

Original article

Assessment of neonatal health profile in rural district of central India

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Abstract

Background: Mortality is one of the basic components of population change and related data is essential for demographic studies and public health administration. 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. Care practices during delivery and neonatal period contribute to risk of mortality and morbidity.

Objective: The objective of this study was to find out neonatal mortalities and morbidity patterns, utilisation of health services, assessment of home based neonatal care taught to ASHA workers and evaluate newborn practices carried out by mothers in the villages of Dewas, Madhya Pradesh, India.

Method: The present study was conducted in 10 village of Dewas, Madhya Pradesh for period of 1 yr. Detailed information about the neonate was taken by interviewing the mother and the decision makers of the family within 30 days of birth. In case of any death of the newborn the verbal autopsy was conducted. Interviews of the ASHA workers were also conducted to assess the knowledge of the ASHA workers.

Result: A total of 247 neonate- mother pairs were studied. About 96% deliveries were conducted at hospital. All mothers were educated and trained by the ASHA workers regarding various newborn care practices. 86% neonates had weight more than 2.5 kg. Enquiring into breast feeding practices it was observed that 81% of the mothers exclusively breast fed their neonates. Hand washing practices was not much followed by the mothers as only 27% followed regular hand washing. 65% mothers had the knowledge of umbilical cord care. Assessment of hypothermia was known by 59% of mothers. The mother was the first person to detect the illness in 58% of babies.

Conclusions: Villages in Dewas displayed positive health behaviours. There was increased awareness of the mothers regarding newborn care. Through health education interventions, an attempt can be made to improve mothers and other caretaker's skills leading to improvement of neonatal health. Thus It is important for policy-makers to consider home based neonatal care interventions as tools to improve neonatal health in rural areas.

Keywords: Community care, Home-based neonatal care

Introduction

Globally four million deaths occur every year in the first month of life. Almost all (99%) neonatal deaths arise in low-income and middle-income countries.^[1] In India alone, around one million babies die each year before they complete their first month of life, contributing to one-fourth of the global burden.

India has made a significant progress in reducing infant mortality (death under one year) in recent decade from 146 in 1951 to 33 in 2010.^[2] Infant mortality rates in developed countries are almost one tenth of the level in India. Even in many developing countries the IMR is much less than in India.

The lowest neonatal mortality rate is in Kerala is 7. The highest one in Orissa and Madhya Pradesh is

42 and 39 respectively in 2012. The mortality rate is higher in Rural and urban slums as compared to urban areas.^[3] The reason for such disparity could be socio-economic status, literacy and non availability of obstetric and neonatal services.

Neonatal care is highly cost effective because saving the life of a newborn is associated with survival of productivity of over five decades as opposed to intensive care of adults with cancer or degenerative disorder which is associated with an average survival of 2-5 years. The World Bank has estimated that the burden of disease contributes by perinatal cause in India accounts for 25 percent of the global disability adjusted life years lost to the society. For a long time newborn care has been equated with hospital based care. It is true that a small proportion of newborn babies who are sick would require care in hospital setting but most newborn can be successfully managed at home. The principles of newborn care are simple and achievable through primary health care provided at the community level. The need of the hour is to generate an atmosphere in which survival and well being of neonate becomes a community responsibility. In order to reduce both maternal and neonatal deaths the government has taken several steps. Important intervention being "Janani Suraksha Yojana", appointment of Accredited Social Health Activist (ASHA) at village level and starting of Basic Medical Obstetric Care (BMOC) and Comprehensive Emergency Obstetric Care (CEOC) facilities. ASHA worker is trained for taking care of neonates at home and timely referral of sick newborn if required.

In the present project the mortalities and morbidities of neonates delivered over a period of 1 year in 10 villages of Dewas district have been studied. An attempt has also been made to assess

the knowledge, skill and attitude of ASHA workers in these villages.

Material and Methods

The present study was carried out to assess the neonatal morbidities and mortalities in Dewas district. This was a prospective study carried out over a one year period from 1st Jan 2013 to 31 Dec 2013. The study was carried out along with a project run by an NGO (Non Governmental Organisation) the Daiichi-Sankyo (DS) and Ranbaxy under the Corporate Social Responsibility (CSR). This project is for a period of 5 years and covers 100 villages. For our study we selected ten villages.

