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Original Research Paper

JUDGING THE BURDEN OF MORBIDITIES IN RURAL CHILDREN AT INDIAN HEALTHCARE CENTERS

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ABSTRACT

Background: In the majority of neonates from developing nations, the birth and development of neonates is done in rural backgrounds. However, the literature data is scarce concerning the assessment of the burden of morbidities in rural children at Indian healthcare centers.

Aim: The present study aimed to assess the incidence of various morbidities in the neonates of rural areas along with associated case fatalities in rural neonates that are home-cared for. The study also assessed neonates with indications for health care and the subjects that received the healthcare.

Methods: The study assessed neonates by trained female village healthcare workers at birth and in the neonatal period of 0 to 28 days through 8 visits at home. The data was checked by a physician expert in the field and to assess morbidities, a computer program was used. The data gathered was statistically assessed.

Results: Among 508 live births, 95% of births were at home and a total of 75% (n=381) neonates were assessed. The agreement in the observations of physicians and healthcare workers was 92%. High-risk morbidities were seen in 48.03% (n=183) neonates with a case fatality of >10%. Inadequate weight of <300 grams and low-risk morbidities were seen in 17.9% and 72.2% of subjects respectively. Clinical features of sepsis were seen in 17% of subjects. 54% of subjects needed healthcare and 19 neonates died among these 20 with only 2% getting medical attention. The rate of neonatal mortality was 52.4/1000 live births.

Conclusions: The present study concludes that nearly half of neonates in rural areas develop 10 times more neonatal morbidity rates and require healthcare. However, these neonates practically do not receive healthcare facilities. This gap in care needs urgent home-based neonatal care development to decrease neonatal mortality and morbidity.

Keywords: Healthcare, neonates, newborn, morbidity, rural, sepsis

INTRODUCTION

Nearly half of the child mortality cases worldwide are contributed by the neonatal deaths of nearly 5 million being reported every year. It has also been reported that nearly 83% of the newborns in rural India and 63% of the newborns in the developing nation are being born at home. The newborns that are being born in the hospital are generally discharged immediately after the birth refraining them from the proper nursing care. As to these subjects, hospital care is generally inaccessible, the majority of the neonates in rural areas are cared for, die, or survive at their homes only.[1]

In such cases, community-based estimates are needed concerning the burden of neonatal morbidities and the care gap in the realistic planning approach for neonates. However, these data have limited availability and are scarce in the available literature, The majority of the existing literature data estimate single morbidities in these subjects such as sepsis or asphyxia, and are usually hospital-based studies.[2] The condition of neonatal health in rural areas is not adequately assessed based on hospital-based studies as the conditions in hospitals and at home are completely different. Also, only a few fortunate neonates reach the hospital for their treatments.[3]

Few of the literature studies concerning birth asphyxia are community-based studies. However, the incidence in these studies was assessed retrospectively which could result in misleading data and results. The majority of the studies based on birth weight were in general hospitals with a limited number of community-based studies, and the birth weight was not assessed on day 1 of reporting of these neonates, but on the day of visiting the health worker.[4]

All the studies concerning the outcomes and incidence of neonatal sepsis were generally hospital-based. Hence, the available data might not depict the actual picture concerning the death of neonates in rural areas.[5] Hence, the present study followed home-cared neonates in rural areas of India to assess the incidence of various neonatal morbidities in these neonates along with the associated case fatality. The study also assessed the proportion of neonates with the need for health care and the neonates that received the healthcare.

MATERIALS AND METHODS

The present prospective study aimed to assess the home-cared neonates in rural areas of India to assess the incidence of various neonatal morbidities in these neonates along with the associated case fatality. The study also assessed the proportion of neonates with the need for health care and the neonates that received the healthcare. The study was done after the clearance was given by the concerned Institutional Ethical committee. The study subjects were neonates in rural areas.

Verbal and written informed consent was taken from parents/guardians of all the neonates before study participation.

The study clearly defined the morbidities to be assessed in the included neonates along with related environmental and maternal factors and the neonatal symptoms and signs. This was followed by training of the included female healthcare workers concerning their knowledge to take history, observe the labor process, examination of the newborns, and record the findings. The data were gathered in the eight visits on fixed days from 0-28 days, and more if needed. The method utilized was from the Bang AT[6] in 1999. The healthcare workers were trained to provide pneumonia case management in children including neonates as Bang AT[7] in 1993.

