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Prevalence of Neonatal Diseases in Multan Region, Pakistan

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Abstract: Neonatal death rates and morbidity is forever a high interest for doctors and public health specialist. Main objectives of this research is to determine the prevalence of neonates diseases in Multan region, to make assessment which disease has been most commonly occurring in this region and finally present comparison of neonatal diseases proportion by gender. This study was carried out in the Children ward, Nishter Hospital, Multan from 1st January to 31st July 2012 and data of all admitted neonates were recorded. Descriptive statistics and z-test was used for the comparison of proportion of neonatal diseases by gender. A total of 889 neonates patients were observed during this period which comprises 535 (60.18%) male and 354 (39.82%) female. Of the all neonatal diseases, Birth asphyxia (B.A) was the most frequent i.e., 424 (47.69%) patients. Preterm babies were 168 (18.90%) and babies with sepsis were 155 (17.44%). Tetanus followed 12 (1.35%), Meconium Aspiration Syndrome (MAS) 28 (3.15%) babies and babies who born premature were 46 (5.17%). From z-test, we have found that all neonatal diseases by gender are significant. In our study Birth asphyxia, preterm, prematurity, MAS, sepsis, and tetanus are the main causes of neonatal admissions, while preterm birth, birth asphyxia and sepsis are in great proportion. When comparison was made, it was revealed that the prevalence of all neonatal diseases is higher among male neonates than female except in MAS neonates. The Solid and supportable policies are required to formulate and carried out to escape from numerous preventable reasons of neonatal morbidity and mortality.

Key words: Neonatal diseases, mortality rate, z-test

INTRODUCTION

Neonatal period (0 to 28 days of life) is the extremely unsafe era of life (Aijaz *et al*., 2012). Globally, of the approximately 130 million annual births, 4 million die during the first 28 days of life and nearly half of them on the first day of the birth (Warren *et al*., 2012). Developing countries accounts 99% of neonatal mortality and up to 1 million deaths are referred to infectious causes including neonatal sepsis, meningitis and pneumonia. Pakistan is one of the five countries who contributed 49% (4.294 million) of child deaths and has highest neonatal mortality (53/1000 live births). Nearly half of the baby's deaths in Pakistan take place at first 28 days of life. Most of the reasons of neonatal morbidity in Pakistan are preventable with an estimated 298000 neonatal deaths annually and a reported neonatal death rate of 49 per 1000 live births (Aaijaz *et al*., 2012). In Pakistan, out of 5.3 million births, 270, 000 newborn die, each year a rate of neonatal death approximately 10 times greater than in US (Yousafani *et al*., 2008). In other countries of the region, like in Bangladesh, neonatal mortality rate are 42 per 1000 live birth and the leading cause of these deaths are perinatal asphyxia, neonatal infection and premature birth (Ahmad *et al*., 2011). Pre-maturity considered for majority of high risk newborns as they face a large number of problems. Approximately 1.2-1.6% of newborn infants develop MAS (Xn *et al*., 2006). Throughout the world the major reasons of neonatal mortality were estimated to be infections (35%), pre-term births (28%) and asphyxia (23%). Sepsis is the main cause of deaths in new born babies approximately 20% of all new born babies develop sepsis and each year in developing countries sepsis is liable for 30-50% of the total neonatal deaths (Aaijaz *et al*., 2012). The occurrence of sepsis in neonates in the developed countries is 1 to 10 per 1000 live births, while it is approximately three times more in developing countries like Pakistan (Waseem *et al*., 2005).

MATERIALS AND METHODS

This expositive study was carried out in neonatal unit, Nishter hospital Multan, Pakistan, from January 1st 2012 to 30th July 2012. 889 neonates of either gender were studied over the period. The data was composed concerning diagnosis and consequence of all admission through the study period (Discharge, left against medical advice, death). The record of death cases was moreover assessing in particular regarding age of babies, gender of babies.

