

Assessment of a Comprehensive New-Born Survival Programme in 14 Districts in the Northern and Upper East Regions of Ghana

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Abstract

Objective: The aim is to ascertain the effectiveness of a package of evidence-based neonatal survival interventions focusing on Home-Based Postnatal Care and Facility-Based Integrated Management of New-born and Childhood Illnesses models on reduction in neonatal mortality rate in Northern and Upper East regions of Ghana.

Method: The assessment employed a mixed method design. Baseline and end line neonatal mortality rates were estimated using the 2011 Multiple Indicator Cluster Survey and the 2014 Ghana Demographic and Health Surveys respectively, which used similar designs and analytical methods. The qualitative component consisted of in-depth interviews with key national decision-makers, donor partners, sub-national authorities and service providers, and focus group discussions with mothers or caregivers drawn from project communities.

Results: Over the period of project implementation, the neonatal mortality rate decreased from 39 deaths per 1,000 live births in 2011 to 24 deaths per 1,000 live births in 2014 in Northern region (P-value=0.01) and from 34 deaths per 1,000 live births in 2011 to 24 deaths per 1,000 live births in 2014 in Upper East region (P-value=0.049).

Conclusion: The home-based postnatal new-born care and the facility-based neonatal care models have been effective in contributing to improved new-born survival in the two project regions.

Keywords: Neonatal mortality; Home-based postnatal care; Interventions; Neonatal care unit

Introduction

The days and weeks following childbirth – the postnatal period – are a critical phase in the life of new-born babies. Major changes occur during this period, which determine the wellbeing of new-borns. Yet, this is often the most neglected time with regard to the provision of quality services. Lack of appropriate care during this period could result in significant ill health and even death. Most infant deaths occur during this time.

The mortality rate among children under five years of age (U5MR) has fallen globally by 47% (from 90 deaths per 1000 live births in 1990 to 48 deaths per 1000 live births in 2012), but the neonatal mortality rate (NMR) decreased only by 37% (from 33 deaths per 1000 live births to 21 deaths per 1000 live births) over the same period and represented, in 2012, 44% of the total under five mortality [1]. The global annual average rate of reduction in NMR since 1990 has been 2.0%, lower than that of maternal mortality (2.6%) and under-five-year old mortality (2.9%) [2]. In Ghana, around 38 per cent of under-five deaths and 60 per cent of infant deaths occur during the new-born period. In 2011, the neonatal mortality rate was estimated as 32 neonatal deaths per 1000 live births [3]. Birth asphyxia has been reported as the major cause of intra-partum neonatal death (41 per

cent) at the facility level [4], suggesting that there is an issue of quality of care at the facility level.

In response, UNICEF with funding support from the Government of Japan, has been providing technical and financial assistance to GHS in selected fourteen districts of Northern and Upper East regions since October 2011 to implement the project entitled “Accelerating efforts to reduce maternal, neonatal and child mortality in the Northern and Upper East regions of Ghana”. The project was implemented in two phases. Phase 1 covered the period September 2011 to December 2013 in 11 districts in the Northern and Upper East regions whereas phase 2 started in January 2013 and ended in December 2014 in the same focus districts as phase 1, but with the addition of three new districts in the Upper East region, resulting in a total of fourteen project districts out of a total of thirty-nine (26 districts in Northern region’ and 13 districts in Upper East region).

In this paper, we aim to ascertain the effectiveness of the package of evidence-based neonatal survival interventions with a focus on Home-Based Post-Natal Care (HBPNC) and Facility-Based Integrated Management of New-born and Childhood Illnesses (FBIMNCI) approaches in the selected districts of the Northern and Upper East regions. We hypothesised that an increase in effective evidence-based neonatal survival interventions coverage would decrease neonatal morbidity and in turn decrease neonatal mortality in the two regions.