The included families were allowed to seek care from government or private doctors or nurses and were also free to take neonates to the hospital if they felt the need. The care received and its sources were also recorded by the healthcare workers. The newborns were followed till death, the 28th day, or till mother and baby left the village, considering whichever was earlier. All the care was taken to completely gather the data. Few females went to their paternal home for delivery and returned to their home later, few females left for their paternal home after delivery, and if the mother or neonate left the village, the data was incomplete in such cases.

A physician, an expert in the field visited the village once every two weeks and verified the data gathered by the healthcare workers. For quality assessment of the gathered data, the physician assessed parallel observation in 59 neonates independently and in parallel. Agreement is seen on data comparison showing 90-100% agreement and mean agreement of 91.5±6.3%.

No aggressive treatment was provided at home by the visiting physician apart from the treatment already initiated. In cases of seriously sick newborns, the family was advised to the hospital of the neonate along with offering an ambulance to transport the neonate. However, the final decision was left to the family of the neonate. The study design, findings, diagnostic methods, training of healthcare workers, and data collection were assessed at baseline and end of the study to ensure the quality of the study.

Health concerns were diagnosed using the simplified diagnostic criteria from the national Neonatology forum[8] including the birth asphyxia as mild, severe, and indirect, preterm, low birth weight, delayed breastfeeding, problem in feeding, diarrhea, neonatal sepsis, hemorrhage, conjunctivitis, abnormal jaundice, meconium aspiration, hyaline membrane disease, pneumonia, upper respiratory tract infection, hypothermia, umbilical sepsis, tetanus, convulsive disorders, unexplained fever, failure to gain weight.

The completed record of the neonates was weekly assessed and reviewed. The diagnosis was made by physicians individually using the criteria being set. As the diagnosis was completely clinical, pneumonia, meningitis, and septicemia were clubbed together as sepsis. Hypothermia was considered as skin temperature of less than 95^{o} F as an increased case fatality was seen for temperature below 95^{o} F.

Healthcare was indicated in case of the presence of any high-risk health concerns that are associated with a case fatality of >10% or inadequate weight gain of <300 grams during the

neonatal period. Low-risk concerns were termed for conditions where the case fatality was <10%.

The data gathered were analyzed statistically using the SPSS software version 21.0 (IBM Corp., Armonk, NY, USA) and the chi-square test. The data were expressed as mean and standard deviation and frequency and percentage. Statistical significance was kept at a p-value of <0.05.

RESULTS

The present prospective study aimed to assess the home-cared neonates in rural areas of India to assess the incidence of various neonatal morbidities in these neonates along with the associated case fatality. The study also assessed the proportion of neonates with the need for health care and the neonates that received the healthcare. The study assessed 508 subjects and 382 were finally included as they met the inclusion criteria. During the study period, 26 deaths were reported and 21 subjects were from 383 final participants. Of 362 survived neonates, 335 completed 28 days of follow-up and the remaining 27 did not complete follow-ups in 12 subjects mother left the village, in 8 subjects healthcare worker failed to visit, in 1 subject, the parents refused the observation, and in 6 subjects, reason was not specified.

For birth weight and maturity in study subjects at-home care and related case fatality, in subjects of gestational week <37 weeks, 4, 6, 3, 0, and 0 deaths were from a birth weight of <1500, 1500-1999, 2000-2499, >2500, and unknown with a total of 9.8% (n=13) deaths. In 37-38 weeks, of gestation, total deaths were 1, 2, 1, 0, and 1 death from a birth weight of <1500, 1500-1999, 2000-2499, >2500, and unknown with total deaths of 26.1% (n=5) deaths. In >=39 gestation weeks, there were 0, 1, 1, 0, and 0 deaths from birth weight of <1500, 1500-1999, 2000-2499, >2500, and unknown with a total of 2% (n=1) deaths. Total deaths were 5, 9, 5, 1, and 1 from birth weight of <1500, 1500-1999, 2000-2499, >2500, and unknown as shown in Table 1.

On assessing the incidence of high risk in neonates assessed in-home care in the present study, for breastfeeding concerns, problems with mother and baby both were seen in 7.32% (n=28) sick neonates and 2.35% (n=9 neonates that died with a relative risk of death being 16.6, the baby was unable to suck in 8.90% (n=34) sick neonates and 1.30% (n=5) neonates that died. The relative risk is 7.8. Abnormal jaundice was seen in 1.57% (n=6) sock neonates and 0.52% (n=2) neonates that died and the relative risk was 4.5. Hemorrhage was seen in 1.30% (n=5) sick neonates and 1.04% (n=4) neonates that died, relative risk being 16.9. Hypothermia was seen in 1.57% (n=6) sick neonates and 0.52% (n=2) neonates that died with a relative risk of 4.7. The hyaline membrane was seen in 0.52% (n=2) of sick and dead neonates with a relative risk of 19.9. Meconium aspiration was seen in 0.52% (n=2) of sick and dead neonates with a relative risk of 19.9 (Table 2).