The aim of CSR project is to reduce child mortality and morbidity, improve maternal health in rural areas and to fill up the gap in government health delivery system. This NGO works in tandem with the district and state health authorities and utilises infrastructure of the government at PHC and Sub centre level. Under this project they have taken responsibility of 100 villages of Dewas district. 100 ASHA workers were identified and trained. One ASHA worker for each village, Services of the ASHA was utilized for providing the Home based neonatal care (HBNNC) after providing extensive training Neonatal kits and incentives for their service were given by the NGO. These ASHA workers were initially trained by MP government and subsequently a team from National Neonatology Forum M.P retrained them especially on home based neonatal care.

A one day workshop was arranged for these ASHA workers at the District hospital. They were given skill based training in the following- Antenatal Care, breast feeding, weighing the baby, hypothermia, prevention of sepsis, recognition of danger sign, referral procedure.

The ASHA workers visited each house and recorded weight of the neonate during all visits.

They also enquired about signs of illness and systematic collected information of the baby's health at birth, day 3, day 7, day 14, and day 28 after birth.

As soon as a baby was born the ASHA worker informed us within 24 hr and we visited the newborn along with ASHA and took a detailed history and examined the baby. Detailed information about the neonate was taken by interviewing the mother and the decision makers of the family, within the 48 hours after birth. This was followed by detailed examination of child for any illness. The 2nd visit to the family was made at the end of 28 days. The interview with the mother and other respondent of family included details about birth, place of delivery, mode of delivery, gestational age, weight, feeding practices, clothing, hand washing, illness and its progression, hospitalisation, referral and related information. In case of any death of the newborn the verbal autopsy was conducted.

We also enquired from the mothers as to the instructions she received from the ASHA workers. This was to check whether the knowledge imparted to the ASHA worker during training was properly conveyed to the mothers and whether she implemented the same. The knowledge of the ASHA workers was also tested by conducting regular tests for them. The baseline survey done under District level health survey (DLHS) in 2008 in Dewas block suggested there were almost 33% home deliveries conducted by untrained birth attendant under unhygienic conditions which increases the risk of neonatal mortality and morbidity.

Interviews of the ASHA workers were also conducted to assess the knowledge of the ASHA workers. All interviews were conducted by the investigator of the study along with a doctor from the NGO and the assigned ASHA worker of that

village. Written notes were taken during all interviews, which were noted in a structured proforma. The study was approved by the Ethical Review Committee at Sri Aurobindo Medical College and Postgraduate Institute, Indore, India.

Results

In the present study most deliveries were institutional delivery. Among 247 deliveries during the study period 236 (96%) were delivered in the hospital and only 11 (4%) deliveries were conducted at home. Among the home delivered all the deliveries were assisted by Trained Birth Attendant. Study out of the total 247 deliveries, mothers of 182 (74%) neonates received 2 or more antenatal check-up. 65 (26%) mothers had no or one ANC visit.

There were total 247 deliveries out of which 33 (14%) neonates were low birth weight and 214 (86%) were weighing more than 2.5 kg. There were 247 deliveries. Of these, 239 (96.76%) survived after 28 days of birth, while there were 8 (3.23%) neonatal deaths (within 28 days). For the purpose of analysis, these 8 neonatal deaths were excluded and analysis was done on 239 neonates. Among these, 4 deaths i.e. 50% took place within first 24 hours of birth. Among 239 newborns who survived, 187 (78.24%) received colostrum but 52 (21.75%) did not receive colostrum. Prolactal feeds in the form of honey, jaggery, ghutti, sugar water, tea, juices, and diluted animal milk were given in fifty one (21.33%) neonates while 188 (78.66%) did not receive prolactal feeds. 193 (81%) neonates were exclusively breast fed and 34 (14%) received both breast and top milk and 12 (5%) were on top feeding alone.

In the present study majority of the mothers did not have proper concept of hand washing. Only 27% had the right knowledge and practised hand washing regularly. Table 1 shows that 155 (65%) mothers and family members had the knowledge of

umbilical cord care, but over one third 84 (35%) still did not know umbilical cord care and uses means for umbilical cord care. At the time of interview mothers were asked to demonstrate the technique of assessing hypothermia. Despite receiving previous training from ASHA workers, 97 (41%) mothers still did not know about assessment of temperature without a thermometer.

