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Real-time monitoring, technological innovations and improving the quality of maternal and neonatal care

Benin's experience

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MINISTÈRE DE LA SANTÉ

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Background

According to UNICEF's global database, Benin recorded an average of 12,652 newborn deaths in 2017 (9,335–17,534), equivalent to an average of 35 deaths per day. Between 2006 and 2017, this number increased from 11,640 to 12,652, although in percentage terms, there was a very slight decrease in the neonatal mortality rate (from 32 per cent in 2006 to 30 per cent in 2017). The rate in Zou, one of the most vulnerable departments supported by UNICEF, stands at 9 per cent, or about 2,733 deaths. The three communes of Zogbodomey, Bohicon and Zakpota, which are part of the ZOBOZA health district, account for 1,276 of the 2,733 deaths throughout the nine communes, equivalent to 47 per cent of the neonatal mortality rate.

About one in two children under five years of age who died in the Department of Zou came from the Zogbodomey-Bohicon-Zakpota (ZOBOZA) health district and one third of these were newborn deaths. Analysis of the Multiple Indicator Cluster Survey (MICS) 2014 data shows that the three main causes of newborn mortality at the national level are prematurity (34 per cent), asphyxia (26 per cent) and pneumonia (19 per cent). The same trends are observed in Zou, where 34 per cent of deaths are due to prematurity, 26 per cent due to asphyxia and 19 per cent due to pneumonia. According to research,[1] children of low birthweight have twice as high a risk of death as children of normal weight. The survival of these children depends on their nutritional status and the prevention of hypothermia, which are major factors in morbidity and mortality. It is within this context that this model was put in place to improve newborn survival and, more specifically, to:

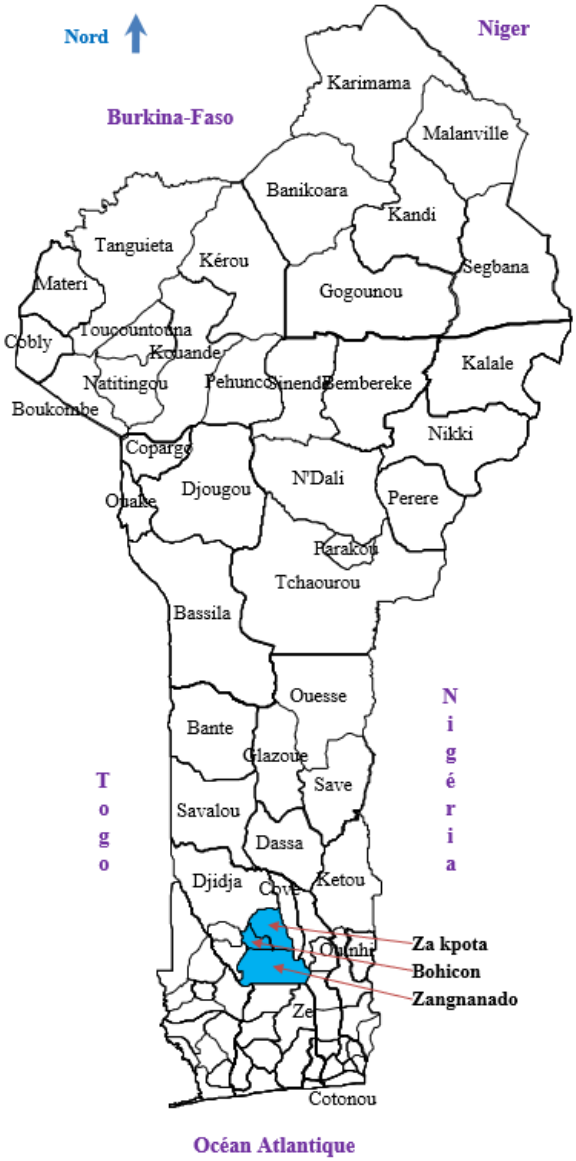
1. Strengthen post-neonatal follow-up in health facilities.
2. Ensure the early detection of hypothermia in newborns born with low birthweight.
3. Ensure that the newborns have a quick access to health care within the community.
4. Improve weight gain in this category of newborns.

