Learning's from community and home-based newborn care experiences of India for strengthening Rajasthan's Community Level Newborn interventions

Yadav A[1]

[1]Ashok Yadav, Nursing Tutor, Government college of Nursing, Jaipur, Rajasthan, India

Address for correspondence: Mr Ashok Yadav, Email: yadav_ashok2006@yahoo.com
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Abstract

Introduction: This study was conducted to understand the evidences generated on community and home-based interventions related to newborn health in India, a systematic review of studies on community and home based interventions from India for last decade 1999-2000 to 2010-2011 is presented. **Methods:** The data was reviewed from various online reports and publications available and the three main sources from where health services, and morbidity and mortality data are derived for the study include the NFHS, DLHS and the Report of RGI. Study data was summarized and analyzed using appropriate statistical tools. **Results:** An analysis of all community based interventions till 2010 demonstrate a reduction in NMR, early NMR, still births and perinatal mortality. It also showed an increase in referrals to health facility for pregnancy – related complications and improved rates of early breastfeeding. The results were significant when impact was estimated for early neonatal mortality. The results are more encouraging if the proven interventions are implemented effectively with high coverage and targeted at areas and population where they are needed the most. **Conclusion:** Community based interventions have to be supported by facility-based interventions. With phased planning, outreach and family-based services can be effective in ensuring access of the poor to basic services, while professional clinical care is being strengthened and made more equitable. Even with a relative weak health system, it is possible to achieve measurable reduction in mortality with adequate coverage of community-based services.

Introduction

India is faced with an unparalleled child survival and health challenge. The country contributes 1.95 million of the global burden of 9.2 million under-five child deaths, which is the highest for any nation in the world. Nearly 26 million infants are born each year, of whom nearly 1 million die before completing the first 4 weeks of life and 1.7 million die before reaching the first birthday [1]. Rajasthan has a population of 68 million. Children below the age of 06 years account for 15.5% of state's population [2]. Rajasthan has infant mortality rate of 57 and neonatal mortality stands at 38 per thousand live births [2]. One third (30%) of children of 12-23 months are not fully immunized against the six major preventable diseases [2]. 36.8% of Rajasthan children under three are underweight and 40% stunted [3]. Each year 2 million pregnancies take place in the state with only less than half of women (47%) receiving three or more antenatal check-ups. Twenty two districts of Rajasthan are 5+ years lagging behind in achieving agreed child mortality rate (up to 5 years) of millennium development goals till 2015 [4].

National Family Health Survey (NHFS-3) showed that there has not been much improvement in the nutritional status of children, within the last eight years. During NFHS-2 (1998-1999), 47% of children under three were found to be underweight while 36.8% of children under three years of age being underweight [3].

Almost 40% of all children under five are stunted (short for their age, an indicator of chronic malnutrition) while 22.5% of children are wasted (too thin for their height, an indicator of acute malnutrition). As much as 37% children are underweight for their age. Exclusive breastfeeding and appropriate complementary feeding of children which are identified as major determinants of child survival still remain significant challenges to be addressed. Overall, slightly less than half of the children under six months of age are exclusively breastfed [3]. Only 24.7% children receive complementary foods between 6-8 months of age [2]. Due to cultural beliefs and ingrained practices over ages, many mothers are still not able to follow appropriate infant feeding practices leading to increase in morbidity and mortality of children less than 5 years of age.

Over half of all women (56%) in India are anaemic as are 70% of children under the age of five. 22% of all children

whose birth weight record is available are low birth weight babies [3], which is a significant contributing factor to malnutrition later in life. The issue of underweight children is particularly serious in rural areas and among the poorest families, ethnic minorities and lower castes.

With one child dying every three seconds, India registers the highest number of child deaths across the globe [5]. The major killers of children are – acute respiratory infections, dehydration due to diarrhea, measles and neonatal tetanus and in some areas malaria. The high prevalence of malnutrition contributes to over 50% of child deaths. In India as well as in Rajasthan, a significant proportion of child deaths (over 40% of under-five Mortality and 64% of infant mortality) take place in the neonatal period. Apart from infections, other causes like asphyxia, hypothermia and pre-maturity are responsible for neonatal mortality. About one-third of the newborns have a birth weight less than 2500 gram (low-birth weight). A significant proportion of mortality occurs in low-birth weight babies. It has been recognized that further reduction of IMR will require focused attention on Neonatal mortality [1].

