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Is it enough training healthcare staff on noise reduction in Neonatal Intensive Care Units? A pilot study from NeoNoise Project

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INTRODUCTION:

The noise in the neonatal intensive care units (NICU) is recognized by many researchers as an agent with negative implications on health and well-being of premature infants (Nicolau et al, 2005) and health professionals. Some sources of noise in hospitals include equipment, alarms, pneumatic tube systems, elevator buzzers, printers, ice machines, food carts, paging systems, call bells, telephones, televisions, and staff/visitors conversations. Several studies showed that “team conversation” was perceived by professionals as one of the main noise sources in NICU. Environmental modifications can effectively decrease noise levels, however the process of caring for hospitalized patients needs frequent and ongoing interpersonal dialogues. Minimizing the patient exposure to interpersonal communications between healthcare staff requires a behavior change. A well structured training program (TP) seems to be a low-cost measure to begin a noise reduction process in a hospital environment (Tsunemi, Kakehashi & Pinheiro, 2012).

OBJECTIVES:

The goal of this pilot study was to develop, implement and evaluate the effectiveness of a TP on noise reduction by comparing the noise levels before and six months after the implementation.

MATERIALS AND METHODS:

All measurements were performed in a NICU of a hospital located in Porto, Portugal between July 2011 (first phase) and July 2012 (second phase - six months after the implementation of the TP). The unit consists of two rooms (A and B), with physical separation between infrastructures. Both the preparation of the parenteral nutrition and medication are made in room A and, as a result, it had the greatest amount of staff activity. The measurements were carried out continuously during 24 hours in each measurement place (work station, traffic zone, inside incubator) and were performed using a sound level meter (01 dB, model Solo-Premium). The measurement protocol was based on the orientations of previous studies (Robertson, 1998). In the analysis and interpretation of the results were used reference values given by WHO (Berglund et al, 1999). The training program aimed to raise the professionals’ awareness about the acoustic reality at the unit along with the objective of reducing noise. This intervention was performed through a lecture of around 60 minutes and was conducted by the researchers. In order to ensure that all the staff of the NICU under study attend the lecture (n=79), were performed fourteen training sessions. The lecture included the results of the sound pressure levels obtained in the first phase, comparing them to the recommended values suggested by WHO and other regulatory agencies. It was also discussed the negative impact of noise on health, both for neonates and professionals, and some actions that needed to be implemented to ensure noise reduction.

RESULTS AND DISCUSSION:

Table 1 shows the results obtained for the mean, minimum and maximum values of L_{Aeq} (dB) and $L_{p, Cpeak}$ (dB) in the two rooms of NICU, before and after the implementation of the training program.

Table 1 - Values of mean LAeq (dB), before and after the implementation of the training program.

Room	Area	L _{Aeq} (dB) - Before	L _{p, Cpeak} (dB) -	L _{Aeq} (dB) - After	L _{p, Cpeak} (dB) -
		Mean (min-max)	Before	Mean (min-max)	After
A	Work station	71.7 (47.8-114.6)	143.3	58.8 (47.6-76.4)	102.8
	Traffic Zone	60.4 (43.6-91.5)	115.8	59.5 (53.0-75.0)	101.5
	Inside Incubator	48.7 (42.2-68.1)	104.1	54.4 (53.3-65.7)	92.8
B	Work Station	59.9 (39.5-85.8)	106.3	60.3 (46.4-79.2)	99.7
	Traffic Zone	58.1 (43.8-82.0)	113.2	63.9 (47.0-82.2)	98.9

As the table 1 shows “Work Station” of Room A had a significant L_{Aeq} and L_{p, Cpeak} decrease (71.7 to 58.8 dB and 143.3 to 102.8 dB, respectively). It was visible a greater care by professionals in carrying out their tasks regarding noise production. In the “Traffic Zone” of Room B, was found an increase of almost 6 dB after the TP. The L_{Aeq} values obtained in the “Work Station” and “Traffic Zone” before and after the implementation of the TP are above the recommended values given by WHO (45 dB). Regarding the values inside the incubator, despite the increase of L_{Aeq} values after the TP, the levels obtained are below 58.0-60.0 dB (maximum levels allowed given by regulatory agencies). The results can be justified by the number of newborns that were in NICU before (fourteen without specific care needs) and after TP (ten, which two of them were helped by an oximeter and ventilator, that may produce 60.0-78.0 and 60.0-80.0 dB respectively (Pugh, Jones & Griffiths, 2007)). Similar data was found by Tsunemi, Kakehashi & Pinheiro (2012) in their study. Despite the good adhesion by the healthcare staff to the TP there was no significant reduction of noise, in the NICU studied. Besides the fact that TP impact was lost over time, these results indicate that it is necessary to consider several factors that may ensure the effectiveness of the training programs.

CONCLUSION:

The results show that after six months of TP implementation, there was no significant noise reduction in the NICU and inside the incubator. While recognizing the importance of training programs in order to promote changes in the team’s attitudes, it must be recognized that the effects are not long lasting, then, it is emphasized to repeat them more often. Noise in all the rooms of a NICU can be reduced considerably by incorporating affordable behavioral and environmental modifications. Training the staff in order to implement quiet work behaviours is essential and must to be seen as a first step to implement a quiet time protocol in neonatal intensive units.

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