Among the morbidities observed in neonates fever was commonest followed by jaundice (Table 2). Almost 36 (58%) morbidities were detected by mother and the family members rather than the health workers which was 26 (42%). 34 (55%) parents took their ill neonates to government hospital and 22 (35%) preferred private medical services. Other 6 (9.67%) neonates were not taken to doctor for treatment because of cultural taboos.

Table 1: Distribution of Patients According to Umbilical Cord Care Practices

Umbilical Cord Care Practices	Number	Percentage
Proper care	155	64.83
Oil application	38	15.89
Powder	21	8.78
Ash	7	2.96
Cow dung	6	2.51
Turmeric	4	1.67
Other	8	3.47
Total	239	100.00

Table 2: Distribution of Patients According to Spectrum of Morbidities (N=62)

Spectrum of morbidity	Number	Percentage
Fever	14	22.58
Jaundice	11	17.74
Respiratory illness	9	14.51
Excessive cry	7	11.29
Dullness	6	9.68
Eye discharge	5	8.06
Umbilical infection	4	6.45
Seizure	3	4.84
Other	3	4.84

Comparing the study that was done in 2011 by the DS-CSR project showed that the incidence of hospital delivery was 93% in year 2011 which increased to 96 % in 2013 under our study. Also there is significant increase in the delivery pattern, there was 1 delivery conducted by Trained Birth Attendant (TBA) and 8 deliveries conducted by relative in 2011, but in 2013 all domiciliary deliveries were conducted by TBA and there were no delivery conducted by relative. The incidence of low birth weight has also declined in the past 2 years. In 2011 LBW was 18.7% which declined to 14% during the study period of 2013.

There was significant rise in the exclusive breast feeding pattern. Earlier in 2011, 59.3% babies were exclusively breast fed but during the study period of 2013 this showed a marked rise in the number of breast fed babies, which was around 81%.

Discussion

The neonatal mortality in our study is 8 out of total 247 births. In our study the sample size is much small to comment on the mortality profile. But despite having a low sample size the neonatal mortality as indicated is high, which corresponds to overall neonatal mortality of the country, which is 33 per 1000 live births^[4].

In India there are large differences in level and rate of neonatal mortality among states. While Kerala and Tamil Nadu have low NMRs (less than 20 per 1,000 live births), Odessa, Madhya Pradesh, and Uttar Pradesh have very high NMRs (32 or more per 1,000 live births.)^[5]. This is the similar finding from our study which is in Madhya Pradesh where the NMR is 39 per 1000 live births.

In our study among the 8 neonatal deaths, 6 deaths occurred within 7 days of birth, and among them 4 succumbed within 24 hr of birth. Similar result has been reported by Baqui et al(2006),^[6] where analysis of the data on the timing of neonatal deaths indicates that about three-fourths of all

neonatal deaths occur in the first week of life. The first 24 hours account for more than one-third (36.9%) of the deaths that occur in the entire neonatal period. A systematic analysis of global, regional, and national causes of child mortality in 2012 identified prematurity and infections to be the major causes of neonatal deaths in India.^[7] The review, which included data from the Million Death Study from India found perinatal asphyxia and malformations to be the other two significant causes of neonatal mortality. These findings are similar to the overall global pattern.^[7]

In our study main cause of neonatal deaths was prematurity. Other included causes like respiratory illness, meconium aspiration and birth asphyxia.

The study by Bryce et al (2005)^[8] elicited primary causes of neonatal mortality as 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. Statistics of different studies conducted in South Asian countries show similar picture of causes of neonatal mortality^[9,10,11]

There is a lack of community-based data on causes of neonatal deaths, because many of them occur at home. Various studies show birth asphyxia/birth injuries, infections, complications of pre-term birth and birth defects as major causes of fetal-neonatal deaths^[12-16]. The greatest gap in care often falls during the critical first week of life when most neonatal and maternal deaths occur, often at home and with no contact with the formal health-care system. In addition, behaviours such as breastfeeding, which influence survival after the neonatal period, are not started in the first days of life, yet contact with the health system during this important period is often non-existent.