The most challenging part of infant mortality, we all know, is the large proportion of newborn deaths, contributing to around 70% of all infant deaths, that too mostly taking place in the first week of life. Mortality rate in the second month of life is also higher than at later ages. In short, to achieve this goal, Rajasthan needs extra emphasis to save newborns.

Access to health care and care seeking for sickness among children has definitely improved but despite improvements in several child specific indicators, Rajasthan has much catching up to do. Based on the fact that three main preventable causes viz. Birth Asphyxia, Prematurity and infections, contribute to more than 80% of the newborn deaths, state plan had envisaged a set of interventions to be delivered at home, community and facility levels [7]. Accordingly the concept of having a network of Facility Based Newborn Care Centers (FBNCs) was planned to be established at District hospitals & Medical College hospitals and linkages with IMNCI and JSSY were also conceived, thus connecting home, community and institutional level interventions. 'Integrated Management of Neonatal and Childhood Illnesses' (IMNCI) was initiated with implementation of standardized guidelines for all the level of Health workers to manage common childhood disorders which are leading causes of infant and child mortality rates. Similarly 'Janani Shishu Suraksha Yojana' (JSSY) was started with the aim of reducing maternal mortality rate (MMR) and

Neonatal mortality Rate (NMR). Later on 'Navjaat Shishu Suraksha Karyakaram' (NSSK) was also launched with the aim of reducing NMR by providing immediate essential newborn care and resuscitation at birth to every newborn in the institutional setup. Setting up of 38 malnutrition treatment centers' (MTC) was planned and is being implemented in a phased manner to tackle the problem of underweight and malnourished children. 'Yashoda Scheme' being implemented by NIPI in its 3 focus districts was adopted for implementation in all districts of state. 'Maternal and Child Health Nutrition (MCHN) Days held at village level under joint collaborative effort of RCH-II and ICDS aims to address the issue of improving routine immunization coverage and level of Vitamin-A supplementation among under 5 children.

Community based interventions are those interventions that can be delivered by a community health worker in close proximity to the beneficiary's home, including services delivered at home or to the family and throughout-reach sessions [8].

There are more than 40 documented interventions to reduce mortality caused by sepsis, asphyxia and preterm birth complications [9]. Packaging of interventions is a cost-effective and practical way of delivering them on scale. The delivery platform could be the community and/or the facility. The various approaches to deliver intervention packages at the level of the community are : Home visits by ASHAs / Anganwadi workers (AWWs) / ANMs, community mobilization, using women's organizations or support groups, training of Traditional Birth Attendants (TBAs) to deliver newborn care and home visits (for ANC and during delivery).

Community based interventions thus broadly consist of two approaches: delivery of packages through home visits, and community mobilization [10].Several studies have demonstrated the effect of home visits and community mobilization in isolation and also in combination. The effect size is, however, based on the baseline NMR and the population coverage [11].

Method

This review focuses on the evidence generated on community and home-based interventions related to newborn health, the implementation status of various programs, the key findings of assessments undertaken to understand the implementation challenges in scaling up these initiatives and possible solutions for the state.

Data Sources: For the above mentioned purpose the data was reviewed from various online reports and publications available and the three main sources from

where health services, and morbidity and mortality data are derived for the study include the National Family Health Surveys (NFHS), District Level Household Survey (DLHS) and the Report of Registrar General of India (RGI). In addition, findings from recent coverage evaluation surveys [12] and health information system of Family Welfare Statistics of India [3] 2009 published by the Ministry of Health and Family Welfare, Government of India, 8th Joint Review Mission Report, National Rural Health Mission, July-September, 2011 [13]. World Health Organization (2010) [14] reports and many other relevant research papers pertaining to maternal and child health in Rajasthan and India were reviewed for reference and data collection.

Period of Review: Review of Community based and home based newborn care, neonatal and child health coverage indicators of last decade 1999-2000 to 2010-2011. Since the last set of comprehensive data on various indicators relevant to this review is provided by NFHS III (2005-06), it was decided to keep NFHS-III as the baseline and any data on corresponding indicators obtained subsequently (including SRS, DLHS-III, CES-2009, HMIS, Other Sources) was included in the most recent data.

