

Home-Based Newborn Care: How Effective and Feasible?

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Neonatal mortality in developing countries is one of the most important problems that need immediate attention in order to achieve Millennium Development Goals. About 4 million newborns die in the world every year, 90% of them in the developing world. Most of these deaths are preventable by simple interventions in the community. However, in most of the target countries, the implementation of essential newborn care has been very poor. The home based or community care packages include maternal care, essential newborn care, improving the behavior change communication of the community, resuscitation of newborn babies at the time of home delivery, and management of sick newborns with antibiotics at home. Studies have reported one-third to two-third reduction of mortality among newborns after home based care interventions. However, when translated into scaling up of home based newborn care in the worst affected districts of the country, the results are not very rewarding. Identification of limiting factors and effective up scaling of the home-based packages will prove to be of enormous benefit in reducing neonatal mortality.

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Every year, four million newborn deaths occur in the world out of which nearly one-fourth are contributed by India. Approximately 98% of this neonatal mortality takes place in developing countries of the world. The primary causes of neonatal mortality are believed to be complications of prematurity (21%), birth asphyxia and injury (23%), neonatal tetanus (7%), congenital anomalies (7%) and diarrhea (3%) with low birth weight contributing to a large proportion of deaths(1). Most of these newborns die at home while being cared by mothers, relatives and traditional birth attendants(1-3). Despite proven cost-effective solutions such as promoting antenatal tetanus toxoid immunization, skilled attendance during delivery, immediate and exclusive breastfeeding, and clean cord care, there has been relatively little change in neonatal mortality rate (NMR), especially in developing countries(4). To achieve Millennium Development Goals, it is expected to reduce the Neonatal mortality by two-third of the present rate, which is not an easy task by any standard of neonatal care(5,6).

Every newborn requires basic care which has to be provided by the mother at home. This includes warmth, feeding, basic hygiene and identification of danger signs, and seeking help from health personnel whenever required. Therefore, all newborns get home based newborn care as per the perception and sociocultural behavior of the society. However, it has been observed by various studies on the newborn care in the communities that the knowledge and the practices of simple care *e.g.* prevention of hypothermia, feeding of colostrum and exclusive breastfeeding, are lacking(7-10). The knowledge regarding identification of danger signs and care seeking behavior of the families has been found to be variable, and in general, poor(11).

SITUATION ANALYSIS OF NEWBORN CARE IN COUNTRIES WITH HIGH NMR

The World Health Organization (WHO) guidelines for essential newborn care include clean delivery, keeping the newborn warm, early initiation of breastfeeding, exclusive breastfeeding, care of the

eyes, care during illness, immunization and care of low birth-weight newborns(12). Therefore it is necessary for the mother and family to understand these aspects of childbirth and newborn care, and be prepared to react for the potential dangers. Baqui, *et al.*(13) in a recent study from Uttar Pradesh, India, reported very poor knowledge regarding newborn care practices among pregnant mothers, especially in rural areas. Only 7% pregnant women received any information regarding clean cord care from health professionals. Similarly, 5% women received information on thermal care and breastfeeding. The study also revealed that only 17% pregnant women received at least one antenatal check up during their entire period of pregnancy. Most of the deliveries were conducted at home and by family members or relatives. Initiation of breastfeeding within six hours of birth was practiced in only 6% cases but later on exclusive breastfeeding in the first month was given to 82% cases. Another study from rural areas of Makawanpur district, Nepal, reported that a very large proportion (>90%) of deliveries took place at home. The study also reported that only six percent of home deliveries were attended by skilled government health workers and newborn care practices were unhygienic and high-risk(14).

In India, 65.4% of all births and 75.3% of births in rural areas occur at home(7). According to National Family Health Survey-III (NFHS-III), the highest neonatal mortality rates are from the states of Chattisgarh, Jharkhand and Uttar Pradesh (**Table I**). As most of these deaths occur at home, unattended by skilled health worker, designing and prioritizing the interventions about the newborn care practices at home is essential to reduce mortality and morbidity. Implementation of an effective program for promotion of childbirth and newborn care practices requires understanding of the community and household traditional newborn care practices. Such information will enable the development of programs to promote culturally sensitive and acceptable change in practices. Information about reasons for delivering at home, home delivery and newborn care practices in many parts of the country is lacking. Identification of simple clinical signs by the health worker and timely intervention for these sick babies would be a key factor in reduction of neonatal mortality(15).

