ORIGINAL ARTICLE

Indicators of Neonatal Sepsis in Pakistan

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ABSTRACT

Background: Septicemia causes devastating effects encompassing multiple defects. As a debilitating illness, it is common cause of neonatal morbidity and mortality leading to prolong hospital stay, lengthy treatment session and increase health cost. Multiple etiologies indicate that sepsis is a result of a number of causalities.
Aim : to assess the indicators of neonatal septicemia in Pakistan.
Methodology: A cross-sectional study was done in the NICUs of a public health sector. The sample size was 173 neonates admitted after confirmation from blood reports as being septic. Birth weight was recorded and other history data pertaining to mother and neonate was obtained after getting informed consent. This study was done during a period of 9 months from April 2019 to December 2019. Data was analyzed on SPSS (version 24.0).
Results: Maternal and neonatal factors were identified as source of sepsis. With regards to maternal factors, history of previous infections [79(83.16), p-value<0.001], comorbidities [99(73.3), p-value<0.05] and anemia [83(76.8), p-value<0.001] contributed significantly towards sepsis. Neonatal factors accountable for sepsis were asphyxia [106(77), p-value <0.001], cord site infection [91(43.3), p-value <0.001] and bottle feeding practices [48(83), p-value <0.05.
Conclusion: The study attempted to reveal variety of maternal and neonatal factors. Significant indicators provide a clue for effective management of sepsis to save the precious lives. In Pakistan there is a need to manage such indicators to improve the quality of life in neonates. Maternal along with neonatal factors both contribute to provoke neonatal sepsis. By efficiently dealing with multiple causalities, issue of sepsis could be combated. There is a need to implement policies regarding antenatal care and pregnancy screening services in Pakistan.
Key words: Indicators, Neonate, Septicemia, Pakistan.

INTRODUCTION

Health is a great blessing. Septicemia remains a challenging fact all over the world. It is one of the silent killers. Septicemia causes devastating effects encompassing multiple defects. As a debilitating illness, it is a factor leading to neonatal mortality[1]. Infectious conditions in newborns proceed to inflammatory response that depict sepsis. The incidence rate is mounting day by day due to multiple factors. Actually, this condition prevails in first 28 days of new born baby which is a precious time for baby development. Every 1 in 8 neonates suffer with this incapacitating illness in 1000 live births. This overwhelming condition leads to increase morbidity and mortality in newborns[2]. Pakistan is one of the developing country contributing 7% in world neonatal death rate. Among multiple etiologies, sepsis is one to cause neonatal deaths globally[3].

Sepsis is common cause of neonatal morbidity and mortality leading to prolong hospital stay, lengthy treatment session and increase health cost. Multiple etiologies indicate that sepsis is a result of low birth weight in neonates that depicts maternal status at time of pregnancy. Low birth weight is a major risk factor to develop septicemia[4]. Mothers did not avail antenatal care to know the health status of fetus. Inappropriate health seeking behaviors are a foremost threat to life in developing countries like Pakistan[5]. Failure to proper health awareness proceed to get late in gaining timely treatment of newborn which is also a factor to promote infections. People fail to avail timely assessment of their loved one and deteriorate the condition further. Poverty is also a risk factor for septicemia[6].

Women nutritional status is a best indicator of newborn health. Mothers ignore their health habits and fail to visit health facility. Any coexisting illness like anemia in pregnancy is a matter of threat to child health as it worsens the fetus condition in getting proper growth. During pregnancy there is increased risk of getting infections[7]. Maternal infections also contribute to neonatal sepsis. In rural communities, people prefer to visit untrained health professionals for deliveries. These non-skilled people fail to adhere infection control protocols and promote unhealthy practices. Neonates delivered through such personals get infections during birth. Late prognosis further deteriorate the situation as people didn't hurry to avail health care services[8].