Diagnoses were done especially on clinical grounds and found on WHO case definition e.g., prematurity (live born neonate delivered before 37 weeks of complete gestation). Sepsis was diagnosed on clinical grounds and was verified by appropriate investigations. Birth asphyxia etc., was suspected on clinical examinations.

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Statistical tool and software: The collected data was analyzed by using Statistical Software MINITAB version 16.1. Descriptive statistics such as percentages and frequencies were calculated. Difference between men and female proportion is carried out by using Z - test. For Z-test proportion of neonatal disease by gender is tested at 0.05 level of significance and p-value <0.05 indicates that significance difference in proportion of neonatal diseases by gender. When two tail test is rejected, then one tail test is also applied to test the direction of disease proportion by gender more clearly.

RESULTS AND DISCUSSION

Total number of babies admitted in neonatal unit was 889 in which there are 535 (60.18%) males and 354 (39.82%) females. The neonate's age ranges from their birth to 28 days. The topmost number of admissions in constitute of birth was B.A (47.69%), preterm (18.9%) was 2nd highest neonatal disease, sepsis (17.44%), Meconium aspiration syndrome (3.15%), neonatal tetanus (1.35%), prematurity (5.17%) and miscellaneous were (6.30%).

The total number of male and female babies in B.A diseases is 264 (49.35%) and 160 (45.19%) respectively which are shown in Table 1 and Fig. 1.

In Table 2 and Fig. 3, percentage of neonatal age on admission is presented. From the Table 2, we have found that 371 (41.73%) babies admitted in first 24 hours of life, 287 (32%) in 24-72 hours of life, 231 (25.9%) after 72 hours but before 28 days of life. More babies are expired in the first 24 hours of life. Baby life in the first 28 days of life is very risky similar results are shown in Fig. 3.

In our study, out of the total neonatal admissions, 209 (23.51%) were discharged in satisfying condition, 65 (7.31%) Left Against Medical Advice (LAMA) and 615 (69.18%) babies died.

From Table 3, we have there were 424 cases with Birth Asphyxia, 276 (44.88%) died, 106 (50.72%) were discharged and 42 (64.62%) left against medical advice. Preterm babies reported for 168 (18.9%) of neonatal admission, 80 (13.01%) of these babies expired, 74 (35.41%) were discharged and 14 (21.54%) left against medical advice. Out of 155 (17.44%) neonates with neonatal sepsis, 140 (22.76%) died, 13 (6.22%) were discharged, while 2 (3.08%) left against medical advice. Premature were 46 (5.17%) of which 44 (7.15%) expired, 2 (0.96%) were discharged and no one left against medical advice. Meconium aspiration babies totaled 28 (3.15%) of which 24 (3.90%) died, none of baby were discharged. and 4 (6.15%) left against medical advice. Miscellaneous groups comprised of 56 (6.30%) neonates out of which 41 (6.6.7%) died, 14 (6.70%) were discharged and 1 (1.54%) left against medical advice. They died of Congenital Heart Defects, Cardio Respiratory Arrest, Intensified Disease Management, Pneumonia and Neonatal jaundice.

Testing the equality of proportion for male and female neonatal diseases:

H_0: There is no significant difference between male and female proportion of Neonatal diseases

i.e.:

$$H_0: P_1 = P_2$$

H_1: There is significant difference between male and female proportion of Neonatal diseases

i.e.:

$$H_1: P_1 \neq P_2$$

Table 1: Gender wise prevalence of neonatal diseases

Diseases	Male (%)	Female (%)	Total (%)
Birth Asphyxia	264 (49.35)	160 (45.19)	424 (47.69)
MAS	4 (0.75)	24 (6.78)	28 (3.15)
Preterm	97 (18.13)	71 (20.06)	168 (18.90)
Prematurity	32 (5.98)	14 (3.95)	46 (5.17)
Sepsis	99 (18.50)	56 (15.82)	155 (17.44)
Tetanus	10 (1.87)	2 (0.56)	12 (1.35)
Miscellaneous	29 (5.42)	27 (7.63)	56 (6.30)
Total	535	354	889