Methods

Ethical consideration

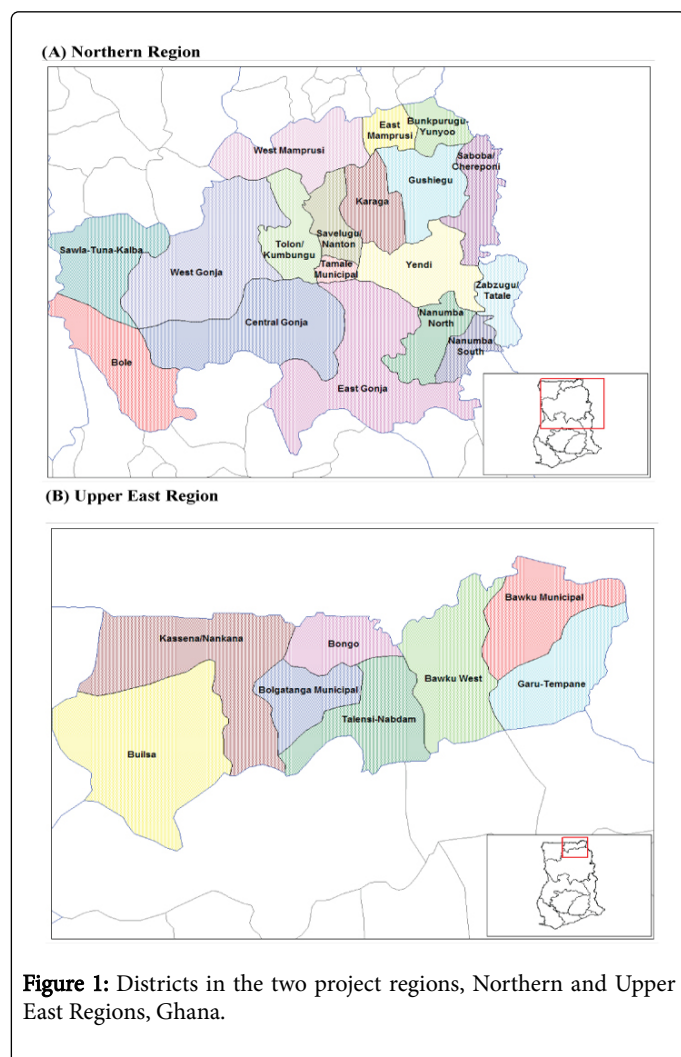
The GHS approved the study. Individual consent was obtained before interviews or focus group discussion (FGD) was conducted. We did not seek personal information or opinions believed to be controversial. No risk was anticipated for participants.

Study design

The evaluation employed a mixed method design. The analytic logic was to merge the quantitative and qualitative data into one analysis and interpretation to address the objectives of the study [5]. We collected the quantitative and qualitative data concurrently.

Study settings

The programme was rolled out in the Northern and Upper East regions of Ghana (Figure 1).



These are two of the four most deprived regions. The district population is sparse ranging 43,605 to 250,301 people in Northern region and from 35,482 to 137,989 people in Upper East region [6]. The district institutional deliveries ranged from 545 to 15,791 live

births in Northern region and from 632 to 5,470 live births in Upper East region [6].

Intervention

The key components of the project were a minimum of two home visits (to mother and new-born) within the first 7 days after delivery by appropriately trained community health workers (CHW). The CHW were encouraged to refer cases that require specialized care. To facilitate the referral, the project also established Neonatal Care Unit (NCU) in four district hospitals to implement Integrated Management of Neonatal and Childhood Illnesses (IMNCI) component of the project. The project also enhanced the capacity of Community-based Health Planning and Services (CHPS) compound and Health Centres to provide Basic Emergency Obstetric and New-born Care (BEmONC) through training and supply of basic equipment. It also included an advocacy component to promote key household and community practices related to delivery as well as new-born care. The project was designed to target 80% of expected deliveries as the population in need. While the intervention was not delivered to all districts in the two project regions the intervention districts constituted high concentration of neonatal deaths so that targeting it will translate into noticeable impact at the regional level.

Sampling and data collection

The quantitative component involved abstraction of neonatal mortality rates from the 2011 Multiple Indicator Cluster Survey (MICS) to estimate baseline rate and the 2014 Ghana Demographic and Health Surveys (GDHS) to estimate endline rate at the regional level. The two surveys used similar methods in estimating mortality. It should be noted that while the intervention took place in selected communities and districts, the mortality indicator is estimated at the regional level. We also abstracted intervention coverage data (i.e., the home visit and NCU admission data) from the District Health Information System (DHIS2) [6].

The qualitative component consisted of in-depth interviews with subnational authorities and service providers, and FGD with mothers or caregivers drawn from the communities in one project district. Interview guides were developed for the in-depth interviews and FGDs. A total of 24 in-depth interviews and 2 FGDs were conducted.