Infections acquired at birth are a major risk for newborn to develop septicemia. Deliveries through untrained hands also lead to multiple morbidities in newborns. Perinatal asphyxia is a significant element to endorse sepsis in newborn which results in substantial systemic and neurologic consequences due decreased blood and oxygen flow to neonate[9]. Cord clamping requires septic measures and when performed through untrained hands leads to sepsis. Neonates can get infection at umbilical site due to multiple septic measures applied for

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cord care which could also be a contributor of neonatal sepsis[10]. Mothers now a days, prefer bottle feeding due to multiple reasons. Mothers' milk is a nutritious formula rich in protective elements that combat infection. Also, improper hand washing during bottle feeding leads to infection risk. Among all the suspected factors, each has a role to promote sepsis in newborns[11].

A community-based study depicting neonatal infection within the first nine days of life demonstrated that history of child death in the family, large family, home delivery, unclean cord care, multiple birth, low birth weight, and perinatal asphyxia were associated with neonatal infection. Some other studies reported that neonatal sepsis was associated with LBW, meconium aspiration, preterm neonates, and premature rupture of membrane[12].

Multiple factors give rise to sepsis in neonates which progress to cause death in neonates. Late health seeking in developing countries like Pakistan necessitate the need for early identification and promote treatment of such debilitating illness. Standard of health facility is also a matter to combat the underlying condition[13].

METHODOLOGY

This institution based cross-sectional study was done in the NICUs of a public health sector. The sample size was 173 neonates admitted after confirmation from blood reports as being septic. Birth weight was recorded and other history data pertaining to mother and neonate was obtained after getting informed consent. Blood reports of CBC, CRP and urine complete were included to see the sepsis. This study was done during a period of 9 months from April 2019 to December 2019. In this study neonatal sepsis was a dependent variable and factors like, birth weight, maternal infection, maternal morbidity, perinatal asphyxia, bottle feeding were independent variables. A semi-structured questioner[14] was used for collecting the data including different factors. Ethical consideration were followed. All the information was provided before conducting the research. Data was analyzed on SPSS (version 24.0). Descriptive statistics was applied to determine the demographics of neonates and mothers. Chi square test was used to see the impact of different factors on morbidity rate in neonates.

RESULTS

In this study, 173 neonates were included. Demographics of mothers and neonates were presented in frequency form. According to table#1, mostly mothers belong to age group of 18 to 35 years. Educational status revealed matriculation in majority of mothers. Common site of delivery was found at homes 92(53). Most of the mothers had no history related to PROM and antepartum hemorrhage 105(60.6) &127(73.4) respectively. History of mothers showed the incidence of previous infections as 95(54.9) of mothers gave the manifestations of infections during pregnancy. Results also provoke maternal comorbidities as 135(78) and anemia in 108(62.4) mothers.

Table 1: Maternal and Neonatal Characteristics

Variable	Category	Frequency%
Maternal Age (Years)	<18	25(14.4)
	18-35	133(76.8)
	>35	15(8.6)
Maternal Qualification	Primary	23(13.2)
	Secondary	56(32.3)
	Matric	68(39.3)
	Intermediate	26(15)
Location of Delivery	Hospital	81(46.8)
	Home	92(53)
Premature Rupture of membrane	Yes	68(39.3)
	No	105(60.6)
Anti-partum hemorrhage	Yes	46(26.5)
	No	127(73.4)
Multiple disorder of pregnancy	Yes	78(45)
	No	95(54.9)
Pre-existing maternal infection	Yes	95(54.9)
	No	78(45)
Co-morbidity	Yes	135(78)
	No	38(21.9)
Anemia	Yes	108(62.4)
	No	65(37.5)
Neonatal Characteristics		
Admission Weight	<2.5	123(71)
	>2.5	50(29)
Gender	Male	99(57.2)
	Female	74(42.7)
Perinatal asphyxia	Present	137(79.1)
	Absent	36(20.8)
Presence of infection at umbilical cord	Yes	110(63.5)
	No	63(36.4)
History of bottle feeding		58(33.5)
History of pre lacteal feeding		115(66.4)

Table 2: Association of Maternal and Neonatal Characteristics with Sepsis.

