

Original Research Article

Prevalence and Determinants of Neonatal Morbidity in a Rural Area of Dibrugarh District, Assam

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Abstract: Newborn health is a foundation of child health and adult health. If proper care is not given to the mother right from conception till the neonatal period, the newborn suffers from various morbidities. The socio demographic factors and antenatal, intranatal and postnatal care are important determinants of neonatal morbidity. The present study was conducted with the objective to determine the prevalence of neonatal morbidity and its associated factors in a rural area of Dibrugarh district, Assam. A Community based cross-sectional study was conducted among 257 infants upto 6 months in a rural area of Dibrugarh district, from August 2013 to July 2014. Data was collected by interviewing the mothers of the infants using a pre-designed and pre-tested proforma. The prevalence of neonatal morbidity was found to be 41.6%. The most common morbidity was cough/difficult breathing (15.2%) followed by fever (10.5%) and diarrhea (8.2%). Neonatal morbidity was significantly associated with birth order, pre-lacteal feeding, education, occupation and number of antenatal visits by the mother. There is a need to focus on BCC activities to promote female literacy and empowerment and to adopt correct breastfeeding practices to reduce the burden of neonatal morbidity in rural areas.

Keywords: Neonatal morbidity, rural area, antenatal, intranatal and postnatal care, breastfeeding practices

INTRODUCTION

Newborn health is a foundation of child health and adult health [1]. A healthy newborn can withstand all the adverse conditions after birth and grow into childhood to experience life to their full potential after birth [2]. The socio-demographic profile of the family and the care the mother received right from the time of conception plays a vital role in the survival of the newborn.

A human being faces the greatest risk of mortality during birth and the first 28 days of life - the neonatal period. In the whole neonatal period, the early neonatal period is very crucial as three quarters of neonatal deaths take place in the first seven days. Ironically, most of these neonatal deaths are preventable with appropriate care of the mother and newborn [2]. It is thus crucial that appropriate care is provided during this period, both to improve the child's chances of survival and to lay the foundations for a healthy life.

Neonatal morbidity and mortality are major global public health challenges as neonatal mortality

contributes bigger fraction to under-five mortality [3]. Globally four million deaths occur every year in the first month of life [4]. Almost all (99%) neonatal deaths arise in low-income and middle-income countries [4, 5]. 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 [4, 6]. The newborn health challenge faced by India is more voluminous, more diverse and more formidable than that of any other country in the world [1]. According to Annual health survey (AHS) 2012-13, the NMR of Assam was 37 per 1000 live birth whereas in Dibrugarh, this figure was 34 per 1000 live birth [7].

In rural areas of India, there are a lot of factors that predisposes to neonatal morbidity and mortality. Socio-demographic factors such as age, education, occupation, socio-economic status of the parents plays an important part in the newborn survival. Improper care of the mother and newborn have been recognized as one of the determinants of the high neonatal morbidity and mortality in this country. Optimal breastfeeding practices such as initiation of

breastfeeding within 1 hour of birth, colostrum feeding and avoidance of prelacteal plays a vital role in preventing neonatal morbidity and mortality. Thus, keeping all the above points in mind, the present study was undertaken in rural areas of Dibrugarh district, Assam with the objective to determine the prevalence and its associated factors of neonatal morbidity in rural areas of Dibrugarh district.

MATERIALS AND METHODS

A community based cross sectional study was conducted in the rural areas of Dibrugarh district, Assam for a period of one year from August 2013 to July 2014. A sample size of 257 was calculated using the formula $4pq/d^2$ considering the percentage of upper respiratory tract symptom to be 20.1% and taking 5% absolute error [8]. There are 6 Block PHCs in Dibrugarh district. For conducting the study one block namely Lahowal Block was selected randomly and a list of all the sub-centres (SC) in this block was prepared. There were a total of 35 SCs. The number of study subjects (infants upto 6 months) to be included from each SC was decided by proportional allocation. Morbidity occurred in the neonatal period were recorded by recall from the mother. Information was collected by face to face interview on a predesigned and pretested proforma after taking informed consent. In each sub-centre, the first house was selected by picking up a random starting number, thereafter consecutive houses were visited until the required number of study subjects in each sub-centre area was obtained. The same procedure was repeated in all the sub-centres until the required sample size was achieved.

