ORIGINAL ARTICLE

Factors Influencing Infant Morbidity in the Urban Field Practice Area of a Medical College in Bangalore

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ABSTRACT

Background: Infants constitute 2.92% of the total population in India. Health of infants is considered as a sensitive indicator of health status and level of socio-economic development of a country. In India, the infant morbidity and mortality are in decline, but the pace of decline is not sufficient to attain the target goals of National Health Mission. **Objective:** To assess the factors influencing infant morbidity in the urban field practice area of a medical college in Bangalore. **Methods and Material:** This was a population based cross sectional study done at an urban poor locality in Bangalore. The study was conducted between April 2018 to September 2019 with a sample size of 300 after obtaining the approval from Institutional ethics committee. Population proportion to size was used to ensure equal representation. Data was collected using pre tested semi structured questionnaire & analysed using open epi like descriptive statistics with univariate & multi variate logistic regression were used. **Results:** Total of 165(55%) subjects were females, with majority 206(68.7%) Muslim by religion and 161(53.7%) lived in the nuclear family. The prevalence of morbidities among infants was 209(69.7%). The most common infant morbidities reported were 121(40.3%) ARI, 85(28.3%) fever and 45(15%) diarrhea. Infants with perinatal complications, faulty feeding practices like delayed initiation of breast feeding, bottle feeding and immunization had significant association with infant morbidities. **Conclusions:** To conclude there is a statistically significant association between perinatal complications, bottle feeding & partial immunization with infant morbidity.

KEY WORDS: Infant, Immunization, Breast feeding, Morbidity.

Introduction

Infancy constitutes the period from birth to one year of age and Infants constitute 2.92% of the total population in India. Health of infants is considered as a sensitive indicator of health status and level of socio-economic development of a country.[1]

There are wide variations between countries and regions in the levels of infant mortality and morbidity. The WHO states that, 4.1 million Children die every year due to preventable deaths. The Infant Mortality Rate (IMR) world wide during 2016 was 29.4 per 1000 live births and IMR in South-Asian countries was 42 per 1000 live births.[1,2]

In India, the infant morbidity and mortality have declined from 57 to 41 per 1,000 live births between NFHS-3 (2005-06) and NFHS-4 (2015-16);[3] the pace of decline is not sufficient to attain the target goals of National Health Mission and the rates are still high compared to developed countries. State-wise IMR for the year 2016 showed a vast regional variation with IMR of 64 in Uttar Pradesh and as low as 6 per 1000 live births in Kerala.[3–5]

The major causes of infant morbidity and mortality in India are preterm birth, birth asphyxia and trauma and neonatal sepsis during the neonatal period whereas Acute respiratory infections [ARI], diarrhoea and malnutrition are the most common causes during the post neonatal period. Timely intervention and immediate newborn resuscitation, if provided will reduce mortality and morbidity.[3,5,6]

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Along with these there is a significant influence of various social, economic, nutritional & environmental factors on infant morbidity & mortality which can be prevented by simple interventions thus reducing the infant morbidity rates.[7]

In this background this study was undertaken with the objectives to describe the socio-demographic profile of infants, to describe the morbidity pattern among infants and to find out the factors associated with infant morbidities.

Material & methods

The study was conducted between April 2018 to September 2019 in an urban poor locality situated in the urban field practice area of the medical college in Bangalore, Karnataka. Informed consent was obtained from all the study subjects. Institutional ethics committee clearance was obtained before initiating the study. As an operational definition, mother of the child was selected as the primary respondent but if the mother was not available either father or other care givers in the house was selected as the respondent.

Based on a similar study conducted in Assam in the year 2013 around 21.7% infants suffered from diarrhoea. On this basis the sample size calculated considering absolute precision as 5% was 297 which was rounded off to 300.[8]

The sample size Calculation was done as follows:

p =21.7%[8]

$n = (Z_{\alpha/2})^2 pq/d^2$

p = 0.217; q = 0.783(1-p); d = 5% precision error = 0.0025; $\alpha = 0.05$

$n = 1.96 \times 1.96 \times 0.217 \times 0.783 / 0.0025 = 261 \approx 270$

Addition of 10% non-responders: 270+27= 297

Sample Size (n) = 300

All the infants whose mother/care giver giving informed consent were included and seriously ill infants or infants born as twins/ triplets/ multiple births were excluded.

