Risk factors of neonatal mortality in Faisalabad, Pakistan

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Abstract: The objective of study was to find out major correlates of neonatal mortality. The main focus was in determining the impact of different demographic and health related characteristics of neonates and their mothers. A planned questionnaire was prepared in order to collect the information from mothers of newborns. The data were collected from different public and private hospitals of Faisalabad district. Discharge condition of neonate (dead or alive) was taken as response. Binary logistic regression was applied in order to unveil the impact of different contributory factors on the chances of neonatal mortality. Marriage age of mother, age of mother at baby birth, number of pregnancies, time since last birth, antenatal care, delivery mode, gender of baby, baby weight, baby disease and its nature, domestic violence, baby nutrition and residence were found to be significant factors affecting neonatal mortality. Odds ratio was used as a measure of association. From the results, it can be summed up that marriages at optimal ages, lesser frequency of pregnancies, early initiation of mother feeding, increased care during pregnancy to avoid low birth weight and birth time diseases, and increased facilities of antenatal care in rural areas can effectively reduce the neonatal mortality rates.

Keywords: Antenatal care, baby weight, mother feed, neonatal deaths, Body Mass Index.

INTRODUCTION

Neonatal mortality is a term referred to the death of a newly born baby during first 28 days of his/her life. Neonatal mortality rate (NMR) is defined as the number of neonates dying before reaching 28 days of age, per 1,000 live births in a given year. Approximately 14 million women aged 15-19 years give births all over the world annually and the neonates of these women have high risk of mortality (Ramaiya *et al*., 2014). Four million infants die during their neonatal age out of 130 million born each year (Jehan *et al*., 2009). The situation of neonatal death in Pakistan is alarming as Pakistan has highest NMR among all ECO, SAARC (even higher than Afghanistan, Bhutan and Nepal etc.) from 2011 to 2015 (The World Bank, 2015). There are different diseases to mother or babies at birth that can cause neonatal deaths. Some of such common diseases are hepatitis, hypertension, diabetes and breathing problems (Rey & Couturier, 1994; Clausen *et al*., 2005; Ghias & Pervaiz, 2009; Ananth & Basso, 2010). The impact of birth weight, birth order, mother's body mass index (BMI), and maternal age at delivery have also been found as significant correlates of neonatal mortality (Wilcox & Skjaerven, 1992; Fretts *et al*., 1995; Jehan *et al*., 2009). It is reported that children who used milk other than mother feed had four times higher risk of dying during their neonatal age (Edmond *et al*., 2006). In addition to these health related factors, there may be many other social and demographic factors that can have an influence on neonatal mortality (Lee *et al*., 2008).

Keeping the above situation in view, it seems pertinent to study the factors that cause neonatal mortality. Although the present study is limited to Faisalabad district but our results may provide guidelines and propositions about different factors for future studies based on other areas of the Punjab province. From an analytical point of view the present study is not limited to descriptive analysis like many studies conducted in past (Fikree *et al*., 2002; Chen *et al*., 2009) but we have tried to use more reliable and interpretable statistical approach.

MATERIALS AND METHODS

For data collection, a detailed questionnaire consisting of questions on different demographic and health related characteristics of neonate, mother and family, was prepared. We have collected information from a sample of 300 mothers from different public and private hospitals namely Allied hospital, District Headquarter hospital, Mian Trust hospital, Faisal hospital, Social Security hospital and Aziz Fatima hospital in district Faisalabad during March and May, 2016. In order to analyze the correlates of neonatal mortality, we have used different characteristics as contributory factors like mother age at marriage and at neonates' birth, no. of pregnancies in past, time since last delivery, check up during pregnancy,

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Table1: Risk factors of neonatal mortality using binary logistic regression

Variable	Estimate	S.E	Z-Statistic	P-value	Odds Ratio
Constant	1.142	1.848	0.382	0.537	3.133
Age-Marriage	0.161	0.097	2.753	0.097	1.175
Age-Current	-0.186	0.107	3.045	0.081	0.83
no. of Pregnancies	0.335	0.189	3.143	0.076	1.398
Time Since Last Birth	0.328	0.165	3.935	0.047	1.388
Checkup-Pregnancies	-0.93	0.48	3.749	0.053	0.394
Delivery-Mode	1.454	0.521	7.78	0.005	4.278
Gender	-0.814	0.479	2.89	0.089	0.443
Baby-Weight	-1.428	0.389	13.453	<0.0001	0.24
Baby-Disease	1.678	0.515	10.597	0.001	5.353
Severe-Disease	3.143	0.717	19.207	<0.0001	23.184
Mother-Feed	-1.427	0.489	8.525	0.004	0.24
Residence	-0.739	0.475	2.425	0.119	0.478

delivery mode, baby weight at birth, baby disease and its severity, mother feed, and urban or rural location of family. Binary logistic regression (Cox, 1958) was applied which is standard tool in case of binary response. Odds ratio was used to assess the magnitude and direction of association of different factors with response (neonatal mortality). For Statistical analysis SPSS 20 was used.

RESULTS

The results are based on 300 babies out of which 227 (75.7%) were alive and 73(24.3%) were dead at the end their neonatal age. Table 1 shows the results of binary logistic regression of neonatal mortality. From the results of logistic regression, mother's marriage age (p=0.097), mother's current age (p=0.081), number of pregnancies (p=0.076), regularity in checkups during pregnancy (p=0.053), gender of neonate (p=0.089) and time since last birth (p=0.047) were found to be significant, while delivery mode (p=0.005), baby weight (p<0.0001), presence of disease at birth (p=0.001), severity level of birth time disease (p<0.0001) and mother feed (p=0.004) were found to be highly significant in terms of their influence on chances of death during neonatal age.

DISCUSSION

Mother's age at marriage is found to be positively related to odds of dying while mother's current age is negatively related to probability of dying in neonatal age. The age related variables have been found significant in some other studies (Fretts *et al*., 1995; Jehan *et al*., 2009). Interpreting them together, it can be inferred that pregnancy in too early or too late age can be highly risky for neonate's life. Every additional pregnancy enhances the odds of neonate's death by 1.398 times. The odds ratio of the variable 'time since last birth' indicates that chances of death in neonatal period increase with increasing time between two births. The results indicated that women who had regular checkups during pregnancy have lesser odds of having neonatal deaths compared to others. Comparing the impact of delivery mode showed that babies through caesarian deliveries have lesser chances of neonatal mortality. It may be due to the fact that in caesarian delivery, the child related complications get reduced although complications related to mother are increased. It is observed that female babies have less than half chances of death in neonatal period compared to male babies. The results of logistic regression indicate that babies with lower birth weight are at higher risk of dying in neonatal period which is in confirmation with literature (Edmond *et al*., 2006). The results also indicated that babies having severe diseases at birth time have higher chances of dying during neonatal age. Like in different studies (Kaushik *et al*., 1998; Uthman, 2008),our results also indicate that the odds of neonatal mortality of children taking only mother feed are about 4 times less compared to others. The chances of neonatal mortality were found to be less in the urban areas as compared to those in the rural areas. However, this impact is found to be statistically non-significant (p-value 0.119).

CONCLUSION

From results, it is found that the marriages at very young age and very old age are both risky for neonate's survival. The more the number of pregnancies the more the chances of mortality in neonatal age. Antenatal care is found to be significant as regular checkups during pregnancy can reduce the chances of neonate's death. Low weight babies or babies with any severe disease at the time of birth have higher odds of dying during the neonatal period. Mother feed can effectively reduce the chances of neonatal mortality. Time between two births to a mother and delivery mode are two variables which have signs opposed to the general expectations.

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