Neonatal morbidities constitute a huge burden to the health system and society in general. The SEARCH study by Bang et al. (1995-96) provided

a detailed insight into the burden of common morbidities in rural community settings.^[17,18] The most common morbidities identified in our study were fever (23 percent), jaundice (18 percent), Respiratory illnesses (14 percent), Excessive cry (11%), umbilical sepsis (6 %), seizure (5%), and other (5%).

A recent study conducted in 2009 at an urban Reproductive and Child Health centre and a district hospital in Lucknow assessed the distribution of neonatal illnesses among the urban poor^[19] which found a similar morbidities prevalent during the neonatal period in that area. Similar morbidity pattern were also found during two different studies from rural areas of Maharashtra and rural Uttar Pradesh.^[20] as well as study done in urban slums of India^[21,22].

Study from rural areas of developing countries of the world, reported that a very large proportion of deliveries took place at home. The study from Nepal reported 90% of deliveries were home deliveries and that only six percent of home deliveries were attended by skilled government health workers and newborn care practices were unhygienic and high-risk.^[11] The need of the hour is to promote hospital deliveries as evident from recent study in china by Xing et al in 2011^[23] where neonatal deaths were prevented by almost 70% due to institutional deliveries. In India, 65.4% of all births and 75.3% of births in rural areas occur at home^[24] 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.

In the present study 96% of the deliveries were institutional and only 4% deliveries were at home. This was mainly because of the already working Janani Suraksha Yojana (JSY) project and help of the ASHA workers and the NGO working in this

area which is responsible for mobilizing the pregnant mothers for deliveries to the hospital. The ASHA workers were paid incentives for this work from both the government and the NGO.

In our study among the deliveries that were conducted at home, all of them were assisted by the Trained Birth Attendant and there were no delivery conducted by the family members or relatives. This shows the impact of the training and working of Village Health workers.

A healthy mother is most likely to have a healthy full-term baby who will survive. A mother who is not healthy during pregnancy may not be able to meet all her baby's needs. The goals of antenatal care are to keep the mother healthy, help prevent problems like low birth weight and identify high risk pregnancies and refer them in time, it is also essential for them to understand that good newborn health depends on good maternal health and nutrition, especially during pregnancy, labour, and postpartum.

Baqui, et al^[12] in a recent study from Uttar Pradesh, India, reported very poor knowledge regarding newborn care practices among pregnant mothers, especially in rural areas. The study also revealed that only 17% pregnant women received at least one antenatal check up during their entire period of pregnancy. In contrast; in our study there were 74% mothers who received antenatal care, and had 2 or more antenatal visits. This was due to the already working of the government and NGO facilities in this region. Similar results were found in two other studies done by the Bang et al^[25] and Darmstadt et al^[26] where number of antenatal visits was increased due to counselling of the mother and families by the village health workers which helped in reducing the neonatal mortalities.

Nearly 30% of neonates in India are born with a low birth weight.^[27] This accounts for 42% of the global burden. LBW newborns are at higher risk of

dying in the neonatal period and beyond, as compared to normal birth weight (NBW) babies. Community based studies indicate that the LBW babies are 11 to 13 times more at risk of dying than NBW babies.^[10] Indeed, more than 80% of all neonatal deaths occur among LBW neonates. In our study as there were 14% low birth weight neonates born during the study period. And the incidence of LBW has decreasing during the past 2 year from 18.7% in 2011 to 14% in 2013. This was due to providing better antenatal care to the mother, educating mothers about maternal and child health. Similar result was found by Bang et al (2005)^[18] where during the field trial they found significant (16.0%) reduction in LBW after the home based intervention. This can contribute to improved survival because the neonatal mortality is concentrated in the LBW babies.

In our study we found that 22% of the neonates didn't received Colostrum. These neonates were given water (plain or flavoured with some supplement, such as betel, jaggery or glucose) during the initial days of birth. Villagers considered colostrum as "bad" or "stale milk" because of its color. It was possible to explain the need to start breast feeding within a few hours of birth by giving analogy of animals. As colostrum is thick it is believed to be difficult to digest. This resistance, however, may be countered by explaining that the thick colostrum is protection against infection and gives more nutrition in smaller quantities, which the newborn is able to suck. Such advice from the community health workers was well received.^[28]

As clear from the other studies done by Moss et al (2002),^[29] Leach et al (1999)^[30] that replacement of colostrum with pre - lacteal feeds increased the risk of neonatal mortality. So it is important to promote and teach the health workers and the mothers about the benefits of colostrum, and make community aware about it.

