

THE MEASUREMENT OF NOISE LEVELS IN NMH NEONATAL UNIT



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Vita Gloriosa Vita ~ Life Glorious Life

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BACKGROUND

- Noise represented is by sound pressure level (SPL) and is an environmental health hazard.
- SPL in the NICU should not exceed 45 decibels (dB)
- Higher noise level is associated with physiological instability.
- Studies have shown that noise reduction strategies can improve developmental scores at long-term follow-up

AIMS

- We hypothesised environmental SPL the neonatal unit exceeds recommended levels
- SPL (peak and total) was measured in 3 areas at varying times of day
- We compared:
 - SPL between ICU1, ICU3 and HDU
 - SPL during active vs inactive time periods was
- This finding may promote staff awareness of noise levels the unit

METHODS

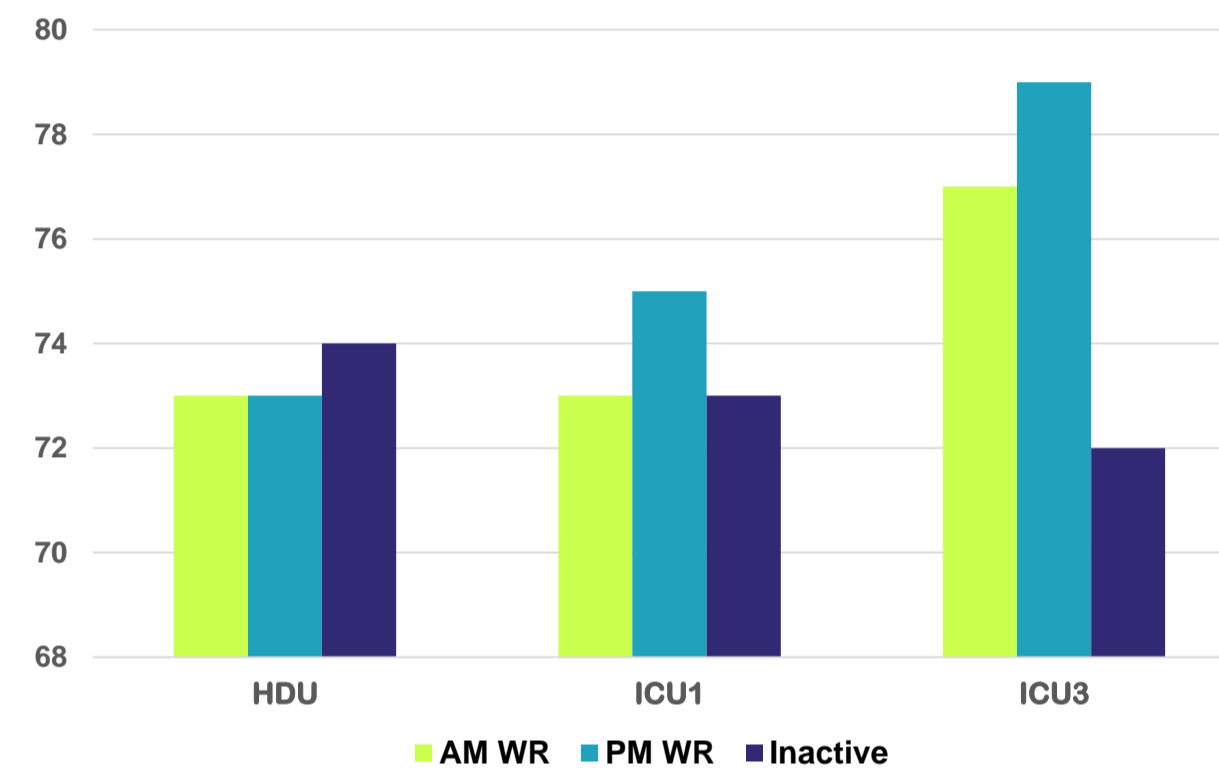
- SPL was measured in decibel-A (dBA) using a sound level meter (Svantek 958A®) that was placed opaque box in the middle of the clinical areas.
- SPL was measured and recorded from ICU1, ICU3 and HDU over a 2 month period during:
 - Active (morning and evening ward rounds)
 - Inactive (night-time)
- SPL was measured in peak and total values
- Data transferred using compatible software (SvanPC++®) for further analysis