Among high-risk health concerns, delayed breastfeeding was seen in 9.16% (n=35) sick neonates and 1.04% (n=4) subjects that died with a relative risk of 2.2. Pneumonia sepsis was seen in 1.04% (n=4) subjects. Clinical neonatal sepsis was seen in 17.01% (n=65) sick subjects and in 3.14% (n=12) neonates that died with the relative risk being 7.1. In subjects with birth weight <2000 grams, it was seen in 9.68% (n=37) sick neonates and 3.66% (n=14) neonates that died

with a relative risk of 19.1. Multiple pregnancies were seen in 2.87% (n=11) sick neonates and 1.04% (n=4) neonates who died with a relative risk of 8.2. The congenital anomaly was seen in 1.30% (n=5) sick neonates and 0.26% (n=`1) neonates that died with a relative risk of 3.8. There were 48/16% (n=184) neonates with a minimum of one high-risk concern and a relative risk of 20.2 (4.8-83.7) as summarized in Table 2.

The study results showed that for the incidence of low risk in neonates assessed in-home care in the present study, physiological jaundice was seen in 2.09% (n=8) neonates where 12.5% (n=1) neonates died, conjunctivitis was seen in 12.30% (n=47) subjects with death in 2.12% (n=1) subject, pyoderma in 6.02% (n=23) neonates and death was seen in 4.34% (n=1) subject, intertrigo was seen in 6.28% (n=24) subjects with no death, umbilical sepsis in 19.89% (n=76) subjects with death in 2.63% (n=2) subjects, umbilical fever 11.25% (n=43) subjects with death in 2.32% (n=1) subject, and diarrhea in 5.49% (n=21) subjects with no death. Upper respiratory tract infection was seen in 19.89% (n=76) subjects with death in 1.31% (n=1) subjects, mild birth asphyxia was seen in 10.47% (n=40) subjects with death in 2.5% (n=1) subjects, and birth weight of 2000-2499 was seen in 32.19% (n=123) subjects with death in 3.25% (n=4) subjects. There were 72.25% (n=276) subjects with a minimum of one low-risk concern with a total of 2.09% (n=8) deaths as summarized in Table 3.

It was also seen that concerning the weight gain in neonates during the study period the mean weight gain in study subjects was 581.5±13.2 grams. The weight gain of <=0 was reported in 4.71% (n=18) subjects with a cumulative incidence of 5.2, weight gain of 1-99 grams was seen in 0.78% (n=3) subjects and cumulative incidence of 6.1, 100-199 grams in 3.92% (n=15) subjects with a cumulative incidence of 10.8, 200-299 grams in 6.02% (n=23) subjects, 300-399 grams in 6.54% (n=25) subjects, 400-499 grams in 5.75% (n=22) subjects, 500-599 grams in 14.65% (n=56) subjects, 600-699 in 13.08% (n=50) neonates, 700-999 in 19.63% (n=75) neonates, and >=1000 grams in 10.47% (n=40) subjects. The respective cumulative incidence was 17.7, 25.3, 32.2, 49.2, 64.6, 87.6, and 100 in weight gain of 200-299, 300-399, 400-499, 500-599, 600-699, 700-999, and >=1000 respectively as depicted in Table 4.

DISCUSSION

The present study assessed 508 subjects where 382 were finally included as they met the inclusion criteria. During the study period, 26 deaths were reported and 21 subjects were from 383 final participants. Of 362 survived neonates, 335 completed 28 days of follow-up and the remaining 27 did not complete follow-up in 12 subjects mother left the village, in 8 subjects healthcare worker failed to visit, in 1 subject, the parents refused the observation, and in 6 subjects, the reason was not specified. These data were similar to the studies of Blencowe H et al[9] in 2012 and Foreman KJ et al[10] in 2012 where authors assessed subjects with demographic data comparable to the present study.