[1] Kabore, P., Donnen, P. & Dramaix-Wilmet, M. (2009), Impact du petit poids de naissance à terme sur la morbidité et la mortalité infantile en milieu rural sahélien, Journal de Pédiatrie et de Puériculture, Volume 22, Issue 3, 121-127, https://doi.org/10.1016/j.jpp.2009.02.003

Implementation framework

This pilot model was implemented in the three communes of the ZOBOZA health district, located in the Zou Department in central Benin. This area has a population of 471,927 inhabitants spread across 29 *arrondissements* (administrative units) and 172 villages (General Population and Habitat Census (RGPH) 2013 projections). On average, 20,517 pregnancies are expected each year. About one in two pregnant women attends the four antenatal consultations required by national standards before childbirth (55 per cent) and nine in ten women gives birth in health centres within the health district.

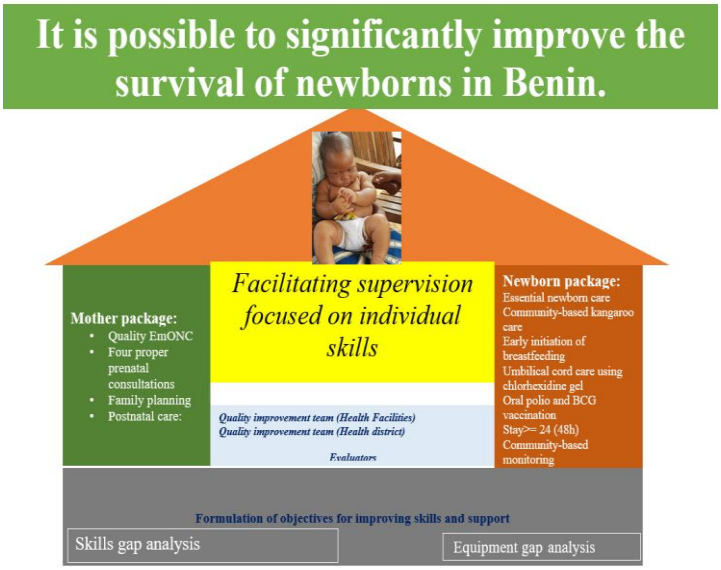
Implementation period: This model was implemented between September 2018 and February 2019.



Components of the model

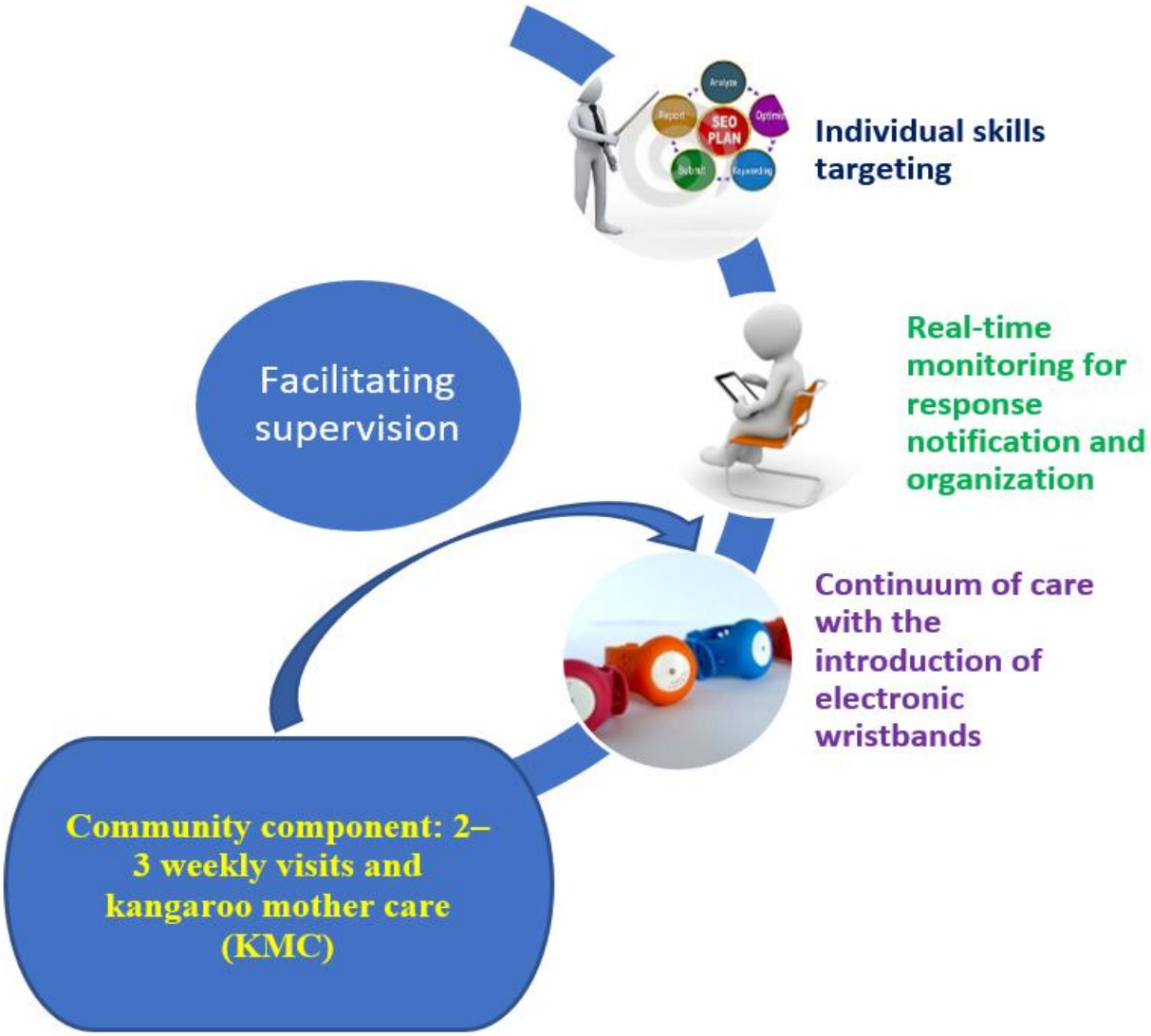
The model is based on several integrated components to better impact the survival of newborns in the health district. These are as follows:

- The "human resources" component, focused on the individual skills-based approach, which made it possible to use the established standards as a basis for defining the level of skills of each service provider and establishing an objective contract for performance improvement.
- The “clinical delivery” component which consisted of implementing the continuum of care focused on quality maternal care before and after childbirth, as well as essential newborn care. This involved introducing an electronic wristband to monitor the occurrence of hypothermia in any low birthweight newborn and ensure that they received care quickly. In this case, a systematic weekly follow-up of newborns with low birthweight at the health centre during the first four weeks of life was set up.
- The “real-time monitoring” component, using the open source TextIt platform, made it possible to monitor the main quality indicators of maternal and neonatal health in real time and to organize responses when adverse events occurred.
- The “community” component is two-pronged, entailing both the organization of two to three home visits to newborns during the first week of life and the use of kangaroo care carried out by mothers or caregivers in the event of the wristband reporting hypothermia.
- The "facilitating supervision" component (unlike traditional supervision), is provided by qualified supervisors at the level of the health district and is carried out regularly and very closely, taking into account the constraints of the health centre teams and the individual evaluations made in the course of Component 1 of the model, focused on the common objective.



Human resources component

1. Design of a tool to evaluate the individual skills of health workers using the Emergency Obstetric and Neonatal Care (EmONC) and essential newborn care monitoring tools.
2. Setting up data-collection materials: Mother component, Newborn component, Community survey.
3. Consensual definition of improvement objectives with care providers, focusing on the continuum of care, based on the evaluation data.
4. Micro action plan focused on objective contracts.
5. Capacity-building for providers and Community Health Workers.



Real-time monitoring component

Thanks to TextIt technology, weekly tracking of the key indicators for the mother and newborn continuum of care has been implemented, taking neonatal deaths into account.

- Text messages are sent via SMS from a server (every Monday at 5pm) to the maternity ward managers.
- An instant response is received via the same server.
- Server is used to deliver the report of the health district management team on Tuesday morning.
- Feedback is sent to the health teams.
- Preparation and response as required.

Clinical delivery component

1. **Mother package**

   Provides four mandatory antenatal cares and quality basic obstetric and neonatal care, promotes family planning and promotes postnatal consultation immediately and six weeks after birth.

2. **Newborn package**

   Definition of a compulsory care package for all newborns born in the health centres within the health district. This package is composed as follows: a) initial assessment of the newborn's condition, b) umbilical cord care with chlorinexydrine gel, c) mandatory 48-hour stay, d) early initiation of breastfeeding, e) exclusive breastfeeding and f) necessary advice regarding the baby's healthy growth. Newborns born with a low birthweight (weighing under 2,500 g) are automatically given an electronic wristband.