Result

World Health Organization (WHO), in collaboration with United Nations Children's Fund (UNICEF) and several other agencies, institutions and individuals, developed a strategy during mid 1990s, popularly known as Integrated Management of Childhood Illness (IMCI). Later on in 2005 in India neonatal component was added to it and named it as Integrated management of neonatal and childhood illnesses (IMNCI) [15]. Home visit was made as an integral component of this strategy. A Study was conducted to evaluate the effectiveness of IMNCI package through a cluster randomized trial which covered 60,702 live births. Study was carried out in Haryana between 2008 and 2010, where community health workers were trained to conduct postnatal home visits (three visits for normal newborns and six for (BW babies). Evidence showed that NMR beyond 24 hours was significantly lower in those clusters where IMNCI was implemented, as compared to that in the control clusters (adjusted hazard ratio 0.86 ; 0.79 to 0.95) [16]. The NMR was found to be significantly lower in the intervention clusters among those born at home. Though the effect of the interventions was seen only among home births, it led to a reduction in post neonatal mortality rate both among home births (adjusted hazard ratio 0.73 ; 0.63 to 0.84) and facility births (0.81 ; 0.69 to 0.96).

Integrated management of neo natal and child hood illnesses (IMNCI) data of DLHS-II (2002 to 2004) and DLHS III (2007 to 2008) from 12 districts of seven states, showed the difference between IMNCI and non-IMNCI districts [17]. The coverage of home visits under IMNCI reached only 64% of target neonates, and those newborns not reached were likely to be vulnerable. The reasons for the slow-uptake of home visits included absence of workers in several villages, poor supervision and lack of motivation of the workers for this additional task. On the positive side, the quality of home visits was found to be satisfactory. More than 80% of sick children were correctly classified and treated. The major bottlenecks were poor supervision and monitoring and poor availability of logistics and supplies. The component of training was assessed to be good in six out of seven districts. However, supervision was poor in most districts. The program appears to have an impact on the improvement of the coverage of all the indicators, but this improvement was not statistically significant. Another important finding was that the skills on assessing and classifying illnesses based on guidelines were conflicting in different studies. The authors concluded that training without effective implementation plans will not result in long term skill retention [18].

Indian Council of Medical Research (ICMR) undertook a project on home-based management of young infants between 2002 and 2009 to implement the Gadchiroli model in the five districts. The model was implemented with a modification to include young infants (0-2 months – according to IMNCI) This project was carried out with a package of interventions delivered by specially recruited health workers, Shishu Rakshak, in one arm and AWW in the other. The third (control) arm included usual care. Findings revealed that compared to the control arm, there was a significant decline in the ENMR, PMR and IMR in the Shishu Rakshak arm, but not in the AWW arm.

According to a study by Pappu K, K Kumar et al. titled "Experience with implementation of a district based comprehensive newborn care package [19] the success of the package is based on increasing access to a minimum set of essential services that would significantly reduce NMR. It is collection a collection of the following services - home-based postnatal care, initiated through a package of newborn care services by ASHAs, SNCUs developed in district hospitals through NRHM mechanisms, District and block maternal and child health managers inducted to support program management process, yashoda-care and counseling service to the mother and newborn to be given by yashoda, mobile money transfer to ASHA.

Assessing and supporting NIPI Interventions (ASNI) is an operations research project conducted between November

2009 and September 2011 in Rajasthan and Odisha, two NIPI focus states in India. This was a quasi-experimental design study with an intervention and control district in each of the states to assess NIPI activities within the continuum of care approach, focusing on both demand and supply side issues and to strengthening NIPI to achieve NRHM goals. The data showed improvement in key newborn care indicators such as birth registration and weighing of newborn in the intervention districts. The proportion of mothers who reported receiving counseling specific to newborn care (breastfeeding, birth registration, immunization) from ASHAs during their postnatal home visits was significantly higher in the intervention districts, compared to the control districts. The identification of danger signs and subsequent referrals, including use of referral funds, too were higher in intervention districts, but the actual proportions reporting these were still low, indicating potential for significant improvement.

