literature shows that preterm infants can be adversely affected by sounds in a hospital. Yet completely quiet environments may potentially limit a much-needed exposure to language. This presents a challenge to designing an optimal sound environment in NICUs. This study examined the acoustic variance in open bay and single room NICUs and found that there was little variability in the acoustic environment of the two NICU models. It also found that the single room NICU had longer periods of silence than the open bay NICU.

Methods

The methods involved in this study involved included the analysis of audio signals that were extracted from video electroencephalograms (EEGs) of 18 infants in open bay and 18 infants in single room NICUs. The first 24 hours of data were analyzed to cover all shifts. The variances in audio signals were analyzed, average Z-score for each NICU environment calculated, and T-tests and Chi-square tests conducted to compare demographic and acoustical data - all using SAS statistical software.

Findings

Infants in both units were of similar age and birth weight, and there were no differences in their neurological scores. The single rooms had a more heterogeneous group of subjects than the open bay unit. The acoustic environments of the two units were not different (p=0.7). Analysis showed that acoustic variance in the two units was not different and sound peaks took place at the same frequency in both units. Contrary to the hypothesis, noise peaks were similarly high in both units. However, there were longer periods of silence in the single rooms as compared to the open bay. The authors point out that although silence is beneficial to preterm infants, it can also limit their exposure to sounds and languages that they

DESIGN IMPLICATIONS

Although the study concluded that silent times were longer in the single room NICU, the study doesn't elaborate on what aspects of the environment contributed to the silent times. Hence, there are no design implications resulting from the findings of the study.

would have otherwise experienced in the uterus, potentially having negative outcomes.

Limitations

The authors indicated that their study had the following limitations:

1. The recording equipment was not specifically calibrated for reliable comparisons of absolute sound levels.
2. The audio signals were extracted from video recordings.

Another limitation of this study (in terms of design implications) is that there is no elaboration/mention of what (physical environment or other) caused the longer silent time in the single room NICU.