IMNCI definitions were used for classifying the type of morbidities wherever applicable [9]. The data was analyzed using standard statistical software: SPSS (version 16.0) and presented by using percentage and chi-square test. The study was conducted after clearance by the Institutional Ethics Committee of Assam Medical College and Hospital, Dibrugarh.

Inclusion criteria:-

All the mothers of infant's upto 6 months who gave consent

Exclusion criteria:-

The mothers of the infants who were not willing to give consent and were non-cooperative

Definition used for neonatal morbidity

1. **Congenital malformation:** Any morphological, functional, biochemical or molecular defects that may develop in the embryo and fetus from

conception until birth, present at birth, whether detected at that time or not [10].

2. **Diarrhea:** Diarrhea is defined as three or more loose or watery stools in a 24-hour period [9].
3. **Jaundice:** Yellow discoloration of skin extending to palms and soles [9].
4. **Fever:** Fever is considered if the mother gives a history of fever or feels hot to touch [9].
5. **Ear infection:** Ear pain or discharge from the ear [9].
6. **Eye infection:** Redness or discharge from the eye [9].
7. **Umbilical infection:** Redness of the end of the umbilicus or draining pus [9].
8. **Skin infection:** Skin pustules are red spots or blisters, which contain pus. 10 or more pustules or a big boil indicate a serious infection [9].

RESULTS:

As shown in Table 1, 51.8% of the neonates were males while 48.2% were females and 60.7% were of birth order 1. Most of the neonates (82.5%) belonged to Hindu religion, 67.3% belonged to OBC category and 68.5% were from joint families. Most of the families (42.0%) belonged to socioeconomic Class IV.

As shown in Table 2 and 3, 41.6% neonates suffered from at least one morbidity during the neonatal period. The most common morbidity suffered was cough/ difficult breathing (15.2%) followed by fever (10.5%) and diarrhea (8.2%). The most common morbidity among male neonates was cough/ difficult breathing (17.3%) followed by fever (15%) while in females was cough/ difficult breathing (12.9%) followed by diarrhea (9.7%).

As shown in Table 4, the prevalence of neonatal morbidity was highest (44.5%) in neonates whose mothers were in age group 20-24 years, followed by 25-29 years (40.5%) and 30-34 years (41.2%). However, no significant association was found between the age of mother and neonatal morbidity. The prevalence of neonatal morbidity was highest (55.6%) in neonates whose mothers were illiterate (55.6%) and in working mothers (58.2%). This association was found to be statistically significant.

As shown in Table 5, neonatal morbidity was highest (48.7%) in neonates with birth order 1 compared to birth order 2 and above. This association was found to be statistically significant. Highest morbidity was found among the Muslim (56.7%), general caste (44.2%), nuclear family (49.4%) and in socio-economic class V (48.8%).

As shown in Table 6, the percentage of neonatal morbidity was highest (75.0%) in neonates whose mother’s undertook only one antenatal visit (75.0%) and in neonates who were given pre-lacteal feed (60.5%). This association was found to be statistically significant. The present study also revealed highest percentage of morbidity in neonates of mothers consuming less than 100 numbers of iron folic acid tablets (44.3%), not immunised with tetanus toxoid

(66.7%), at home delivery (66.7%), in neonates with delayed initiation of breastfeeding (50.0%) and neonates not given colostrum (47.6%). But no statistical significant association was found. Neonatal morbidity was more (50.0%) in neonates whose mother’s did not avail any postnatal visits compared to the mothers who availed 3 or more PNC visits (38.3%).