Data analysis

The primary outcome was neonatal mortality rate defined as the probability of dying within the first month of life. All children born in the five years preceding the survey constituted the base population for the analysis. To ascertain the effect of the project in improving new-born survival in the two regions we estimated the change in and percentage reduction from baseline in new-born mortality rate over the period 2011 to 2014. P-values were estimated assuming that the two populations were asymptotic normally distributed. To assess whether the reduction in mortality was accompanied by an increase in coverage of home visits, we also estimated the change in intervention coverage. The analysis was performed using MS Excel and Stata 14 MP2 (Statcorp, College Station, USA).

For the qualitative data, recorded interviews were transcribed verbatim. Data were analyzed manually using two analytic approaches, namely: (1) Thematic analysis – looking for themes and patterns among data (verification); and (2) Narrative analysis – in order to identify narratives or cases, and explore how they differed between

groups. The ideas, views, opinions and quotations from the transcribed (verbatim) data summaries and the notes, were used to explain the quantitative findings.

Findings and Discussion

The percentage of new-born babies who were visited at home by trained health worker increased from 30% in 2013 to 37% in 2014 in the seven districts in Northern region, and from 39% in 2013 to 58% in 2014 in the seven districts in Upper East region (Table 1).

Project Districts	Expected target neonates (i.e., 80% of expected deliveries)		% babies visited		% gap close=[B-A]*100/[100-A]
	2013	2014	2013 (A)	201(B)	
Northern (Districts)					
Bole	2147	2210	37.5	39.2	2.7
Gushiegu	3879	3992	43.3	46.5	5.6
Kpandai	3794	3904	11.5	19.9	9.5
Saboba	2291	2357	22.7	64.3	53.8
Savelugu-Nanton	4856	4997	25.9	35.9	13.6
Tolon-Kumbungu	3699	3699	11.1	17.7	7.4
Yendi*	4123	4243	54.1	45.4	-18.9

All seven districts	24790	25402	29.6	37	10.5
Upper East (Districts)					
Bawku Municipal*	3193	3231	37.7	33	-7.5
Bolga Municipal	4363	4415	38	45.4	12
Kasena Nankana East	3646	3690	24.4	29.9	7.3
Bawku West	3119	3156	64.2	80.3	44.8
Garu Tempene	4312	4363	91.4	93.1	20.4
KasenaNankana West §	2344	2372	-	58.1	-
Talensi/Nabdam §	3815	3994	-	58.7	-
All seven districts	24792	25222	39.1	57.5	30.2

Table 1: Percentage of new-born babies who were visited at home by trained health worker (Source: Ghana District Health Information System, 2013-2014. * The decline is likely to be due to the civil unrest in the area during the period under review § Started reporting January 2014).

Neonatal mortality rate decreased from 39 deaths per 1,000 live births in 2011 to 24 deaths per 1,000 live births in 2014 in Northern region and from 34 deaths per 1,000 live births in 2011 to 24 deaths per 1,000 live births in 2014 in Upper East region (Table 2).

Region	2011 ¹ (Baseline)		2014 ² (End line)		% reduction from "2011"	Difference		
	Estimates (A)	Standard Error	Estimates (B)	Standard Error		[1-(B)/(A)]	Change (B)-(A)	Standard Error of change
Northern	39	3.1	24	5.552	38.5	-15	6.4	0.01
Upper East	34	3.9	24	4.643	29.4	-10	6.1	0.049
Ghana	32	2	29	2.734	9.4	-3	3.4	0.19

Table 2: Percentage change in neonatal mortality rate, Ghana, 2011 to 2014 (1: Ghana Multiple Indicator Cluster Survey, 2011¹; 2: Ghana Demographic and Health Survey, 2014).

The results showed that the reduction in mortality rate observed in Northern region was unlikely to be due to sampling error (P-value=0.01) whereas there was borderline evidence in the observed mortality reduction in Upper East region (P-value=0.049).

Findings from the qualitative study generally provided some insights into the improvement in neonatal survival. The beneficiaries expressed satisfaction with the home-based care their babies received from the CHOs/CHNs. Some quotes below:

“Health education during home visits helped us to learn many things. It was important that when nurses and volunteers came for home visits they insisted and met my mother-in-law and my husband and educated them also on danger signs for the baby, care of the cord, exclusive breastfeeding up to 6 months, how to position the baby at breast, how to keep the baby warm after delivery, when to immunize the baby and that both mothers and baby should sleep under mosquito net. This has helped me to practice and they support me and remind

me what to do. My husband and in-laws are helping me to keep the household environment clean”.