MAS: Meconium Aspiration Syndrome

Table 2: Age of neonates on admission

Age (days)	No. of Neonates	Age (%)
<1	371	41.73
1-<4	287	32.28
4-<7	119	13.39
8-<14	68	7.65
15-28	44	4.95
Total	889	100

Table 3: Descriptive analysis of neonatal diseases in Multan region

Diseases	Frequency (%)	Discharge (%)	LAMA (%)	Expired (%)
B.A	424 (47.69)	106 (50.72)	42 (64.62)	276 (44.88)
Preterm	168 (18.9)	74 (35.41)	14 (21.54)	80 (13.01)
Sepsis	155 (17.44)	13 (6.22)	2 (3.08)	140 (22.76)
Prematurity	46 (5.17)	2 (0.96)	0.00	44 (7.15)
MAS	28 (3.15)	0.00	4 (6.15)	24 (3.90)
Tetanus	12 (1.35)	0.00	2 (3.08)	10 (1.63)
Miscellaneous	56 (6.30)	14 (6.70)	1 (1.54)	41 (6.67)
Total	889	209	65	615

LAMA: Left against medical advice

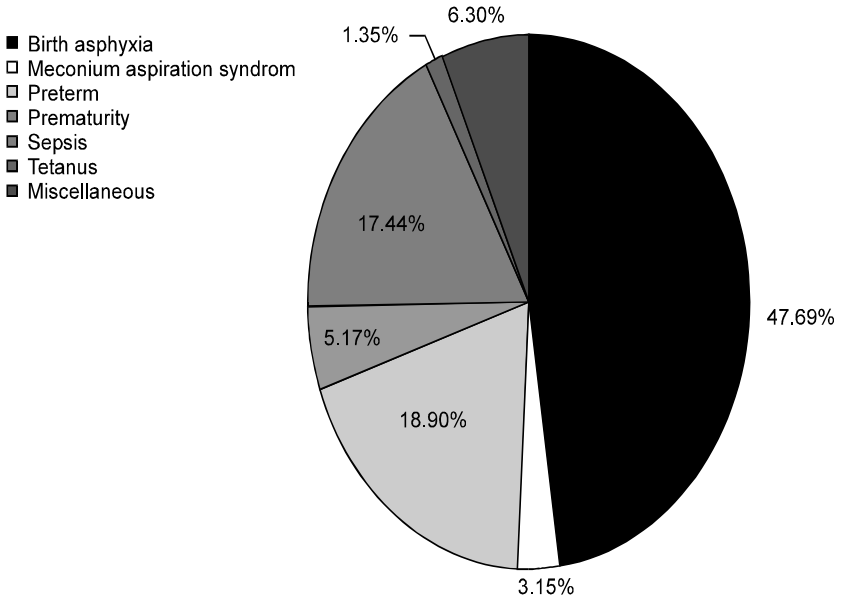

Fig. 1: Over all prevalence of neonatal diseases in Multan region

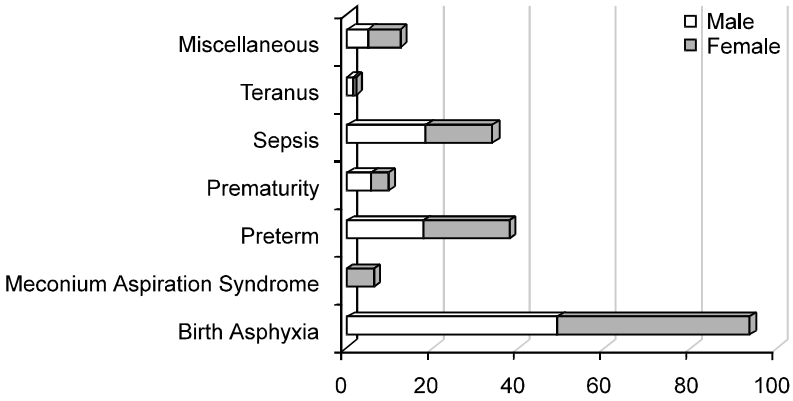

Fig. 2: Prevalence of neonatal diseases by gender in Multan region

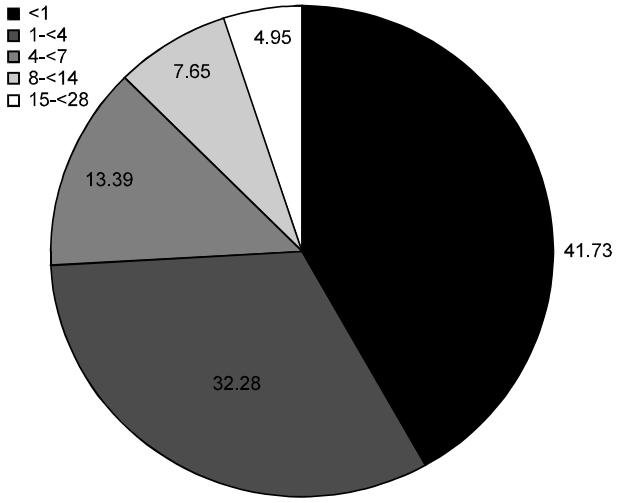