TABLE I CHILD MORTALITY RATES (PER THOUSAND LIVE BIRTHS) IN INDIA (NFHS - III)

State	Neonatal mortality rate	Infant mortality rate	Under-5 mortality rate
Andhra Pradesh	40.3	53.5	63.2
Arunachal Pradesh	34.0	60.7	87.7
Assam	45.5	66.1	85.0
Bihar	39.8	61.7	84.8
Chattisgarh	51.1	70.8	90.3
Delhi	29.3	39.8	46.7
Goa	8.8	15.3	20.3
Gujarat	33.5	49.7	60.9
Haryana	23.6	41.7	52.3
Himachal Pradesh	27.3	36.1	41.5
Jammu & Kashmir	29.8	44.7	51.2
Jharkhand	48.6	68.7	93.0
Karnataka	28.9	43.2	54.7
Kerala	11.5	15.3	16.3
Madhya Pradesh	44.9	69.5	94.2
Maharashtra	31.8	37.5	46.7
Manipur	18.7	29.7	41.9
Meghalaya	23.6	44.6	70.5
Mizoram	16.3	34.1	52.9
Nagaland	19.8	38.3	64.7
Orissa	45.4	64.7	90.6
Punjab	28.0	41.7	52.0
Rajasthan	43.9	65.3	85.4
Sikkim	19.4	33.7	40.1
Tamil Nadu	19.1	30.4	35.5
Tripura	33.1	51.5	59.2
Uttar Pradesh	47.6	72.7	96.4
Uttaranchal	27.6	41.9	56.8
West Bengal	37.6	48.0	59.6
India	39.0	57.0	74.3

COMPONENTS OF HOME-BASED NEWBORN CARE

There is no uniformity on the exact definition of home based care. Damstadt, *et al.*(16) defined it as family oriented and community oriented services that support self care, including the adoption of improved care practices and appropriate care

seeking for illness. It also involves community mobilization and the empowerment of individuals and communities to demand quality services that respond to their needs. The main emphasis of home based newborn care lies in preventive, promotive and curative services to the newborn as well as their mothers at home. Example of family oriented care include behavior change communications, community mobilization, antenatal, intrapartum and postnatal care practices, care seeking for illness, and in some settings, community based case management of illness *e.g.* management of sepsis or pneumonia by community health workers.

Bhutta, *et al.*(17) in a review of the evidence based, cost effective interventions for reduction of neonatal mortality, identified 16 possible interventions which have proven efficacy. The intrapartum and postnatal packages with 90% coverage have similar effects which are two to three fold greater than that of only antenatal care. Their analysis also reveals that a combination of universal *i.e.* for all settings-outreach and home based newborn care at 90% coverage can avert 18-37% neonatal deaths. It is interesting to note that the most beneficial effect is observed with family and community care in settings with high neonatal mortality.

Some of the postnatal interventions which have been studied with primary purpose of reduction of neonatal morbidity and mortality are summarized in the **Box 1**.

EVIDENCE SUPPORTING HOME-BASED CARE FOR NEONATES

Several workers and groups have evaluated the efficacy of the home or community-based interventions for improving neonatal health. In rural India, Daga, *et al.*(18) emphasized resuscitation of asphyxiated newborns, prevention of hypothermia, and referral of sick newborns; and achieved 41% and 62% reductions in NMR and perinatal mortality rate (PMR), respectively, compared with baseline data over a 3-year period. Pratinidhi, *et al.*(19) used village health workers to identify and manage high-risk neonates at home. Interventions included management of birth asphyxia, hypothermia

prevention, clean cord care, breastfeeding promotion, postnatal visits, and identification and referral of sick newborns and those with feeding problems. Newborn mortality declined by 25% during the intervention year, compared with the year before implementation of the program.

Table II summarizes the results of some more robust studies on home-based care for newborns. Bang, *et al.*(20), from Gadchiroli in Maharashtra, India, showed 62% reduction of NMR in their study areas at the end of three years of intervention of home-based newborn care. In their study, community based neonatal interventions were implemented through village health workers who were chosen among the residents of the same village. They served a population of 1000 people and were trained by a team of doctors in practices of essential newborn care including resuscitation and identification of danger signs. They were also trained in giving antibiotic (gentamicin) injections and oral cotrimoxazole to newborn babies. Workers made 8-12 postnatal visits to examine the newborn babies regarding weight, temperature, and identified any problem or sickness. The investigators also trained

BOX 1 POSTNATAL INTERVENTIONS FOR IMPROVING NEONATAL HEALTH

Newborn resuscitation
Delayed umbilical cord clamping
Umbilical cord antisepsis
Hypothermia prevention and management
Hypoglycemia prevention and management
Breastfeeding
Prevention and treatment of ophthalmia neonatorum
Vitamin K prophylaxis
Hepatitis B vaccination
Neonatal vitamin A supplementation
Kangaroo mother care (KMC)
Topical emollient therapy
Hyperbilirubinemia screening
Traditional birth attendant (TBA) training
Pneumonia case management
Sepsis case management