Table 1: Distribution of neonates according to socio- demographic profile

Characteristics		Number	Percentage (%)
Sex	Male	133	51.8
	Female	124	48.2
Birth order	1	156	60.7
	2	83	32.3
	3 and above	18	7.0
Religion	Hindu	212	82.5
	Muslim	30	11.7
	Christian	15	5.8
Caste	General	52	20.2
	OBC	173	67.3
	SC	13	5.1
	ST	19	7.4
Type of family	Nuclear	81	31.5
	Joint	176	68.5
Socio-economic status	I	7	2.7
	II	25	9.7
	III	37	14.4
	IV	108	42.0
	V	80	31.1

Table 2: Distribution of the neonates according to the presence of morbidity during neonatal period

Presence of Morbidity	Number	Percentage (%)
Yes	107	41.6
No	150	58.4
Total	257	100.0

Table 3: Distribution of the neonates according to the type of morbidity during neonatal period

Type of morbidity	Sex				Total (N= 257)
	Male (N=133)		Female (N=124)		
	No.	%	No.	%	
Prematurity	10	7.5	9	7.3	19 (7.4)
Birth injury	1	0.8	0	0.0	1 (0.4)
Congenital malformation	1	0.8	1	0.8	2 (0.8)
Jaundice	2	1.5	5	4.0	7 (2.7)
Eye infection	3	2.3	3	2.4	6 (2.3)
Fever	20	15.0	7	5.6	27 (10.5)
Cough/ difficult breathing	23	17.3	16	12.9	39 (15.2)
Ear infection	4	3.0	2	1.6	6 (2.3)
Diarrhea	9	6.8	12	9.7	21 (8.2)
Skin diseases	7	5.2	5	4.0	12 (4.7)
Umbilical sepsis	1	0.8	4	3.2	5 (1.9)
Oral thrush	0	0.0	4	3.2	4 (1.6)

Table 4: Distribution of neonatal morbidity according to age, education and occupation of mother

Characteristics		Total	Neonatal morbidity		p- value
			Yes	No	
			No.(%)	No.(%)	
Age of mother (in years)	15 - 19	27	9 (33.3)	18 (66.7)	0.711
	20 - 24	137	61 (44.5)	76 (55.5)	
	25 -29	74	30 (40.5)	44 (59.5)	
	30 -34	17	7 (41.2)	10 (58.8)	
	35 -39	2	0 (0.0)	2(100.0)	
Education of mother	Illiterate	72	40 (55.6)	32 (44.4)	0.007
	Primary school	27	14 (51.9)	13 (48.1)	
	Middle school	52	23 (44.2)	29 (55.8)	
	High school	38	9 (23.7)	29 (76.3)	
	Intermediate / Post school	62	20 (32.3)	42 (67.7)	
	Graduate and above	6	1 (16.7)	5 (83.3)	
Occupation of mother	Working	67	39 (58.2)	28 (41.8)	0.001
	Non-working	190	68 (35.8)	122 (64.2)	

Table 5: Distribution of neonatal morbidity according to birth order, religion, caste, type of family and socio-economic status.

Characteristics		Total	Neonatal morbidity		p-value
			Yes	No	
			No. (%)	No.(%)	
Birth order	1	156	76 (48.7)	80 (51.3)	0.016
	2	83	26 (31.3)	57 (68.7)	
	3 and above	18	5 (27.8)	13 (72.2)	
Religion	Hindu	212	87 (41.0)	125 (59.0)	0.058
	Muslim	30	17 (56.7)	13 (43.3)	
	Christian	15	3 (20.0)	12 (80.0)	
Caste	General	52	23 (44.2)	29 (55.8)	0.945
	ST	19	7 (36.8)	12 (63.2)	
	SC	13	5 (38.5)	8(61.5)	
	OBC	173	72 (41.6)	101 (58.4)	
Type of family	Nuclear	81	40 (49.4)	41(50.6)	0.087
	Joint	176	67 (38.1)	109 (61.9)	
Socio-economic status	I	7	1 (14.3)	6 (85.7)	0.056
	II	25	5 (20.0)	20 (80.0)	
	III	37	14 (37.8)	23 (62.2)	
	IV	108	48 (44.4)	60 (55.6)	
	V	80	39 (48.8)	41(51.2)	

