SWISS SOCIETY OF NEONATOLOGY

Her name was Miracle

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Title figure:
On the road between Rundu and Katima (Source: Thomas M. Berger, NEO FOR NAMIBIA – Helping Babies Survive).

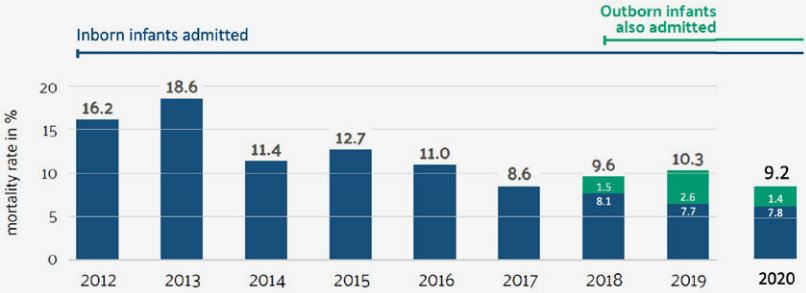
INTRODUCTION

NEO FOR NAMIBIA – Helping Babies Survive, a Swiss NGO founded in 2017, has been supporting the development of neonatal care in several hospitals in the poor north of Namibia. The introduction of basic neonatal care practices, including fluid and nutrition management, appropriate use of antibiotics, treatment of apnea of prematurity, continuous or intermittent oxygen saturation monitoring to guide oxygen therapy and non-invasive respiratory support with the Pumani® CPAP device (Fig. 1) (1 – 3) has been associated with a reduction in mortality rate of babies admitted to the Prem Unit at Rundu State Hospital by 50 % (Fig. 2) (4).

Fig. 1

Non-invasive respiratory support with an affordable and robust CPAP device (Pumani® bCPAP).

Fig. 2



Mortality rates of neonates admitted to the Prem Unit at Rundu State Hospital from 2021–2020; the activities of NEO FOR NAMIBIA – Helping Babies Survive started in 2015.

In low- and middle-income countries (LMICs), poor staffing, poor maintenance of medical equipment, unreliable laboratory services and fragile supply chains remain important challenges. The current Covid-19 pandemic has had an additional negative impact on these issues. Provision of affordable and robust medical equipment with thorough training of health care professionals, point of care testing (POCT) for commonly used laboratory parameters and routine stock management of vital consumables are therefore priorities.

This female infant was admitted to the hospital in Katima, the capital of the Zambezi region of Namibia on day of life 26. Her name was Miracle. The girl had been born near term in Onandjokwe (approximately 1100 km east of Katima). In her health passport, a birth weight of 2150 g was recorded. On admission, her weight was 1700 g, corresponding to a weight loss of 21 % over the first four weeks of life.

Despite her critical condition, she was admitted to the pediatric ward. No laboratory investigations were ordered, but she was started on antibiotics. Unfortunately, the admitting physician did not write adequate fluid and nutrition orders, and her weight was not followed over the next few days.

On day of life 29, the visiting team of NEO FOR NAMIBIA – Helping Babies Survive was asked to review the patient. Miracle was found in the arms of her mother, wrapped in several blankets. She was severely emaciated and dehydrated with standing skin folds, had a dry cough and appeared to be cyanotic. She was immediately transferred to the neonatal unit. On arrival, she was hypothermic (35.0°C) and in mild respiratory distress with an oxygen saturation of 78 % in room air. Her weight had decreased even further to 1580 g, 570 g (27 %) below birth weight (Fig. 3, movie).

Fig. 3

Day of life 29: Miracle is severely malnourished and dehydrated; she has lost 27 % of her birth weight.

Fig. 4

Initially, Miracle seemed to improve with steady weight gain, slow correction of hypernatremia and normalization of urea and creatinine values.