Using Probability Proportion to Size (PPS) corresponding number of subjects were selected from 8 urban poor localities falling under the urban field practice area till the required sample size was obtained ensuring proportionate representation of every area under the urban field practice area.

In each locality, an approximate centre was identified. The number of roads leading from the centre was counted and numbered. One of the roads was selected randomly using lottery method. After selecting the road a walk through survey was done & one of the house was randomly selected using a currency note. Subsequently by tossing a coin, the direction of selection of subsequent household was decided.

The household having infants fulfilling the inclusion criteria was identified and enrolled to the study. Survey was continued, till the required sample size of each locality was collected.

During the survey the data was collected using a pretested, semi-structured proforma and information regarding maternal factors, factors related to child birth, infant feeding practices was ascertained.

Details regarding morbidity conditions & immunization were obtained from the medical records. Data was entered in Microsoft excel 2010& analysed using Open epi.[9]

Descriptive statistics like mean, standard deviation, frequency & percentages were used along with univariate and multivariate logistic regression to determine the association of various factors with infant morbidity.

Results

Totally 300 infants were included in the study of which 277 (92.3%) subjects were aged between 29 days to 12 completed months and rest of the subjects were aged less than 29 days. Muslims constituted 206(68.7%) of the total subjects with majority 161(53.7%) residing in nuclear families. Most of the fathers and mothers of the study subjects 115(38.4%) and 112(37.4%) were educated up to middle school respectively. Based on modified Kuppuswamy classification majority of the study subjects belonged to lower middle class.

A total of 209(69.7%) of study subjects were suffering from at least one morbid condition at the time of the

survey.

There was no statistically significant association between any of the socio-demographic characteristics & infant morbidity on univariate analysis. Similarly, maternal factors like maternal age, maternal education, birth spacing, antenatal & intranatal complications showed no statistically significant association with infant morbidity.

In order to assess overall effect of various variables on infant morbidities, the multiple logistic regression models was applied. The variables that were statistically significant in the univariate logistic regression analysis were included in the multiple logistic regression model. In multivariate analysis it was found that, statistically significant association was observed between infant morbidities and infants who had perinatal complications (OR=11.91; CI=1.56-90.64), bottle fed infants (OR=2.92; CI=1.43-5.98) and partially immunized infants (OR=6.56; CI=1.50-28.68). So they may be considered as the independent risk factors.

To conclude there is a statistically significant association between perinatal complications, bottle feeding & partial immunization with infant morbidity.

Table 1: Distribution of study subjects according to neonatal morbidities (n=300)

Neonatal morbidity (#)	Frequency	Percentages
Neonatal sepsis	5	1.7
Neonatal birth asphyxia	9	3
Convulsions	5	1.7
Jaundice	8	2.7
Acute Respiratory Infection (ARI)	22	7.3
Diarrhoea	2	0.7
Fever	4	1.3
Others	8	2.7

Multiple responses Others: vomiting, feeding problems, congenital problems

Discussion

The causes of infant morbidities are multifactorial. Most of the infant morbidities can be prevented by simple intervention through early identification of risk, treatment and prompt referral. The community specific health status assessment is very essential for planning, administration and evaluation of public health programs. This will give an estimate of the actual problem in its varying dimensions, which may be considered for prevention of morbidity.

Table 2: Distribution of study subjects according to post neonatal morbidities (n=277)

Post neonatal morbidity (#)	Frequency	Percentages
ARI	99	35.7
Diarrhoea	43	15.5
Fever	81	29.2
Eye Diseases	6	2.1
Ear Diseases	12	4.3
Skin Diseases	2	1.4
Convulsions	2	1.4
Others	109	39.4

Multiple response, Others: vomiting, injuries/accidents, burns, surgical illness and congenital anomalies.

In the present study majority of the subjects 55% were females. It was similar to other studies conducted at Gulbarga, Karnataka by Sakre et al and Kalaburagi, Karnataka by Naaz F et al were most of the subjects were females. This was in contradict to the sex ratio of Karnataka population 979 females to 1000 males reported in NHFS 4.[10–12]

In the present study, 53.7% of them lived in the nuclear family similar to a study conducted by Baruah and Borah et al in rural, Assam.[6] However in other cross sectional studies conducted by Borah M et al and Sakre et al showed that, majority of the babies in their study lived in joint family.[8,10]