Table 6: Distribution of neonatal morbidity according to antenatal care, intranatal care and postnatal care

Characteristics		Total	Neonatal morbidity		p- value
			Yes	No	
			No. (%)	No. (%)	
Number of antenatal visit	0	3	2 (66.7)	1 (33.3)	0.021
	1	16	12 (75.0)	4 (25.0)	
	2	9	5 (55.6)	4 (44.4)	
	3	42	20 (47.6)	22 (52.4)	
	4 and above	187	68 (36.4)	119 (63.6)	
IFA tablets consumed	<100	70	31 (43.7)	39 (55.7)	0.598
	100 and above	187	76 (40.6)	111 (59.4)	
TT immunization	Yes	254	105 (41.3)	149 (58.7)	0.376
	No	3	2 (66.7)	1 (33.3)	
Place of delivery	Institutional	251	103 (41.0)	148 (59.0)	0.208
	Home	6	4 (66.7)	2 (33.3)	

Mode of delivery	Vaginal	212	84 (39.6)	128 (60.4)	0.156
	Caesarean section	45	23 (51.1)	22 (48.9)	
Initiation of breastfeeding	<1 hour	189	73 (38.6)	116 (61.4)	0.103
	≥1hour	68	34 (50.0)	34 (50.0)	
Pre-lacteal given	Yes	43	26 (60.5)	17 (39.5)	0.006
	No	214	81 (37.9)	133 (62.1)	
Colostrum fed	Yes	236	97 (41.1)	139 (58.9)	0.562
	No	21	10 (47.6)	11 (52.4)	
Number of postnatal visits	0	4	2 (50.0)	2 (50.0)	0.855
	1	140	57 (40.7)	83 (59.3)	
	2	66	30 (45.5)	36 (54.4)	
	3 or more	47	18 (38.3)	29 (61.7)	

DISCUSSION:

In the present study, it was observed that 41.6% neonates suffered from morbidity during the neonatal period which was comparable to Srivastava NM *et al.*; in 2007 and Ahmed S. *et al.*; in 2001 [11,12]. Contrast to the present study, a higher percentage of neonatal morbidity was noticed by Eishabrawy EM *et al.*; in 2010 [14]. However, Khanum M *et al.*; in 2004 recorded a lower percentage of morbidity [14]. This might be due to the difference in study settings. Regarding the type of morbidity, the most common morbidity suffered was cough/ difficult breathing (15.2%) followed by fever (10.5%) and diarrhea (8.2%). The finding of the present study was somewhat similar to Srivastava NM *et al.*; in 2008, Eishabrawy EM *et al.*; in 2010, Khanum M *et al.*; in 2004 and Gupta M and Swami HM [11, 13-15]. Among the 133 male neonates, the most common morbidity suffered was cough/ difficult breathing (17.3%) followed by fever (15%) while among 124 female neonates, the most common morbidity suffered was cough/ difficult breathing (12.9%) followed by diarrhea (9.7%). Thus the most common morbidity suffered by both male and female neonates was cough/ difficult breathing.

In the present study, the percentage of neonatal morbidity was highest (44.5%) among the neonates whose mothers were in age group 20-24 years, followed by 25-29 years (40.5%) and 30-34 years (41.2%). However, no significant association was found between neonatal morbidity and the age of mother which is in accordance with the findings of Ahmed S *et al.*; in 1998 [12]. Neonatal morbidity was highest among the illiterate (55.6%) and lowest (16.7%) among mothers with graduation and above. This association was found to be statistically significant. Ahmed S *et al.*; in 1998 also observed similar findings in their study [12]. The present study revealed a higher percentage of neonatal morbidity among the neonates of working mothers (58.2%) compared to non-working mothers (35.8%)

which was found to be statistically significant. Similar observations were made by Choudhury G *et al.*; in 1987 [16].