Since breast feeding is traditionally practised without exception, it is taken for granted that every mother knows the technique. In practice, however, one often sees the need for guidance. Care of the nipples during pregnancy and correct technique of breast feeding need to be explained by the field worker. Baqui et al (2007)^[12] in a recent study from Uttar Pradesh, India, reported very poor knowledge regarding newborn care practices among pregnant mothers, especially in rural areas. Only 5% women received information on thermal care and breastfeeding. 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. Similar results were found in our study also where 81% of neonates were exclusively breast fed. Although in our study the mothers were quite aware of the benefits of breast feeding.

When we compared this from previous unpublished data from district hospital; only 59.3% babies were exclusively breastfed in 2011. The increase in breastfeeding most probably occurred due to the effective health education and practicing supervised breastfeeding in the presence of ASHA workers. Evidence of these changes was seen in the knowledge and behaviour of mothers.

Similar results were found in other studies done in India by Bang et al (2005),^[31] Bhandari et al (2003)^[32] and in Mexico by Morrow (1999),^[33] where Community-based health management was promoted and found to have increased exclusive breastfeeding by the mothers.

In our study we found that around one third (35%) of the mothers and the family members did not have knowledge of umbilical cord care. There were much poor results seen in the other studies done by Baqui et al (2007)^[12] from rural Uttar Pradesh, India, reported only 7% pregnant women received any information regarding clean cord care from

health professionals. In our study we found most of the mothers apply oil on umbilical cord, others apply powder, ash, cow dung, turmeric. Similar results were found from study done in rural Pakistan,^[34] where mothers apply ghee (clarified butter) heated with cow dung to the umbilical stump, where this practice was commonly associated with increased incidence of neonatal tetanus and sepsis.

We placed emphasis on prevention, recognition and management of hypothermia. During our study we tried to find out the knowledge of mother regarding hypothermia among which 59% of the mothers had knowledge of the technique of assessing hypothermia. Hypothermia can be prevented by simple measures such as ensuring a warm environment during delivery, early breastfeeding and skin - to - skin contact with the mother, proper bathing, drying and swaddling, prompt identification and rewarming of hypothermic neonates. However in our study basic knowledge and practice of thermal control are inadequate among health care providers and families of the neonates. Similar findings were seen in the two different studies done in developing countries.^[35,36]

Evidence suggests that it is difficult for mothers to detect slight changes in body temperature simply by touch, but it appears to be possible for them to detect moderate or severe changes, i.e., 47% of mothers could detect moderate hypothermia.^[6] This is similar to the finding in our study where 59% mothers knew the assessment of hypothermia.

In our study although the skill of assessment of hypothermia was not adequately known by the

mother, most of the mothers were aware of the fact that the neonates need to be covered properly to prevent them from cold environment, which is due to the reason that mothers were counselled and educated by the ASHA workers regarding prevention, and harmful effects of hypothermia. There are not much studies regarding incidence of morbidity in relation to hand washing and type of clothing of neonates. But it is mentioned in a study by Darmstadt et al in 2005^[26] that increasing hand washing and maintaining hygienic condition like clean clothing is related to decreased chances of infections and ultimately decreasing the neonatal mortalities as well as morbidities. In our study it was observed that only 27% follow regular hand washing practices and large number 60% mother washed hands sometimes.

There were certain limitations in our study. Firstly the sample size was small. And secondly the study lacks a control sample. A similar number of villages with same socioeconomic background and terrain without intervention by ASHA workers should have been taken. Therefore there is a need to carry out a larger study in rural areas where neonatal mortality continues to remain high. Training of ASHA workers in neonatal health and entrusting them the responsibility of one village is essential because the infrastructure and transport facilities being inadequate prevents the mother and the newborn from gaining access to health facilities. Thus home based neonatal care is the need of the hour.

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