A study conducted by Dr. Abhay Bang on home-based care of neonates in Gadchiroli district in Maharashtra from 1993 to 1998 served as a path-breaking research. He adopted a quasi-experimental design with 39 intervention and 47 control villages to evaluate the impact of the intervention of 2 years i.e. from 1993 to 1995. The baseline NMR was 62 and 58 per 1000 live births in intervention and control areas respectively. The village health workers trained in neonatal care attended delivers managed birth asphyxia. (if indicated) and made home visits on Day 1, 2, 3, 5, 7, 14, 21, 28 and on any other day if called by the family. Oral contrimoxazole and injection gentamicin were also administered to suspected cases of sepsis. The findings of the study clearly indicates the reduction in neonatal, infant and perinatal mortality rates by 62.2, 45.7 and 71 percent respectively. The cause specific mortality rates were also reduced in cases of prematurity, birth asphyxia and neonatal sepsis by 16.5, 47.6 and 76 percent respectively. It is therefore, this model has been accepted by the Government of India as a key approach for addressing neonatal deaths in underserved populations.

Another remarkable study, popularly known as ANKUR Project, carried out in 2004-05 was to test the home-based newborn care model. The HBNC model was replicated by 7 non-governmental organizations (NGOs) in different parts of Maharashtra which were working in tribal, rural and urban slum areas. Each of these 7 NGOs covered a population of 10,000-20,000 people. Village health workers of the area were trained in newborn case, including administering injections. The data was collected from 1,475 live births. Results showed 70 to 90 percent increase in the coverage of home-based newborn care for key indicators, at the end of the first year of intervention.

The NMR declined by 51 percent at the end of the project. The findings / results not only stopped here but went beyond the neonatal period, leading to a further reduction in infant and child mortality [20].

"Care of low birth weight infants in rural community" commonly referred as Amabala study was conducted by Datta et al. to assess the feasibility of implementing a specific intervention package which is likely to reduce morbidity and mortality among LBW babies during first year of life. The study was carried out in two community development blocks of Haryana, including 970 newborns in 16 control villages and 1061 newborns in 19 intervention villages. The specific intervention package included TT immunization of pregnant women, delivery of infants using a clean delivery kit and promotion of breastfeeding. For the treatment of moderate to severe respiratory infections oral penicillin was administered by primary health care workers for five days. The findings of the study showed 42 percent reduction in IMR in LBW infants and a larger reduction i.e. 60 percent in the post-neonatal mortality rate than in the NMR i.e. 30 percent. Use of penicillin in the treatment of acute respiratory infection (ARIs) in LBW infants resulted in a significant decline in case fatality rate (CFR) i.e. 8.7 per 100 episodes in intervention areas in comparison to 24.6 per 100 episodes in control areas [21].

Pratinidhi A, Shah U et al. in their Risk-Approach Strategy study in Pune adopted risk approach strategy which involves identifying local risk factors, screening the population for vulnerable individuals, and providing them with extra care in proportion to their needs according to a risk-based management plan. This study was carried out in the early 1980s in 22 villages with a population of 47,000 at Sirur near Pune. Community health guides (CHGs) were trained to identify high risk newborn within 48 hours of delivery at home. Follow-up visits were made on days 8 and 29 under the supervision of a field medical officer. Depending on the number of risk factors and the severity of illness, domiciliary care or referral were planned and managed. Findings revealed that NMR dropped from 5.19 in 1981 to 38.8 in 1982 [22] within a period of one year.

Dahanu Study (Domiciliary neonatal care) Daga S, Daga A et al undertook a study at Dahanu taluka of Thane district, Maharashtra from 1987 to 1990. The study aimed at testing a model of domiciliary neonatal care by a Traditional Birth attendant (TBA) with referral services provided by a Primary Health Center (PHC) and a Community Health Center (CHC). Under the study TBAs were trained by Lady Health Visitors (LHVs) and then these TBAs provided Ante-natal care (ANC), conducted

deliveries and took postnatal care of neonates. TBAs used foot-length measurements to identify very low birth weight (LBW) infants. The small and sick neonates identified by TBAs were taken to PHC where they were initially stabilized and then referred to the community hospital (with facilities for admissions), as needed. Results revealed that there was a significant decline in the PMR from 74.7 per 1000 births during 1987 to 57.1 during 1990 and in the NMR from 33.6 per 1000 live births during 1987 to 28.7 during 1990.