In the present study, the likelihood of morbidity was found to be greater among the neonates who belonged to the first birth order (48.7%). This association was found to be statistically significant. Similar finding was observed by Ahmed S *et al.*; in 1998 in Bangladesh[12]. This might be due to lack of expertise on newborn care among the mother's with birth order 1. The percentage of neonatal morbidity was highest among the neonates belonging to Muslims (56.7%) than compared to Hindu (41.0%) and Christian (20.0%). Similarly, Ahmed S *et al.*; in 1998 also found higher morbidity among Muslims compared to non-Muslims and it was not significantly associated [12]. Neonatal morbidity was highest among general caste (44.2%) than the other caste. However this association was not found to be statistically significant.

Neonatal morbidity was found to be higher (49.4%) in nuclear family compared to joint family (38.1%). This might be due to insufficient family support in newborn care in nuclear family. Antenatal care of the mother is of paramount importance for the proper health of the mother and growth of foetus. When a mother does not get adequate care during pregnancy her health deteriorates which ultimately affect the growing foetus. An improperly growth foetus when comes to the external environment at birth suffers from various disadvantages leading to ill-health and mortality. This is no contrast to the present study. Neonatal morbidity was more in neonates whose mother's had availed only one antenatal visit (75.0%), consumed less than 100 number iron folic acid tablets (44.3%) and with no tetanus toxoid administration (66.7%). These findings were in conformity to the study by Niswade A *et al.*; in 2011 [17]. The association of number of antenatal visits and neonatal morbidity in the present study was statistically significant which in line

with Niswade A *et al.*; in 2011[17].

Hospital provides a very careful and clean environment where delivery can be conducted by skilled personnel. On the contrary, deliveries of newborn at home in unhygienic condition with lack of expertise make the newborn prone to various infectious agents leading to morbidity and mortality. This is in conformity to the finding of the present study where higher prevalence of neonatal morbidity was higher (66.7%) in neonates born at home than in hospital (41.0%). However, this association was not found to be statistically significant. Eishabrawy EM *et al.*; in 2010 in their study in Egypt observed that infection in neonates was higher in home delivery (62.2%) than hospital delivery (36.8%) [13].

Postnatal care is vital for the newborn after birth. The breastfeeding practices and the postnatal check-up of the newborn are essential for its survival and for proper growth and development. In the present study, a higher proportion of morbidity was observed with faulty breastfeeding practices and inadequate postnatal check-up. Neonatal morbidity was higher (50.0%) in neonates with delayed initiation of breastfeeding (>1 hour) compared to neonates breastfed within 1 hour (38.6%). However, no statistically significant association was found between them. Niswade A *et al.*; in 2011 also observed a higher percentage of morbidity in neonates with delayed initiation of breastfeeding and it was significantly associated [17]. This might be due to the fact that neonates with delayed initiation of breastfeeding are deprived of the protective factors of breast milk in early hours of life.

A statistically significant association was found between neonatal morbidity and in newborn with prelacteal feeding. Pre-lacteal foods provide a source of introduction of infection to the newborn and as a result various neonatal morbidity occurs. Colostrum provides all the essential nutrients and anti-infective properties that protect the newborn from various infections. This is no contrast to the present study where neonatal morbidity was lower among neonates who were colostrum fed (41.1%) than in neonates with no colostrum feeding (47.6%).

CONCLUSION:

The study revealed a high prevalence of neonatal morbidity. Neonatal morbidity was significantly associated with education and occupation of mother, birth order, number of antenatal visits and prelacteal feeding. There is a need to promote female

literacy and empowerment to influence the correct newborn care and thus reducing neonatal morbidity in the rural areas. Behavior Change Communication (BCC) activities should be stepped up in the rural areas focusing on the correct breastfeeding practices.

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