TABLE II SUMMARY OF THE STUDIES ON COMMUNITY-BASED INTERVENTIONS FOR IMPROVING NEWBORN HEALTH

Authors (Ref.)	Location	Intervention	Neonatal outcome
Bang, <i>et al.</i> (20)	India	Home based newborn care package implemented through community health volunteers	62% reduction in neonatal mortality
Manandhar, <i>et al.</i> (14)	Nepal	Community based health care package delivered through community health workers	30% reduction in infant mortality rate
Jokhio, <i>et al.</i> (21)	Pakistan	Improving clean delivery practices by traditional birth attendants	29% reduction in neonatal mortality
Baqui, <i>et al.</i> (22)	Bangladesh	Community based health care package through community health worker and treatment of sepsis	34% reduction in neonatal mortality
Bartlett, <i>et al.</i> (23)	Guatemala	Community based health care package in which every newborn baby was seen at home weekly in first month and biweekly in 2 nd and 3 rd month and treated by physician if there was any problem	Mortality rate in first three months reduced by 85%

TBAs regarding safe delivery methods and basic newborn resuscitation, and provided them with disposable delivery kits. There was a close coordination between village health workers and the TBAs. The study team had an excellent rapport with the community as well as district and sub-district Government health functionaries, making it an ideal set up for the experimental intervention.

Manandhar, *et al.*(14) conducted a cluster-randomized trial at Makwanpur, Nepal to evaluate a community-based participatory intervention to improve essential newborn care. In this study, mothers' groups were identified in the villages and were trained to identify perinatal health problems. Common goals of the action plan included community surveillance of births and birth outcomes, improved caregiver recognition of danger signs, proper care seeking, improved knowledge and skills of health workers, clean delivery practices, increased rates of early breastfeeding and improved referral patterns. Infant mortality was reduced by 30% and maternal mortality was reduced by 78%.

In another community based interventional study from Sylhet district of Bangladesh, Baqui, *et al.*(22) reported a reduction of neonatal mortality by 34% in the home care group. In this study, female health workers were trained in home based newborn care according to an adapted version of WHO integrated

management of childhood illness (IMCI). A newborn with very severe disease was either referred to a health facility or if not willing, then treated with single daily dose of injections procaine penicillin and gentamicin once a day for ten days. However, in their study of 478 sick newborn babies with very severe disease, the health worker could motivate only 162 families to seek advice from qualified care, 112 families refused treatment or any advice from the health workers, and 207 families wanted care at home by the village health workers. This shows resistance from the community regarding the advice from the community health workers who were exclusively meant for this study.

FEASIBILITY OF IMPLEMENTATION

Community based newborn care strategies in resource poor countries with high neonatal mortality show significant reduction in neonatal mortality as evidenced by the above studies. However, all these studies were done by excellent researchers with good resources and dedicated workers supervised by trained researchers. However, there are innumerable problems in actual implementation of these strategies. It will be a challenging task to upscale the home care newborn package to the most vulnerable districts in certain states in India such as UP, Chattisgarh, Jharkhand and Bihar where NMR is alarmingly high. A pilot project was undertaken by

Government of India with the help of Indian Council of Medical Research to implement home-based newborn care package developed by Bang, *et al.* but the study results (unpublished) are not reported to be very encouraging. Government of India is trying to upscale the maternal and newborn care services by a group of female community health volunteers who are known as 'accredited social health activist' (ASHA). They would identify all pregnant women in the village and also identify high risk pregnancy with timely referral to first referral units. After delivery, each newborn will be visited by them within 24 hours of birth, on 3-4th day and on 7th-10th day of life. Each low birth weight baby will receive three additional visits on 14th, 21st and 28th day. All babies with danger signs would be referred by them to the nearest first referral center. The referral and survival of the babies will be incentive linked. A large number of ASHA workers are already recruited in India and the training component is complete. However, the impact of the program is yet to be known.

WHAT NEEDS TO BE DONE?

In order to achieve the millennium development goal of reduction in neonatal mortality in resource poor countries with weak primary care health system, it is important to establish a good outreach and home based newborn care by improving home care practices and demand for skilled care at birth. There is an urgent need for improvement of care seeking behavior of the community by behavior change communication so that people accept the services provided by the Government. Mother and baby pair should be considered as a single unit to formulate strategies for improvement of neonatal care. Simultaneous expansion of clinical care for mother and newborn at all levels needs immediate attention. Although all systematic reviews as well as individual studies on home based newborn care have shown promising results, there are limitations when implementing at the country level as it should fit into the logistics of the available health care system in terms of manpower, infrastructure and policy. There has to be parallel development of adequate numbers of functional first referral units all over the country and especially in districts where the neonatal mortality is very high, so that the newborns requiring

secondary or level II care get attention and proper treatment. The millennium development goal can only be achieved by improving all available services and not only by home based newborn care. The long term solutions can only be achieved by improving the literacy rate and empowerment of mothers, which has been clearly shown to be effective by reduction of neonatal mortality in Indian states of Goa, Kerala and Mizoram where female literacy and empowerment is at a high level. Building the capacity of mothers through basic education is a key long term strategy to improve perinatal and neonatal care.

