ECRONICON OPEN ACCESS

EC PAEDIATRICS
Opinion

The Need to Improve Housing for Newborn Infants in Neonatal Intensive and Intermediate Care Units in Family Integrated Care: An Opinion

Carlos Alfonso Fajardo[1]* and José María Rodríguez Pérez[2]

[1]Paediatrician, Neonatologist, Clinical Associate Professor, University of Calgary, AB, Canada
[2]Pediatrician Neonatologist, CINN International Neonatal Neurodevelopment Center, SP, Brazil

***Corresponding Author:** Carlos Alfonso Fajardo, Paediatrician, Neonatologist, Clinical Associate Professor, University of Calgary, AB, Canada.

Received: September 23, 2021; **Published:** October 28, 2021

Since the creation of contemporary neonatal intensive care units; in the early 1900s [1], the NICU environment had focused on the medical needs of the newborn. Little attention was placed on the needs of the family and the benefits of interaction with the infant. Indeed, parents were visitors to the NICU with limited contact with their child, which remains a challenge in many units around the world. In recent years, this concept has been challenged based on compelling evidence in favor of a family integrated neonatal care model. The principles of the Family Integrated Care (FICare) model promote skin-to-skin contact, minimizing noxious stimulation, and encourages the participation of parents in the care of their newborn infant.

A team of parents and health-care professionals in Canada developed the FICare model for Canadian NICUs [2]. The FICare model challenges the current dogma of neonatal care, by shifting the role of parents from disempowered observers to active caregivers and advocates for their infant in the NICU.

Family-centered care is a philosophy that uses principles to guide the provision of care, ultimately focusing on building partnerships between patients, their families, and health-care providers to facilitate shared decision making. FICare draws on all elements of family-centered care but, advances it further by enabling parents to become their infant's primary caregiver and to actively participate in their care [3]. It improves the care by minimizing isolation, stress during painful procedures, while also providing a mechanism for parents to build the confidence and skills required to better care for their infant on discharge.

FICare is based on four main pillars: 1-staff education and support 2- Parent education 3- NICU environment 4- Support from veteran parents.

The housing of newborn infants is presently in incubators and radiant warmers and cots in any neonatal unit to manage newborn microenvironment [4,5].

There have been no changes in technology since the development of incubators and radiant warmers until recently when the neonatal laminar flow (NLF) unit was developed and mostly used in providing therapeutic hypothermia for infants with hypoxic ischemic encephalopathy (HIE) and as a device to manage the microenvironment of the newborn [6].

From birth to the admission into the NICU, the infant requires to be in a warm and humid environment. Incubators provide these conditions but separate the infant from his/her parents due to its physical characteristics. The radiant warmer, on the other hand may facilitate the interactions with the parents but do not provide a humid environment and produces high water body loss by irradiation heat.

In a family-centered care system, the NLF unit does not impair this interaction and provide a warm by convection heat and humid environment. The NLF unit is open, facilitating access to care providers and family. It provides warm by convection at an air velocity of 0.6 m/s, much faster than an incubator (0.1 m/s). The system provides 1,000 class isolation which is always less than 1,000 particles higher than 0.3 micron per cubic feet (incubator provides about 60,000 particles per cubic feet). Additionally, it provides humidification of the newborn's microenvironment (about 60% relative humidity). Any procedure can be done without the extreme heat produce by the warmers upon the operators.

The physical contact is greatly facilitated since there are no mechanical barriers between the newborn and his parents.

The NLF unit keep the microenvironment practically free of particles greater than 0.3 micras which eliminates bacteria, fungus, and viruses due to the HEPA filter.

FiCare, to improve care, among other strategies, discourage the use of sedative and analgesic drugs. Those medications had shown to worsen neonatal neurodevelopment, outcomes at 1 year and 7 years of age, particularly in premature babies under 29 weeks of gestational age [7].

To decrease the sedatives, FICare has used other alternatives, such as keeping the newborn limbs flexed, music therapy, stimulation of breastfeeding, non-nutritive sucking, body massage to the newborn, lateral positioning of the body and selective stimuli of environment. All these procedures are easier to do with the use of NFL than incubators or radiant warmers.

