

Novel Low-cost Bubble CPAP as an Alternative Non-invasive Oxygen Therapy for Newborn Infants with Respiratory Distress Syndrome in a Tertiary Level Neonatal Intensive Care Unit in the Philippines: A Single Blind Randomized Controlled Trial

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Abstract : Background and Objective: Respiratory Distress Syndrome (RDS) among premature infants is a major causes of neonatal death. The use of Continuous Positive Airway Pressure (CPAP) has become a standard of care for preterm newborns with RDS hence cost-effective innovations are needed. This study compared a novel low-cost Bubble CPAP (bCPAP) device to ventilator driven CPAP in the treatment of RDS. Methods: This is a single-blind, randomized controlled trial done on May 2022 to October 2022 in a Level III Neonatal Intensive Care Unit in the Philippines. Preterm newborns (<36 weeks) with RDS were randomized to receive Vayu bCPAP device or Ventilator-derived CPAP. Arterial Blood Gases, Oxygen Saturation, administration of surfactant, and CPAP failure rates were measured. Results: Seventy preterm newborns were included. No differences were observed between the Ventilator driven CPAP and Vayu bCPAP on the PaO₂ (97.51mmHg vs 97.37mmHg), So₂ (97.08% vs 95.60%) levels, amount of surfactant administered between groups. There were no observed differences in CPAP failure rates between Vayu bCPAP (\bar{x} 3.23 days) and ventilator-driven CPAP (\bar{x} 2.98 days). However, a significant difference was noted on the CO₂ level (40.32mmHg vs 50.70mmHg), which was higher among those hooked to Ventilator-driven CPAP (p 0.004). Conclusion: This study has shown that the novel low-cost bubble CPAP (Vayu bCPAP) can be used as an efficacious alternate non invasive oxygen therapy among preterm neonates with RDS, although the CO₂ levels were higher among those hooked to ventilator driven CPAP, other outcome parameters measured showed that both devices are comparable. Recommendation: A multi-center or national study to account for geographic region, which may alter the outcomes of patients connected to different ventilatory support. Cost comparison between devices is also suggested. A mixed-method research assessing the experiences of health care professionals in assembling and utilizing the gadget is a second consideration.

Keywords : bubble CPAP, ventilator-derived CPAP; infant, premature, respiratory distress syndrome

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