

Disadvantaged at Birth

7.5 MILLION

Number of low birth weight babies (less than 2,500 g) born in India every year

0.76 MILLION

Number of preterm babies dying every year in India

80%

Percentage of neonatal deaths due to low birth weight

Source: State of India's Newborns 2014 - Public Health Foundation of India, AIIMS

The Problem

Low-birth weight babies (less than 2,500 gram) don't have enough body fat to regulate temperature. The effort to stay warm comes at the cost of the body's growth



The Effect

- Low birth weight babies...
 - Are at higher risk of dying
 - Are at higher risk of complications like asphyxia, sepsis, hypothermia
 - Have higher odds of being underweight, stunted
 - Have higher risk of major neuro-developmental disabilities



How Embrace Nest Helps

Embrace Nest is a low-cost infant warmer which does not require uninterrupted power

It has two parts – a mini sleeping bag, or a cocoon, in which the baby is kept, and a warm pack

A phase change material with special chemicals is inserted in the warm pack and heated for 30 minutes, after which it is slipped into the cocoon

The special material and chemicals allow the heat to be retained for six hours

Advantages

Low-cost, portable, does not need uninterrupted power, easy to use

Price

₹ 15,000

(1% cost of traditional incubator)

Current reach

2,00,000

babies in 11 countries;
14 states in India

which would give consistent results. So he wrote to PLUSS Advanced Technologies, a Gurgaon-based company specialising in the manufacture of the phase change materials that he and his team had been using at the hospital. The company began collaborating with CMC Vellore and together came up with the MiraCradle-Neonate Cooler, which costs ₹1.6 lakh.

The 'cradle' has two levels of phase change materials that help reduce body temperature and a conduction mattress, which is a gel bed that helps in the transfer of heat from the infant. Like the Embrace Nest, the MiraCradle too does not need continuous electricity. Once it has been stored in a refrigerator for six to eight hours, it can be used for up to 72 hours without uninterrupted power.

The Sales Pitch

"But as someone said, the better mouse-trap does not sell by itself," says Raghu Dharmaraju, Embrace Innovations' chief operating officer and Panicker's senior at IIT Madras. The company has a for-profit and not-for-profit arm, with part of the revenue used by the not-for-profit to donate warmers to other NGOs. Because the intent was to serve those who could not afford to put their babies in conventional incubators, the company's main customer would have to be state governments.

When Dharmaraju approached then Rajasthan chief secretary CK Mathew with the low-cost infant warmers in 2012, he directed them to deploy them in Baran, a challenge of sorts. Home to 20,000 families of the Sahariya adivasi tribe, the district is one of the least developed in Rajasthan, with high rates of infant mortality and malnutrition.

A week later, the team from Bengaluru was fanning out through Baran distributing the infant warmers to primary health centres and hospitals. "The Sahariyas are very vulnerable and have remained impervious to many development initiatives. But the reports I got about the deployment of the Embrace Nest were excellent," says Mathew, who retired last year.

The 50 Embrace Nests bought by the Rajasthan government was the company's first big order, which was followed by 500 by the Karnataka government. Dharmaraju says nearly half of Karnataka's primary health centres use Embrace Nests.

"We issued orders two years ago that every taluk hospital should have one," says Dr Vimochana, deputy director of child health, Karnataka. But rather than as a substitute for the con-

ventional incubator, she says they found it most useful while transporting babies who need to be kept warm, particularly because paediatricians might not always be available. It is also effective when the baby needs to be kept next to the mother, she says.

MiraCradle's manufacturer, PLUSS, is in talks with the Rajasthan and Haryana governments for sales. "The maximum number of cases of asphyxia deaths of infants happen in Rajasthan, Haryana, Bihar and Odisha," says Samit Jain, the company's managing director. He also says that hospitals in a number of tier-II towns in the country have started using the cradle.

Ravi Khanna of Newborn, Child & Critical Care Centre at Bareilly, says the machine has proved to be a life-saver at his paediatric hospital. "It has huge significance. We cannot afford the imported equipment and this was also a reason for the large number of deaths on account of asphyxia. Though I had attended a workshop on therapeutic hypothermia (which deals with induced hibernation among infants to deal with asphyxia), there was nothing much I could do since the equipment was so expensive," says Khanna. According to the paediatrician, of the 50 newborns at his hospital every month, at least 15 have problems pertaining to asphyxia in some form or the other. "It used to be very frustrating for us when we would lose an infant. It is all the more incredible that an Indian company has come up with the product," he says. Launched in 2014, PLUSS says it is too early to reveal sales figures yet.

Come September, Embrace will be entering the US market with swaddles and sleeping bags for babies created using similar technology. Called Little Lotus and priced at \$150, this is both a revenue-generating and branding exercise. A fifth of revenue will be set aside for impact work. Embrace Nest has got CE certification, the European equivalent of USFDA, and the company, which expects to be profitable in another two years, would eventually explore the US medical devices market. "All startups take time to reach financial stability, right? We will get there," says Panicker.

Their success, Panicker hopes, might inspire other young people to follow similar paths. "These are some of the biggest problems of the world. You need the creative energies of young people, and for them to devote the best years of their life to this, rather than look at it as a retirement job," he says. And when the chips are down, he says they remind themselves of what one of their Stanford professors told them. "You may be starting something with noble intentions but don't expect the gratitude of the world. Be very clear that you are doing it because it is worth doing." ■



Embrace Innovations cofounders Rahul Panicker and Jane Chen at Stanford University