She was started on nasal cannula oxygen, and a fluid bolus of 20 ml/kg was administered. Initial laboratory examinations revealed marked hypernatremia with a sodium concentration of 162 mmol/l. Serum creatinine and urea were both elevated with values of 138 µmol/l and 28.1 mmol/l, respectively. A full blood count was unremarkable, and the C-reactive protein concentration was 0.4 mg/l. A chest X-ray could not be obtained because the mobile X-ray machine had been broken for more than a year, and the baby could not be brought to the X-ray department.

Following initial stabilization and steady weight gain with intravenous rehydration and enteral nutrition (Fig. 4) and slow correction of electrolyte abnormalities within 24 hours (sodium concentration 158 mmol/l, creatinine 90 µmol/l, urea 23.1 mmol/l), her condition deteriorated again three days later with increasing respiratory distress. She was switched to nasal CPAP (Fig. 5), and broad-spectrum antibiotics were started despite the fact that inflammatory parameters remained within the normal range. A chest X-ray could not be obtained. Electrolytes and renal function studies could not be repeated at this point because the laboratory run by the National Institute of Pathology (NIP) had run out of reagents necessary to perform these tests.

Fig. 5

Following initial stabilization, Miracle's respiratory condition deteriorated, and she was put on CPAP.

Transfer to Rundu State Hospital was considered but finally judged to be too risky (no CPAP during transport, distance more than 500 km). A trial of furosemide had no effect on oxygenation, and she became increasingly hypoxemic despite an FiO_2 of 1.0. Apnea spells were noted but could not be treated because caffeine citrate had been out of stock for more than a month. Finally, Miracle died five days after her admission to the neonatology unit.

CONCLUSIONS

The tragic case of Miracle illustrates various challenges faced by LMICs, many of which have been aggravated by the Covid-19 pandemic. Late referrals, inadequately trained physicians and nurses, unreliable laboratory services, and intermittent lack of essential drugs have a direct impact on the prognosis of critically ill children.

In Namibia, the so-called under-5 mortality rate (probability of dying by the age 5 years) remains high at 42.4 per 1000 live births in 2019. This is more than ten times the rate in Switzerland (3.6 per 1000 live births) (Fig. 6) (5). Of note, almost 50 % of these deaths occur in the neonatal period. Improving care for this vulnerable population could have a marked impact on the under-5 mortality rate in LMICs.

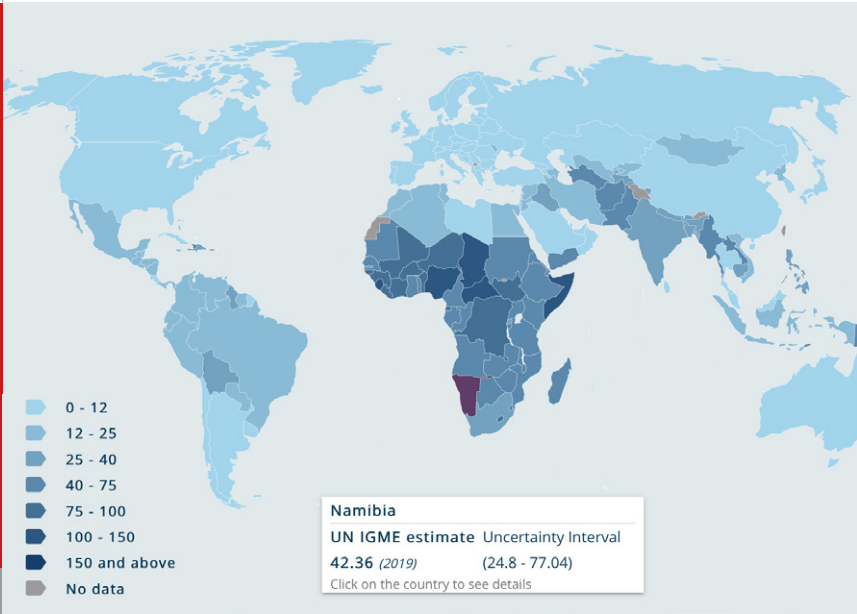


Fig. 6

World map of under-5 mortality rates (2019): Switzerland 3.6 per 1000 live births, Namibia 42.4 per 1000 live births (5).

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