“There has been major improvement in the lives of our babies. Hygiene practice is really helping since our children are no longer having diarrhea as in the past. We were taught first aid for fever in child. Putting this into practice has reduced convulsions in children when they have fever. Now it is far better than what it used to be. Children are no longer dying as we used to see”.

“From the pictures we learnt that after using toilet we should wash our hands before touching the baby and also before breastfeeding the baby. Putting all these into practice helped us to keep the child away from sickness.”

In terms of postnatal new-born care at the facility, the service providers reported having enhanced their skills through the training and mentorship. Some quotes in support of such quality improvement: “There has been an improvement in quality of new-born care at the

facility. Today due to the training, we no longer fear or panic when there is a case of sick new-born. We use the guidelines to manage the case. Our community encourages facility delivery because of the quality of services provided. We have recorded less neonatal deaths for the past 12 months”.

“After the training, I received a case of twin delivery and the mother was bleeding. Since I was taught how to stop bleeding, I gave her oxytocin I.V and was able to stop the bleeding. If it was before the training, I would have just referred the woman to the district hospital.”

“Our facility report shows reduction in new-born deaths. Our admission report shows a big increase in facility deliveries and more surviving babies than before. When we identify any problem in the new-born that endanger the life of the baby we manage the case using guidelines or we refer it to NCU. New-born survival has improved a lot”.

However, this study has some limitations. Given that this is not a controlled study, there may be some important biases. For example, the lack of a control group means that history effects (extraneous events) and contemporaneous trends are an important threat to validity. Furthermore, while the intervention was delivered in some districts the primary outcome was estimated at the regional level giving the potential of an ecological fallacy. While we desire to explore causal link to the reduction in neonatal mortality by analysing data on neonatal morbidity such as preterm, low birth, asphyxia neither the project database nor the district health information system captured these data.

The limitations notwithstanding, these findings highlight the importance of using community structures linked to health facilities to deliver package of evidenced-based new-born health interventions for improved health outcomes. The challenge for improving new-born health lies in ending preventable new-born deaths. Success will be measured in terms of lives saved. Success will depend on Government’s commitment to operationalize the Ghana National New-born Health Strategy and Action Plan [7]. An important first step is to scale-up the home-based postnatal new-born care model to all districts as part of routine activities and demand accountability from the CHOs/CHNs by periodically assessing their home visit registers. It should be ensured: that every district hospital has a NCU for secondary (level 2) care; and that Health Centers that performed delivery be enhanced to a BEmONC status for primary (level 1) care.

The strategy of using community volunteers, who are very familiar with the communities and persons within the communities, as agents to identify households where pregnant women are, and where recent deliveries have occurred and inform and link-up with the CHOs/

CHNs for scheduled visits was an enabling factor for the home-based postnatal new-born care.

Conclusion

The home-based postnatal new-born care and neonatal care models have been effective in contributing to improved new-born survival in the two project regions of Upper East and Northern regions of Ghana.

Competing Interest

The authors declare that they have no competing interests.

Authors Contribution

SB and HB conceived the study. SB and GT analysed the data. SB wrote and finalized the manuscript. CG, AML, and VM reviewed and edited the manuscript. All authors approved the final draft for submission.

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References

1. UN Inter-agency Group for Child Mortality Estimation I: Levels and trends in child mortality: Report 2013. New York: UNICEF, 2013.
2. Darmstadt GL, Kinney MV, Chopra M (2014) The lancet every new-born study group. Who has been caring for the baby? *Lancet*.
3. (2014) Ghana Statistical Service: Ghana Multiple Indicator Cluster Survey with an Enhanced Malaria Module and Biomarker Final Report.
4. (2011) Ministry of Health/Ghana Health Service GoG: National Assessment for Emergency Obstetric and New-born Care.
5. Creswell JW, Klassen AC, Clark VLP, Smith KC (2011) Best practices for mixed methods research in the health sciences. In: Office of Behavioural and Social Sciences Research, National Institutes of Health.
6. (2011) Ghana Health Service: Ghana District Health Information System (DHIS2). Health Information System Programme (HISP).
7. Ghana Ministry of Health (2014) Ghana National New-born Health Strategy and Action Plan, 2014 - 2018.