Discussion

The above discussed studies set a good platform to establish that community based intervention packages result in a significant decline in mortality rates. An analysis of all community based interventions till 2010 demonstrate a reduction in NMR (RR-0.76 ; 95 percent C1 0.68 – 0.84) early NMR (RR=0.74 ; 0.64-0.86), still births (RR-0.84 ; 0.74-0.97) and perinatal mortality (RR=0.80 ; 0.71-0.91). It also showed an increase in referrals to health facility for pregnancy – related complications (RR=1.40 ; 1.19-1.63) and improved rates of early breastfeeding (RR=1.94 ; 1.56-2.42)[8]. The results were significant when impact was estimated for early neonatal mortality (RR=0.74 ; 0.64-0.86). It is well documented that higher reductions in NMR were achieved in the proof-of-principle studies : the metar analysis estimate showed a 45 percent reduction (95 percent C137 to 52). However; the results of the trials in South Asia showed substantially lower reduction i.e. overall reduction in NMR of 12 percent (95 percent C15 to 18).

The results are more encouraging if the proven interventions are implemented effectively with high coverage and targeted at areas and population where they are needed the most [23]. While family outreach and clinical services have their own merits, the importance of each one depends heavily on the baseline NMR. The effect of community-based interventions declines as baseline NMR decreases and as NMR gets to below 50. Community based interventions have to be supported by facility-based interventions. With phased planning, outreach and family-based services can be effective in ensuring access of the poor to basic services, while professional clinical care is being strengthened and made more equitable. Even with a relative weak health system, it is possible to achieve measurable reduction in mortality with adequate coverage of community-based services.

Above studies have shown that HBNC interventions can prevent 30 to 60 percent of newborn deaths in high mortality settings under controlled conditions [24]. An analysis of interventional studies (with home visits as the key intervention) gives a pooled relative risk of 0.62 (95 percent C1 = 0.44 – 0.87). A greater effect on mortality was observed with both curative (injectable antibiotics) and preventive interventions (RR-0.52 ; 0.30-0.85) as compared to only preventive interventions (Rr-0.70 ; 0.44-1.12). Higher coverage (7.50 percent) was associated with better survival (RR-0.54 ; 0.42-0.70) than lower coverage (RR-1.06 ; 0.81-1.38). Pooled data showed a reduced risk of still births (RR-0.76; 0.65-0.89). Yet another review suggests that home visits within the first 48 hours have maximum impact.

A meta-analysis of seven trials on community mobilization through women's groups showed that exposure to women's groups was associated with a 37 percent reduction in maternal mortality (odds ratio 0.63, 95 percent C1 0.32-0.94), a 23 percent reduction in neonatal mortality (0.77, 0.65-0.90) and a 9 percent non-significant reduction in still births (odds ratio 0.91, 0.79-1.03).

Conclusion

Community and home-based newborn care approaches reduce neonatal mortality substantially when implemented effectively. The rapid roll out of the IMNCI programme made an impact on newborn health on the ground ; its continuation at the AWW level appears to have been diluted. India has contributed immensely towards generating global evidence on HBNC and community mobilization. Scale of HBNC has been slow ; although training has been accomplished well in most states, coverage is low. Supportive supervision remains a weak link in community based programmes. VHNDs have emerged as effective convergence points, as well as platforms for maternal, newborn and child health action. Care seeking for sick neonates, especially girls, remains poor.

Coverage and quality of the HBNC Program can be improved by operationalizing an effective supportive supervisory mechanism with role clarity of ANMs and ASHA supervisors, continue to train, engage and monitor AWWs in IMNCI, ensure that all ANMs are trained in IMNCI. Scale up new operational guidelines allowing ANMs to treat neonates with suspected sepsis, where referral is not possible or refused, using injectable gentamicin and oral amoxicilin, ensuring uninterrupted supply of ASHA kits and replenishment thereof, timely reimbursement of ASHA incentives, improving the reporting and data collection system and move rapidly from the training phase of HBNC into full operationalization, aim to cover at least 50 percent of the annual newborn cohort in the country under HBNC by 2015 and 80 percent by 2017.

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