   Using the wristband: under normal circumstances, a bluelight flashes on the wristband. If hypothermia is detected, the blue light turns orange and the wristband continuously beeps until the temperature returns to normal. In case a newborn has a low birthweight; the mother is trained while she is still in the maternity ward to provide kangaroo care to her baby once she returns to the community. Newborns are monitored on a weekly basis during the critical four-week period. During each visit, information is collected on the number of wristband alerts, the number of kangaroo care sessions that have taken place, the duration of the care,

the continuation of breastfeeding and the newborn's weight. The newborn is then examined, receives the appropriate vaccines and the mother is given all necessary advice for ensuring her child's healthy growth.

Community component

This component focused on two aspects:

- Carrying out home visits to follow up with newborns, two to three times during their first week of life. Training Community Health Workers in the use of the wristbands so that they can better inform new mothers during home visits. Any danger signs are reported and referral to a health centre is organized.
- The provision of kangaroo care by mothers of children born with low birthweight.

Key observations

Between September 2018 and February 2019:

- Two hundred and eighteen newborns with low birthweight (weight < 2,500 g) were registered – 123 were female (56 per cent) and 95 were male (44 per cent). Their average birthweight was 2,154 g (1,500 g – 2,430 g). Among the 218 low birthweight newborns who received electronic wristbands and whose mothers received close follow-up, 164 (75 per cent) received an alert indicating the presence of hypothermia and required an average of 61 kangaroo care sessions. As regards the weight of these newborns, this protocol enabled an average weight gain of 669 g (110–1,380 g) between birth and the fourth follow-up appointment. Fifty-two per cent of newborns experienced weight gain that allowed them to pass the 2,500 g mark after four weeks of follow-up.
- Postnatal monitoring of newborns in the maternity ward during the first 48 hours is more frequently documented (78 per cent).
- Essential care was systematically provided to 5,892 registered newborns during the period.
- All the maternity wards have made early initiation of breastfeeding systematic.

Other observations

Regarding mothers, this system also allowed to achieve the following results:

1. The availability of inputs for the implementation of Basic Emergency Obstetric and Neonatal Care increased from 75 per cent to 81 per cent during the period.
2. The rate of third postnatal consultation following childbirth increased from 41 per cent to 55 per cent.
3. Contraceptive prevalence has improved from 10 per cent to 13 per cent.

Difficulties encountered

These mainly relate to the completing of newborn monitoring tools and mothers' failure to attend scheduled follow-up appointments. After a stay of at least 48 hours in a maternity ward, mothers tend not to keep follow-up appointments, especially when the newborn shows no signs of concern. The rate of missed appointments already reached 16 per cent in the first week, 22 per cent in the second week, 26 per cent in the third week and 34 per cent in the fourth week.

Lessons learned

Thanks to a good care protocol and rigorous follow-up, the survival of low birthweight newborns can be improved, even within the community.

Three quarters of low birthweight babies who received wristbands experienced hypothermia alerts. Therefore, hypothermia in newborns is not negligible. It is a critical element to take into account in the follow-up of these newborns.

Kangaroo care is easy to implement within the community and can be the first resort for mothers or caregivers before they access a health centre.

The electronic wristband is an effective tool for monitoring hypothermia and a real hope for reducing neonatal mortality.

Monitoring the implementation

The cost of setting up this pilot experience is estimated at US$ 42,734, or CFA franc 24,643,457 , of which 2 per cent come from local funding of the health district, 23 per cent from a personal donation made by UNICEF-France Goodwill Ambassador Mikko Franck, and 75 per cent from UNICEF- Benin.

Success factors

The following key elements were key to the successful implementation of this model:

- The leadership of the Health Care Coordinator who mobilized the various teams around a common and shared vision.
- The performance-based approach was crucial to increase the motivation of health workers. The gap of skills was addressed on an individual basis. The implemented tool enabled the various to actors to become aware of these gaps, and to make the link with existing norms and standards.
- Real-time performance monitoring saves time and allows a rapid response.
- The introduction of the electronic wristband has made it easier for health workers to monitor the temperature of newborns with low birthweights in real time. This has helped improve rapid care.

Opportunities

- Carry out an impact study of the model for reducing neonatal mortality in the region.
- Conduct a study on the effect of the "wristband use, community-based kangaroo care, growth monitoring" model for the health of low birthweight newborns.
- Integrate private health centres into the system.
- Integrate this system into the "quality of care" package for other health districts.

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