For birth weight and maturity in study subjects at-home care and related case fatality, in subjects of gestational week <37 weeks, 4, 6, 3, 0, and 0 deaths were from a birth weight of <1500, 1500-1999, 2000-2499, >2500, and unknown with a total of 9.8% (n=13) deaths. In 37-38 weeks, of

gestation, total deaths were 1, 2, 1, 0, and 1 death from a birth weight of <1500, 1500-1999, 2000-2499, >2500, and unknown with total deaths of 26.1% (n=5) deaths. In >=39 gestation weeks, there were 0, 1, 1, 0, and 0 deaths from birth weight of <1500, 1500-1999, 2000-2499, >2500, and unknown with a total of 2% (n=1) deaths. Total deaths were 5, 9, 5, 1, and 1 from birth weight of <1500, 1500-1999, 2000-2499, >2500, and unknown. These results were consistent with the studies of Knippenberg R et al[11] in 2005 and Pitt C et al[12] in 2015 where authors reported a comparable correlation of death, gestational age, and birth weight in their study subjects as reported in the results of the present study.

It was seen that for the incidence of high risk in neonates assessed in-home care in the present study, for breastfeeding concerns, the problem with mother and baby both were seen in 7.32% (n=28) sick neonates and 2.35% (n=9 neonates that died with relative risk of death being 16.6, baby was unable to suck in 8.90% (n=34) sick neonates and 1.30% (n=5) neonates that died. The relative risk is 7.8. Abnormal jaundice was seen in 1.57% (n=6) sock neonates and 0.52% (n=2) neonates that died and the relative risk was 4.5. Hemorrhage was seen in 1.30% (n=5) sick neonates and 1.04% (n=4) neonates that died, relative risk being 16.9. Hypothermia was seen in 1.57% (n=6) sick neonates and 0.52% (n=2) neonates that died with a relative risk of 4.7. The hyaline membrane was seen in 0.52% (n=2) of sick and dead neonates with a relative risk of 19.9. Meconium aspiration was seen in 0.52% (n=2) of sick and dead neonates with a relative risk of 19.9. These findings were in agreement with the results of Edmond K et al[13] in 2010 and Barendregt JJ et al[14] in 1996 where authors suggested similar high-risk factors leading to comparable death rates as in neonates from the present study.

The study results showed that among high-risk health concerns, delayed breastfeeding was seen in 9.16% (n=35) sick neonates and 1.04% (n=4) subjects that died with a relative risk of 2.2. Pneumonia sepsis was seen in 1.04% (n=4) subjects. Clinical neonatal sepsis was seen in 17.01% (n=65) sick subjects and in 3.14% (n=12) neonates that died with the relative risk being 7.1. In subjects with birth weight <2000 grams, it was seen in 9.68% (n=37) sick neonates and 3.66% (n=14) neonates that died with a relative risk of 19.1. Multiple pregnancies were seen in 2.87% (n=11) sick neonates and 1.04% (n=4) neonates who died with a relative risk of 8.2. The congenital anomaly was seen in 1.30% (n=5) sick neonates and 0.26% (n=`1) neonates that died with a relative risk of 3.8. There were 48/16% (n=184) neonates with a minimum of one high-risk concern and a relative risk of 20.2 (4.8-83.7). These results were in line with Vos T et al[15] in 2012 and Murray CJ et al[16] in 2012 where authors reported comparable healthcare concerns as in this study.

It was seen that for the incidence of low risk in neonates assessed in-home care in the present study, physiological jaundice was seen in 2.09% (n=8) neonates where 12.5% (n=1) neonate died, conjunctivitis was seen in 12.30% (n=47) subjects with death in 2.12% (n=1) subject, pyoderma in 6.02% (n=23) neonates and death was seen in 4.34% (n=1) subject, intertrigo was seen in 6.28% (n=24) subjects with no death, umbilical sepsis in 19.89% (n=76) subjects with death in 2.63% (n=2) subjects, umbilical fever 11.25% (n=43) subjects with death in 2.32% (n=1) subject, and diarrhea in 5.49% (n=21) subjects with no death. Upper respiratory tract

infection was seen in 19.89% (n=76) subjects with death in 1.31% (n=1) subjects, mild birth asphyxia was seen in 10.47% (n=40) subjects with death in 2.5% (n=1) subjects, and birth weight of 2000-2499 was seen in 32.19% (n=123) subjects with death in 3.25% (n=4) subjects. There were 72.25% (n=276) subjects with a minimum of one low-risk concern with a total of 2.09% (n=8) deaths. These data correlated with Lozano R et al[17] in 2012 and Mathers CD et al[18] in 2006 where low-risk factors quoted were in line with the present study.