Most of the families in the present study i.e 45.3% belonged to lower middle, 36% were upper lower and 17.4% upper middle, whereas a similar study by Sakre et al reported 43% of the families belonged to lower class, 42% upper class and 15% lower middle according to Modified Kuppuswamy's classification of socio-economic scale.[10]

The most common morbidity reported among infants in the study was acute respiratory infection which accounted for 41.3% of morbidities. The finding was similar to other studies conducted in various parts of India were ARI was the common morbidities among infants. A study by Sakre et al showed 48%, Walke et al 34.3%, Baruah and Borah et al 33.3% and Borah M et al 20%, reported acute respiratory infection as the most common morbidities.[6,8,10,13]

Table 3: Association between individual factors and infant morbidities using univariate logistic regression (n=300)

Variables	Category	Infant with morbidity	Infant without morbidity	Odds ratio (95% CI)	p value
Place of delivery	Private	49(73.1)	18(26.9)	-	-
	Home	3(75)	1(25)	1.10(0.10-11.29)	0.93
	Government	157(68.6)	72(31.4)	0.80(0.43-1.47)	0.47
Mode of delivery	NVD	122(67.0)	60(33.0)	-	-
	LSCS	87(73.7)	31(26.3)	1.38(0.82-2.30)	0.21
Gestational age	Term	196(68.8)	89(31.2)	-	-
	Pre term	13(86.7)	2(13.3)	2.95(0.65-13.35)	0.16
Immunization	Immunized up to age	179(66.8)	89(33.2)	-	-
	Partially immunized	30(93.8)	2(6.2)	7.45(1.74-31.91)	0.007
Bottle feeding	Not Practiced	149(65.1)	80(34.9)	-	-
	Practiced	60(84.5)	11(15.5)	2.92(1.45-5.88)	0.003
Feeding initiated	Within 1 hour	86(62.8)	51(37.2)	-	-
	> 1 hour	123(75.5)	40(24.5)	1.82(1.10-2.99)	0.01
Perinatal complications	Absent	184(67.2)	90(32.8)	-	-
	Present	26(100.0)	-	12.22(1.63-91.68)	0.01

Table 4: Association between individual factors and infant morbidities using multivariate logistic regression (n=300)

Variables	Category	Adjusted Odds ratio (95% CI)	Standard error	Z	P value
Perinatal complications	Absent	-	-	-	-
	Present	11.91(1.56-90.64)	1.03	2.47	0.01
Feeding initiated	Within 1 hour	-	-	-	-
	> 1 hour	1.48(0.88-2.50)	0.26	0.39	0.13
Bottle feeding	Not practiced	-	-	-	-
	Practiced	2.92(1.43-5.98)	0.36	1.07	0.03
Immunization	Immunized up to age	-	-	-	-
	Partially immunized	6.56(1.50-28.68)	0.75	1.88	0.01

About 15.5% subjects had at least one episode of diarrhea in last two weeks preceding the survey which is much more than the NFHS-4 data which mentions it as 9.2%.[12]

In the present study, 73.3% of the preterm infants had morbidities which is similar to a study conducted by Ghulam Nabi Rather et al on morbidity and mortality pattern in late pre-term babies in Jammu and Kashmir.[14]

The present study also found that, there was a statistically significant association between infant morbidities and bottle feeding which was similar to Joseph et al. study on Infant rearing practices in South India.[15]

Vaccinations have reduced the burden of infectious diseases among children. In the present study 89.3% of the infants were immunized up to age which was more than the coverage rate of 63% according to NHFS-4 report of Karnataka.[12] Another cross-sectional study by Borah M et al also reported more than 90 % of immunization coverage at rural areas of Assam which was similar to the present study.[6] The present study also observed that, there was a statistically significant association between partially immunized infants and infant morbidities.

Conclusion

The present study showed that, 69.7% of infants had suffered from either one or other morbidities. The most common infant morbidities noticed were acute respiratory infections, diarrhoea and fever. There was a statistically significant association between presence of perinatal complications, bottle feeding and partial immunization of infants and infant morbidity.

Recommendations

The cause of infant morbidities is multi-factorial and hence it needs a multi-dimensional approach to create awareness regarding its occurrence, management and prevention of the morbidities. Regular health education to parents and care givers along with regular follow up of infants through trained health workers are some of the measures which can reduce infant morbidities.

Limitation

This study was conducted in a small population in one geographic area hence the results cannot be generalized. Morbidity assessment was done only based on history without conducting any investigations.

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