

# The Nigeria LNG respiratory support substation at University of Abuja Teaching Hospital Gwagwalada, FCT – a preliminary report after installation

## Abstract

Respiratory distress is a common presenting clinical sign in newborn infants. It is a manifestation of several underlying conditions including congenital pneumonia, respiratory distress syndrome, sepsis, perinatal asphyxia etc; however, if not properly managed with a good respiratory support device it could lead to an unfavourable outcome.

**Aim:** Preliminary report on effectiveness of Politeheart CPAP device in the care of neonatal respiratory distress.

**Methods:** The initial phase involved training of the end-users on the principles and techniques of the new device. Thereafter, a total of 22 newborn infants with moderate to severe respiratory distress (Silverman Anderson score of 5-7) were successfully managed with the Politeheart respiratory device. Twenty of these neonates were preterm, with their gestational age ranged between 26 to 37 weeks and birthweights of 0.85 to 2.6 kg. The oxygen saturation (SPO<sub>2</sub>) response was dramatic, and most babies were discharged within 24-48 hours of intervention. None of the treated neonates received surfactants.

**Conclusion:** The new Politeheart CPAP is very effective for the management of neonatal respiratory distress. Furthermore, it is cost effective when compared to other respiratory support devices.

**Keywords:** neonate, respiratory distress, cpap device, North-Central Nigeria

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Eyinade Kudirat Olateju,<sup>1</sup> Ojima Alabi,<sup>1</sup> Ruth Modupe Owolabi,<sup>1</sup> Hippolite Onyejiaka Amadi<sup>2</sup>

<sup>1</sup>Department of Paediatrics, University of Abuja Teaching Hospital, Nigeria

<sup>2</sup>Department of Bioengineering, Imperial College London, United Kingdom

**Correspondence:** Eyinade K Olateju, Department of Paediatrics, University of Abuja Teaching Hospital, Gwagwalada, Nigeria, Tel +234 8036148734

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## Introduction

With increase in premature births in Nigeria of recent, there is a corresponding increased demand for respiratory support devices to attend to the conditions of neonatal respiratory distress syndrome (RDS)—one of the numerous complications of prematurity.<sup>1</sup> Unfortunately, these devices are insufficient in number to cater for the large population of this category of newborns who may likely need them for their survival.<sup>2</sup> The accessories and consumables for the devices are relatively expensive in addition to their maintenance challenges. Sometimes we must make do with the local improvised respiratory support device which is not the best for these preterm babies.

The University of Abuja Teaching Hospital (UATH) received an interventional initiative from the Nigerian Liquefied Natural Gas (NLNG) Limited, which was installed towards the end of third quarter of 2024 (Figure 1). The new NLNG donation of a Respiratory Support Substation located within the existing Special Care Baby Unit (SCBU) of UATH Abuja has come at an appropriate time to complement the few existing respiratory devices in the Unit. The main installation of the devices took place within three days (15<sup>th</sup> – 18<sup>th</sup> September 2024) and was immediately followed by the theoretical training of the end- users on the devices. The four notable aspects of the installations include: solar power banking systems and the polite-light-bank system,<sup>3</sup> the politeheartCPAP device, a non- invasive ventilator,<sup>4</sup> and the politeoxygen splitter system (PSS) which enables up to four patients to share one oxygen supply source, simultaneously.<sup>5</sup> The theoretical training on the use of the devices was based on the physiology of respiration and the impact of temperature instability on gaseous exchange; this was brilliantly delivered by the NLNG Ambassador. The hospital engineering team was actively involved during the installation process for ease of maintenance of the devices in the future.



Figure 1 UATH, respiratory support substation.

## Methods

The hands-on training started with an explanation on the device components and essential instructions on how to operate the devices. The settings and how to adjust the devices was explained and demonstrated to the end-users. Some of the participants were allowed to experience hands-on practice with corrections in between when necessary. Thereafter, the clinical practice as led by the NLNG Ambassador placed a needy baby (preterm with gestational age of 30 weeks and birthweight of 1.2 kg in respiratory distress) who was on admission in the unit on the installed CPAP (politeheartCPAP) device.<sup>4</sup> A few hours later, another preterm baby with gestational age 34 weeks and birthweight 1.6 kg was started on the second respiratory support device whilst the ambassador was still on call. The staff were eager to use the devices because of its simple applications and the techniques learned from the visiting team. After the departure of the visiting NLNG ambassador—18 weeks leading up to the final submission of this manuscript, 21 more preterm newborn infants have been treated with the new device without much difficulty to operate the device. Their gestational ages and birthweights for the rest of the first nine

cases were 32 weeks/1.6 kg, 32 weeks/2 kg, 37 weeks/2.6 kg, and 35 weeks/ 1.7 kg and 1.8 kg (a set of twins), and the other three being 1.4kg, 2kg, and 1.6kg, respectively; patient case nos 20-22 being a set of distressed extremely low birthweight triplets.

## Results

The response of the oxygen saturation (SPO<sub>2</sub>) in the initial case baby was so ‘dramatic’ as we observed, and this was easy to monitor since a pulse oximeter is an accessory built into the device. Of the total 22 patients who were nursed on the new device so far in our SCBU, all have been successfully managed and sub-discharged. One baby (who could have increased the tally to 23) had the device discontinued because he was already enrolled for another ongoing research in the Unit. Comparing the new device application to other respiratory support methods, it’s simple to use because it does not require many accessories, and its consumables can be locally sourced. The intervention is cost effective, many babies were discharged from the substation within 24-48 hours of intervention (average speed of weaning off the machine is 24 hours). The patients experienced shorter duration of exposure to oxygen supplement, hence lowers the risk of oxygen toxicity. There was rapid improvement in neonatal breathing efficiency, and patient’s body temperature was easy to maintain within the safe zone limiting the rate of comorbidities such as hypothermia, hypoglycaemia and acidosis. In addition, more of the unit staff including doctors and nurses have been given additional training—after 3 months of initial usage, equipping them on how to maximize the use of the machine. This has further helped improve our patients’ outcome.

## Discussion

Based on the prevalence of RDS and other respiratory conditions complicating prematurity in the Nigerian practice, the new NLNG substation donated to our SCBU would improve the quality of care/ services provided to this vulnerable group which will eventually translate to low neonatal morbidity and mortality. The device is user friendly and cost effective to patients. None of these recipients was given surfactant which is very expensive; and recovery from

respiratory distress was fast. With epileptic power supply in the country, the device can be considered to replace the other electric powered methods since the new device is solar powered.

## Conclusions

The new politeheartCPAP device has made the management of preterm babies presenting with respiratory distress due to different conditions less stressful. Therefore, I wish to recommend it for the LMICs with scarce resources.

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## Funding

None.

## Conflicts of interest

The authors declare that they have no conflict of interest.

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