The study results also showed that concerning the weight gain in neonates during the study period the mean weight gain in study subjects was 581.5±13.2 grams. The weight gain of <=0 was reported in 4.71% (n=18) subjects with a cumulative incidence of 5.2, weight gain of 1-99 grams was seen in 0.78% (n=3) subjects and cumulative incidence of 6.1, 100-199 grams in 3.92% (n=15) subjects with a cumulative incidence of 10.8, 200-299 grams in 6.02% (n=23) subjects, 300-399 grams in 6.54% (n=25) subjects, 400-499 grams in 5.75% (n=22) subjects, 500-599 grams in 14.65% (n=56) subjects, 600-699 in 13.08% (n=50) neonates, 700-999 in 19.63% (n=75) neonates, and >=1000 grams in 10.47% (n=40) subjects. The respective cumulative incidence was 17.7, 25.3, 32.2, 49.2, 64.6, 87.6, and 100 in weight gain of 200-299, 300-399, 400-499, 500-599, 600-699, 700-999, and >=1000 respectively. These findings correlated with the results of Liu L et al[19] in 2012 and Mwaniki MK et al[20] in 2012 where weight gain comparable to the present study was also reported by the authors.

CONCLUSIONS

Considering its limitations, the present study concludes that nearly half of neonates in rural areas develop 10 times more neonatal morbidity rates and require healthcare. However, these neonates practically do not receive healthcare facilities. This gap in care needs urgent home-based neonatal care development to decrease neonatal mortality and morbidity.

REFERENCES

1. Independent Expert Review Group (RG) on Information and Accountability for Women's and Children's Health 2012 Every Woman Every Child: from commitments to action. World Health Organization.
2. UNICEF. Committing to Child Survival: A promise renewed, 2012.
3. Lawn JE, Kinney MV, Black RE, et al. Newborn survival: a multi-country analysis of a decade of change. *Health Policy Plan* 2012;**27**:iii6–iii28.
4. Lozano R, Wang H, Foreman KJ, et al. Progress towards Millennium Development Goals 4 and 5 on maternal and child mortality: an updated systematic analysis. *Lancet* 2011;378:1139–65.
5. UNICEF. Childinfo - Monitoring the Situation of Children and Women, 2012.
6. Bang AT, Bang RA, Baitule SB, Reddy HM, Deshmukh MD. Effect of home-based neonatal care and management of sepsis on neonatal mortality: Field trial in rural India. Lancet 1999;354:1955-61.

7. Bang AT, Bang RA, Morankar VP, Sontakke PG, Solanki JM. Pneumonia in neonates: Can it be managed in the community? Arch Dis Child 1993;68:550-6.

8. Singh M, Paul VK, Bhakoo ON. Neonatal Nomenclature and Data Collection. National Neonatology Forum, New Delhi, 1989; pp 63-74.

9. Blencowe H, Cousens S, Oestergaard MZ, et al. National, regional, and worldwide estimates of preterm birth rates in the year 2010 with time trends since 1990 for selected countries: a systematic analysis and implications. *Lancet* 2012;379:2162–72.

10. Foreman KJ, Lozano R, Lopez AD, Modeling causes of death: an integrated approach using CODEm. *Popul Health Metr* 2012;10:1.

11. Knippenberg R, Lawn JE, Darmstadt GL, et al. Systematic scaling up of neonatal care in countries. *Lancet* 2005;365:1087–98.

12. Pitt C, Greco G, Powell-Jackson T, Mills A. Countdown to 2015: assessment of official development assistance to maternal, newborn, and child health, 2003-08. *Lancet* 2010;376:1485–96.

13. Edmond K, Clark A, Korczak VS, Sanderson C, Griffiths UK, Rudan I . Global and regional risk of disabling sequelae from bacterial meningitis: a systematic review and meta-analysis. *Lancet Infect Dis* 2010;10:317–28.

14. Barendregt JJ, Bonneux L, Van der Maas PJ . DALYs: the age-weights on balance. *Bull World Health Organ* 1996;74:439–43.

15. Vos T, Flaxman AD, Naghavi M, et al. Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 2012;380:2163–96.

16. Murray CJ, Vos T, Lozano R, et al. Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 2012;380:2197–223.

17. Lozano R, Naghavi M, Foreman K, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 2012;380:2095–128.

18. Mathers CD, Lopez AD, Murray CJL. The burden of disease and mortality by condition: data, methods, and results for 2001. In: Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJL, eds. *Global Burden of Disease and Risk Factors*. The International Bank for Reconstruction and Development/The World Bank Group, Washington: DC, 2006.