The reduction of negative experiences, such as pain, stress, and a sense of isolation, seems to decrease the adverse influences on the brain of these newborns [7]; however, the lack of positive auditory stimuli, such as the human voice, caused by isolation in incubators and units with individual rooms can impair the neurodevelopment of these newborns. Additionally, studies have showed that neonatal intensive care units focused on the newborn and his family reduce maternal stress and anxiety and improve weight gain and increases the frequency of exclusive breastfeeding [7].

Conclusion

The operation of newborn intensive and intermediate care units with a focus on the newborn and his family has been shown to be advantageous in relation to the results of the neurodevelopment of newborns, especially of the most vulnerable newborns.

The FICare program is now utilized in Canada, throughout the intensive care units and the level 2 units in Alberta. As the outcomes had been better with this approach, the implementation of this program will increase over time.

Medical equipment should be designed to better achieved that goal.

The use of the NLF unit integrates with these new concepts. For the reasons already mentioned, the newly developed NLF unit fits well for comprehensive care of the newborn. It will allow the family to interact better than if the infant is in an incubator or radiant warmer, giving the benefit of a good temperature stability with convection heat.

The lack of walls around the baby will decrease the noise created by physical barriers when open and closed as well as the temperature fluctuations that preterm infants would be prone to get. Given the above, the advantage of using of NLF unit is evident by the easy access to the newborn without mechanical barriers, with convection heat with humidity around 60% and one hundred time more isolation than incubator. Please see figure.

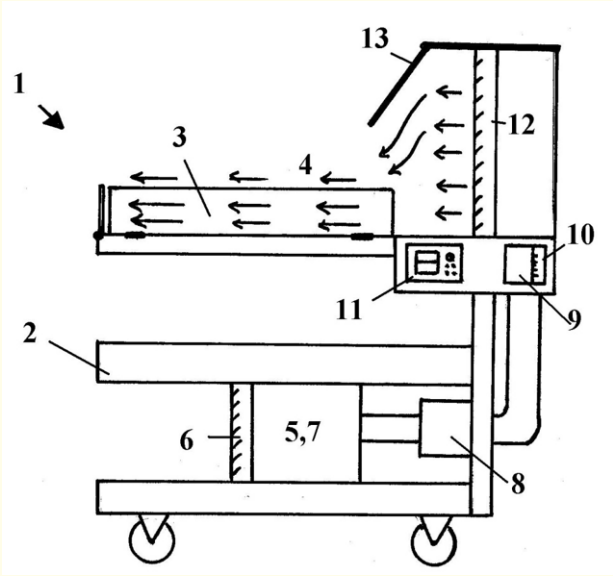

Figure: *Schematic representation of the laminar flow unit for newborn care6. Notes: (1) Laminar flow neonatal unit; (2) mobile equipment; (3) open bed; (4) laminar flow with control of temperature and humidity; (5) engine that aspirates environmental air; (6) air warmed by electrical resistance; (7) engine; (8) servo control equipment; humidifier; (10) water level by humidifier; (11) temperature control; (12) HEPA filter; (13) guiding of air flow. Abbreviation: HEPA: High Efficiency Particulate Air.*

Acknowledgement

We are grateful to Dr. Sumesh Thomas for reviewing the initial manuscript.

Both authors hold partially the patent of the Laminal Flow Unit.

Bibliography

1. Baker JP. "The incubator and the medical discovery of the premature infant". *Journal of Perinatology* 20.5 (2000): 321-328.

2. Lee SK and O'Brien K. "Parents as primary caregivers in the NICU". *Canadian Medical Association Journal* 186 (2014): 845-847.

3. Macdonell K., *et al*. "Implementing family -integrated care in the NICU: engaging veteran parents in program design and delivery". *Advances in Neonatal Care* 13 (2013): 262-269.

4. Gray PH and Flenady V. "Cot-nursing versus incubator care for preterm infants". *Cochrane Database of Systematic Reviews* 8 (2011): CD003062.

5. McIntosh N and Lyon AJ. "Keeping infants warm". *Pediatrics* 110.2-1 (2002): 424-425.

6. Perez JMR., *et al*. "A laminar flow unit for the care of critically ill newborn infants". *The Journal of Medical Devices* 6 (2013): 163-167.

7. Mcpherson C., *et al*. "The influence of pain, agitation, and their management on the immature brain". *Pediatric Research* 2 (2020): 1-8.

Volume 10 Issue 11 November 2021