Fig. 3 Percentage of neonates by age on admission

Table 4: Testing the equality of proportion for male and female neonates under different diseases

			Two tail test		One tail test	
Diseases	P_1 (M)	P_2 (F)	Z	P-value	Z	P-value
Birth Asphyxia (B.A)	0.6226	0.3773	5.0506	4.4E-07*	5.0506	2.2E-07
Sepsis	0.6387	0.3612	3.4538	0.0005*	3.4538	0.0002
Preterm	0.5773	0.4226	2.0059	0.0448*	2.0059	0.0224
Prematurity	0.6956	0.3043	2.6539	0.0079*	2.6539	0.0039
MAS	0.1428	0.8571	-3.7796	0.0001*	-3.7796	0.9999
Tetanus	0.8333	0.1666	2.3094	0.0209*	2.3094	0.0104
Miscellaneous	0.5178	0.4821	0.2672	0.7892		

*Significant

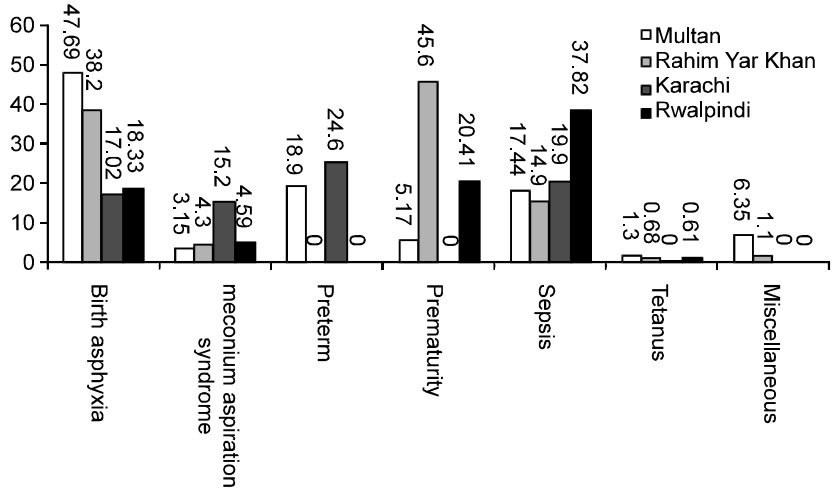

Fig. 4: Bar chart to compare the prevalence proportion of neonatal diseases in Pakistan

When null hypothesis is reject to indicate the significant differences in Gender, then we conduct one tail (lower) test to identify where the prevalence of neonatal disease proportion is higher in male or female babies?. In this situation research hypothesis are as follows:

H_0: Proportion of female neonatal is greater than or equal to male proportion of Neonatal diseases

i.e.:

$$H_0: P_2 \geq P_1$$

H_1: Proportion of male neonatal is lower as female proportion of Neonatal diseases

i.e.:

$$H_1: P_2 < P_1$$

From Table 4, we come to know that P-value is less than 0.05 so we reject the null hypothesis that there is no significant difference between birth asphyxia, sepsis, preterm, prematurity, MAS and tetanus disease for male and female babies and have concluded that the proportion of birth asphyxia male children is greater as compared to the proportion of female children. One tail test is also applied for determining the direction of diseases according to Gender wise comparison. From one tail test, we have found that in B.A disease proportion in male is greater as female, in sepsis disease proportion in male proportion is greater than female, proportion of male is greater as female proportion in preterm disease, the proportion of male babies is more as proportion of female babies in prematurity disease, in MAS disease proportion in male is less or equal as female while in tetanus disease, proportion of male babies is greater than female babies.

Comparison with other Pakistan studies: Similar study was conducted by Saleem *et al.* (2011) in Rahim Yar Khan, by Aijaz *et al.* (2012) in Karachi, by Zulfqar and Naeemullah (2009) in Rawalpindi The comparison of our results with already conducted studies are presented in Table 5 and Fig. 4. From the results, we have found that we have studies more neonatal diseases as other. Also from the figure and table, we have found that the prevalence of B.A in Multan Region is higher as other regions. Prevalence of MAS diseases in Karachi is higher as other regions. While prevalence of Sepsis disease in Rawalpindi is higher as other regions. neonatal disease a similar study done at neonatal unit of Sheikh Zayed Hospital, Rahim Yar Khan

Table 5: Comparison with already conducted studies in Pakistan regarding neonatal diseases

Neonatal diseases	Multan	RYK	FSD	RWD	Karachi
B.A	47.69	38.2	17.02	18.33	14
MAS	3.15	4.3	15.2	4.59	13
Preterm	18.9	0	24.6	0	20
Prematurity	5.17	45.6	0	20.41	
Sepsis	17.44	14.9	19.9	37.82	17
Tetanus	1.3	0.68	0	0.61	
M	6.35	1.1	0	0	4

B.A.: Birth asphyxia, MAS: Meconium aspiration syndrome, M: Miscellaneous, RYK = Rahim Yar Khan, FSD = Faisalabad, RWD = Rawalpindi

in 2010 and Allied hospital Faisalabad Pakistan in 2009 and Neonatal Intensive Care Unit of Department of Pediatrics, Holy Family Hospital (HFH), Rawalpindi which shows that birth asphyxia, sepsis and preterm births are the leading cause of neonatal mortality.

Conclusion: Though newborn is not an illness, wide numbers of children die before long after birth: numerous of them die in the first four weeks of life (neonatal deaths) and much of those die in the first week (Early neonatal deaths). The main troublemaker is birth asphyxia. In the most cases, the baby dies during birth or soon after, due to injure to the brain and other organs. In developing countries birth asphyxia bring about around seven deaths per 1000 births, while in developed countries this ratio is less than one death per 1000 births. The main reason of neonatal death in many countries is the infection following the first week of life. An unclean environment causes sepsis. The other main causes of deaths in new born are preterm and prematurity. Preterm babies are at high risk of becoming sick and dying. Neonatal tetanus has been and remains, a important cause of neonatal mortality in setting. Many of deaths from neonatal tetanus take place in between the seventh and tenth day of life. The proportion of male babies are more as female in B.A, sepsis, preterm, prematurity and in tetanus diseases while proportion of male is less than or equal to female in MAS disease.

Recommendations: Much of this neonatal mortality can be obstructed with cost-efficient settlement that does not rely on extremely technical practice or refined tackle. Appropriate nourishment and sanitation are necessary in many cases, whereas other deaths can be inhibit by using broadly accessible vaccines and medications to preclude and treat infections, With having expert health care on hand in and after delivery, by recognizing and rapidly treating obstetric complexity, by custody the baby heat up and the umbilical cord clean and neat and clearly, by improving breast-feeding and family planning training. By looking after the health of pregnant mothers-before, during and after delivery-many of the reasons of newborn death can be prevented before they occur.

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