19. Liu L, Johnson HL, Cousens S, et al.; Child Health Epidemiology Reference Group of WHO and UNICEF. Global, regional, and national causes of child mortality: an updated systematic analysis for 2010 with time trends since 2000. *Lancet* 2012;379:2151–61.

20. Mwaniki MK, Atieno M, Lawn JE, Newton CR. Long-term neurodevelopmental outcomes after intrauterine and neonatal insults: a systematic. review. *Lancet* 2012; 379:445–52.

Gestation (weeks)	Birth weight (grams) Deaths/ neonates (%)					Total	
	<1500	1500-1999	2000-2499	>2500	Unknown	Deaths/neonates	%
<37	4/5 (80)	6/12 (50)	3/14 (21.4)	0/5	0/2	13/38 (34.21)	9.8
37-38	1/2 (50)	2/8 (25)	1/39 (2.56)	0/46	1/5 (20)	5/100 (5)	26.2
>=39	0/0	1/10 (10)	1/68 (1.47)	0/154	0/5	2/237 (0.84)	62
Unknown	0/0	0/0	0/2	1/4 (25)	0/1	1/7 (14.28)	2
Total deaths/neonates	5/7 (71.42)	9/30 (30)	5/123 (4.06)	1/209 (0.47)	1/13 (7.69)	21/382 (5.49)	-

Table 1: birth weight and maturity in study subjects at-home care and related case fatality (n=382)

High-risk health concerns	Sick neonates (0-28 days)		Deaths		Relative risk of death
	n	%	n	%	
Breastfeeding concerns					
Problems with both mother and baby	28	7.32	9	2.35	16.6
Baby unable to suck	34	8.90	5	1.30	7.8
Total	62	16.23	14	3.66	12.0
Abnormal jaundice	6	1.57	2	0.52	4.5
Hemorrhage	5	1.30	4	1.04	16.9
Hypothermia (<95ºF)	6	1.57	2	0.52	4.7
Hyaline membrane disease	2	0.52	2	0.52	19.9
Meconium aspiration	2	0.52	2	0.52	19.9
Delayed breastfeeding	35	9.16	4	1.04	2.2
Pneumonial sepsis	4	1.04	0		-
Clinical neonatal sepsis	65	17.01	12	3.14	7.1
Birth weight <2000 g	37	9.68	14	3.66	19.1
Birth asphyxia					
Preterm	38	9.94	12	3.14	15.1
Indirect	1/97	0.26	1	0.26	13.7
severe	13/285	3.40	5	1.30	7.8
Multiple pregnancies	11	2.87	4	1.04	8.2
Congenital anomaly	5	1.30	1	0.26	3.8
Neonates with any high-risk concern	184	48.16 (44.5-51.5)	19	9.94 (7.0-13.2)	20.2 (4.8-83.7)

Table 2: Incidence of high risk in neonates assessed in-home care in the present study

Low-risk health concerns	Sick neonates (0-28 days)		Deaths	
	n	%	n	%
Physiological jaundice	8	2.09	1	12.5
Conjunctivitis	47	12.30	1	2.12
pyoderma	23	6.02	1	4.34
Intertrigo	24	6.28	0	-
Umbilical sepsis	76	19.89	2	2.63
Unexplained fever	43	11.25	1	2.32
Diarrhea	21	5.49	0	--
Upper respiratory infection	76	19.89	`1	1.31
Mild birth asphyxia	40	10.47	1	2.5
Birth weight 2000-2499	123	32.19	4	3.25
Neonates with any low-risk concern	276	72.25 (68.8-75.2)	8	2.09 (1.7-4.8)

Table 3: Incidence of low risk in neonates assessed in-home care in the present study

Weight gain (grams)	Number (n)	Percentage (%)	Cumulative incidence (%)
<=0	18	4.71	5.2
1-99	3	0.78	6.1
100-199	15	3.92	10.8
200-299	23	6.02	17.7
300-399	25	6.54	25.3
400-499	22	5.75	32.2
500-599	56	14.65	49.2
600-699	50	13.08	64.6
700-999	75	19.63	87.6
>=1000	40	10.47	100
Mean weight gain	**581.5±13.2**		

Table 4: Weight gain in neonates during the study period