REFERENCES

1. Bryce J, Boschi-Pinto C, Shibiya K, Black RL. WHO estimates of causes of death in children. *Lancet* 2005; 365: 1147-1152.
2. Lawn J, Cousens S, Zupan J. 4 million neonatal deaths: When? Where? Why? *Lancet* 2005; 365: 891-900.
3. Lawn J, Cousens S, Bhutta Z, Darmstadt G, Martines J, Paul V, *et al.* Why are 4 million babies dying each year? *Lancet* 2004; 364: 399-401.
4. WHO. World Health Statistics 2006. Geneva: World Health Organization; 2006.
5. WHO. World Health Report 2005: make every mother and child count. Geneva: World Health Organization; 2005.
6. Ahmad OB, Lopez AD, Inoue M. The decline in child mortality: a reappraisal. *Bull World Health Organ* 2000; 78: 1175-1191.
7. National Family Health Survey III. Mumbai: International Institute for Population Sciences and ORC Macro; 2006.
8. de Zoysa I, Bhandari N, Akhtari N, Bhan MK. Careseeking for illness in young infants in an urban slum in India. *Soc Sci Med* 1998; 47: 2101-2111.
9. Bang AT, Reddy HM, Deshmukh MD, Baitule SB, Bang RA. Neonatal and infant mortality in ten years (1993-2003) of the Gadchiroli field area trial: effect of home based newborn care. *J Perinatol* 2005; 259 (suppl.): S92-S107.
10. Awasthi S, Verma T, Agarwal M. Danger signs of neonatal illnesses: perception of caregivers and health workers in Northern India. *Bull World Health Organ* 2006; 84: 819-826.

11. Bang AT, Bang RA, Reddy MH. Simple clinical criteria to identify sepsis or pneumonia in a community needing treatment or referral. *Pediatr Infect Dis J* 2005; 24: 335-341.
 12. WHO. Essential Newborn Care: A Report of Technical Working Group. Geneva: World Health Organization; 1996.
 13. Baqui AH, Williams EK, Darmstadt GL, Kumar V, Kiran TU, Panwar D, *et al.* Newborn care in rural Uttar Pradesh. *Indian J Pediatr* 2007; 74: 241-247.
 14. Manandhar D, Osrin D, Shrestha B, Mesko N, Morrison J, Tunbhahanghe K. Effect of participatory intervention with women groups on birth outcomes in Nepal: cluster randomized controlled trial. *Lancet* 2004; 364: 979-979.
 15. Young Infant Clinical Signs Study Group. Clinical signs that predict severe illness in children under two months: a multicentric study. *Lancet* 2008; 371: 135-142.
 16. Darmstadt GL, Bhutta ZA, Cousens S, Adam T, Walker N, de Bernes L. Evidence based cost effective interventions: how many newborn babies can we save? *Lancet* 2005; 365: 977-988.
 17. Bhutta ZA, Darmstadt GL, Hasan B, Haws R. Community based interventions for improving perinatal and neonatal health outcomes in developing countries. *Pediatrics* 2005; 115 (2 suppl) : 519-617.
 18. Daga SR, Daga AS. Reduction of neonatal mortality with simple interventions. *J Trop Pediatr* 1989; 35: 191-196.
 19. Pratinidhi A, Shah U, Shtratri A, Bodhani N. Risk approach strategy in neonatal care. *Bull World Health Organ* 1986; 64: 291-297.
 20. Bang AT, Bang R, Baitule S, Reddy M, Deshmukh H. Effect of home based newborn care and management of sepsis on neonatal mortality: field trial in rural India. *Lancet* 1999; 354: 1955-1961.
 21. Jokhio AH, Winter HR, Cheng KK. An intervention involving traditional birth attendants and perinatal and maternal mortality in Pakistan. *N Engl J Med* 2005; 352: 2091-2099.
 22. Baqui AH, Arifeen SE, Damstadt GL, Ahmed SA, Williams EK, Seraji HR, *et al.* Effect of community based newborn care intervention package implemented through two service delivery strategies in Sylhet district, Bangladesh: a randomized controlled trial. *Lancet* 2008; 371: 1936-1944.
 23. Bartlett AV, Paz de Bocaletti ME, Bocaletti MA. Neonatal and early postneonatal morbidity and mortality in a rural Guatemalan community: the importance of infectious diseases and their management. *Pediatr Infect Dis J* 1991; 10: 752-757.
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