References

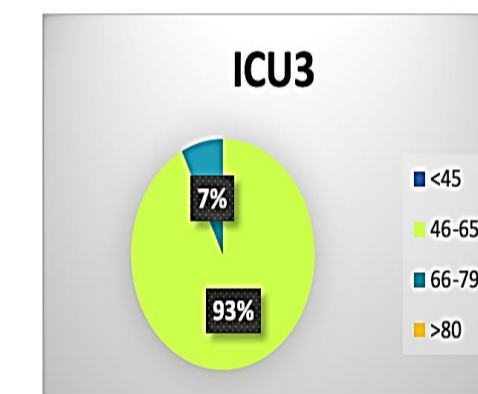
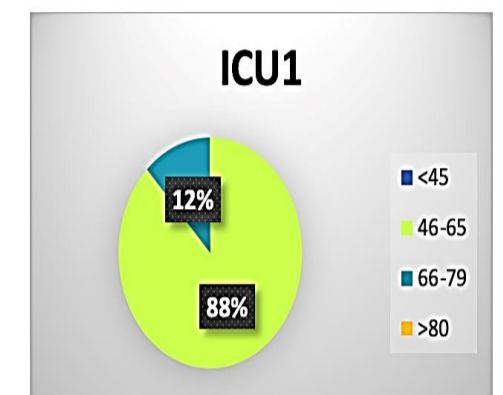
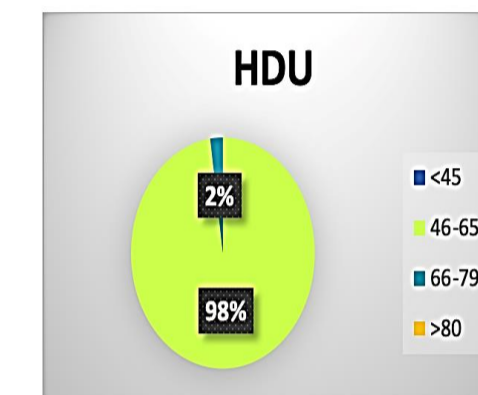
1. Etzel, R; Balk, S; Bearer, C; Hendrick, J; Schell L. AMERICAN ACADEMY OF PEDIATRICS Noise: A Hazard for the Fetus and Newborn (Committee on Environmental Health 1996-1997). Pediatrics. 1997;100(4):724-7.
2. Krueger C, Horesh E, Crossland BA. Safe Sound Exposure in the Fetus and Preterm Infant. JOGNN - J Obstet Gynecol Neonatal Nurs. 2012;41(2):166-70.
3. Aly HA, Ahmed AM. Effect of Noise on Neonatal Vital Data and Behavior in NICU. Clin Med Diagnostics. 2016;6(1):1-6.
4. Almadhoob A, Ohlsson A. Noise reduction management in the neonatal intensive care unit for preterm or very low birthweight infants (Protocol). Cochrane Database Syst Rev. 2015;1.
5. Cristobal R, Oghalai JS, Alford BR. Hearing loss in children with very low birth weight: current review of epidemiology and pathophysiology.
6. Le Prell CG, Yamashita D, Minami SB, Yamasoba T, Miller JM. Mechanisms of noise-induced hearing loss indicate multiple methods of prevention. Hear Res. 2007;226(1-2):22-43.
7. Williams AL, van Drongelen W, Lasky RE. Noise in contemporary neonatal intensive care. J Acoust Soc Am. 2007;121(5):2681-90.
8. Lasky RE, Williams AL. Noise and light exposures for extremely low birth weight newborns during their stay in the neonatal intensive care unit. Pediatrics. 2009;123(2):540-6.
9. Padmakumar AD, Bhasin V, Wenham TN, Bodenham AR. Evaluation of noise levels in intensive care units in two large teaching hospitals - A prospective observational study. J Intensive Care Soc. 2013;14(3):205-10.

RESULTS

Mean Sound Pressure Level (dBA)

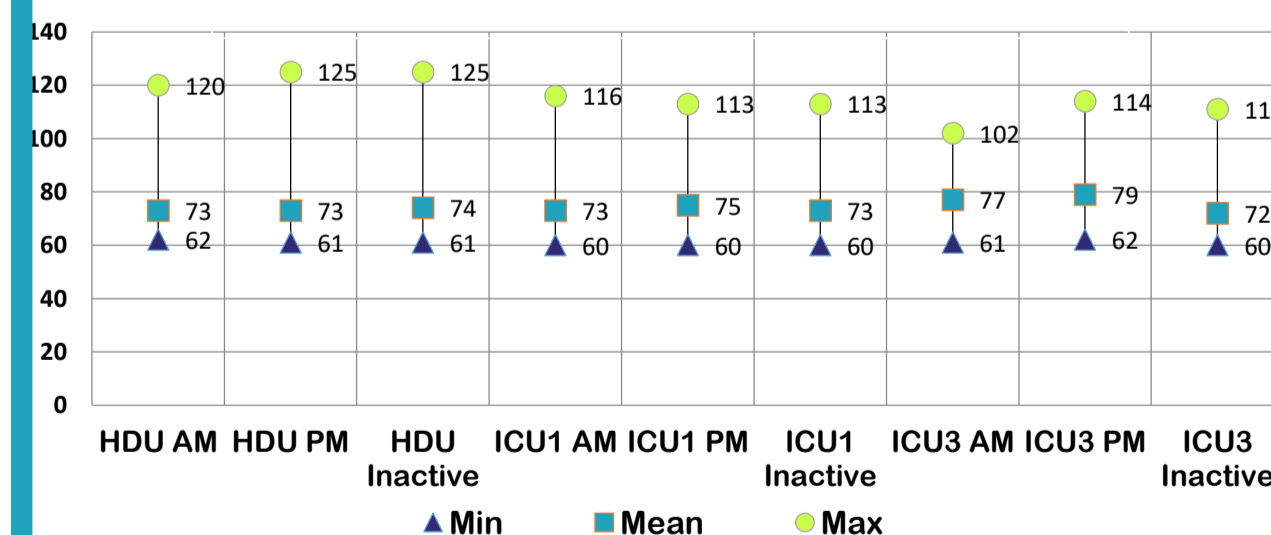


Duration of Recording (%) at Noisy/Harmful SPL



Guide:
< 45 dBA: Ideal NICU environment
46-65 dBA: Noisy
66-79 dBA: Loud/Very Noisy
> 80dBA: Extremely Noisy/ Harmful

Mean, Minimum, Maximum Noise Level (dBA)



- Mean SPL (peak and total) exceeded 45dbA in all three areas
- “Noisy” levels detected 97%, 84%, 91% of recording in HDU, ICU1, ICU3
- Mean peak SPL >70dBA during both active and inactive periods.

Conclusion

Noise in the NMH NICU constantly exceeds recommended limits during all time periods

Very little difference between noise levels during active and inactive periods.

Further action required on noise reduction strategies.