Variable	Category	Frequency (% age)	Neonatal Sepsis		P-value
			Present	Absent	
Pre-existing maternal infection	Yes	95(54.9)	79(83.16)	16(16.84)	
	No	78(45)	21(27)	57(73)	<0.001
Co-morbidity	Yes	135(78)	99(73.3)	36(26.6)	
	No	38(21.9)	15(39.4)	23(60.5)	0.033
Anemia	Yes	108(62.4)	83(76.8)	25(23.2)	
	No	65(37.5)	37(57)	28(43)	0.001
Neonatal Characteristics					
Admission Weight	<2.5	123(71)	100(81.5)	23(18.5)	
	>2.5	50(29)	20(38.8)	30(61.2)	<0.001
Gender	Male	99(57.2)	73(73)	26(26)	
	Female	74(42.7)	47(65)	27(35)	0.43
Perinatal asphyxia	Present	137(79.1)	106(77)	31(33)	
	Absent	36(20.8)	15(40.5)	21(59.5)	<0.001
Presence of infection at umbilical cord	Yes	110(63.5)	91(43.3)	19(16.8)	
	No	63(36.4)	26(43.5)	37(56.5)	<0.001
History of bottle feeding	Yes	58(33.5)	48(83.0)	10(16.95)	
	No	115(66.4)	71(61.7)	44(38.2)	0.005

Neonatal characteristics depicted low weight babies as most of them123 (71) had weight below 2.5kg. Table also showed the history of perinatal asphyxia in 137(79.1) of studied neonates. Cord site infection was also evident in 110(63.5) neonates.

Table 2 showed significant association of maternal and neonatal factors with sepsis. Both type of factors were identified as source of sepsis. With regards to maternal factors, history of previous infections [79(83.16), p-value<0.001], comorbidities [99(73.3), p-value<0.05] and anemia [83(76.8), p-value<0.001] contributed significantly towards sepsis. Neonatal factors accountable for sepsis were asphyxia [106(77), p-value <0.001], cord site infection [91(43.3), p-value <0.001] and bottle feeding practices [48(83), p-value <0.05 etc. Significant associations were present in these factors for causing sepsis as revealed in table.

DISCUSSION

Findings of the study support the notion that variety of factors both maternal and neonatal were accountable for neonatal septicemia. Maternal factor that had profound effect was history of previous infections as results showed significant effects p-vale was found<0.001. Findings are supported with other studies conducted on neonatal sepsis[15].

Multiple factors identified as indicators of sepsis. Outcomes show that mostly mothers having history of comorbidities had newborn with sepsis. Important casual effects were evident as p-value was <0.001. Similar results were found in some other studies[16]. Anemia in mothers promote neonatal sepsis as most of neonates 83(76.8) presenting with sepsis had maternal history of anemia 108(62.4). Significant association was found p-value <0.05. These findings are consistent with other research conducted of factors causing sepsis[17].

Perinatal asphyxia had shown a significant effect on sepsis with the likelihood of sepsis was higher among neonates having history of asphyxia. Significant results revealed the effect of perinatal asphyxia in causing sepsis as p-value < 0.05.Similar outcomeswerealsodetectedinotherstudiesconductedin differentareas[18].

Cord site infection also had shown a significant effect on the expansion of neonatal sepsis in this study. Neonates who had infection at cord site were more prone to sepsis as compared to others without infections. P-value of <0.05 depict important information with regard to sepsis development. This is consistent with the study conducted previously that revealed cord site infection asanindependentindicatorofneo- natal sepsis[19]. Other neonatal factors like bottle feeding practices were also found significantly in association with neonatal sepsis as p-value was less than 0.05. Similar studies also reveal bottle feeding as an important considerate of sepsis[20].

CONCLUSION

The study attempted to reveal variety of maternal and neonatal factors. Significant indicators provide a clue for effective management of sepsis to save the precious lives. In Pakistan there is a need to manage such indicators to improve the quality of life in neonates. Maternal along with neonatal factors both contribute to provoke neonatal sepsis. By efficiently dealing with multiple causalities, issue of sepsis could be combated. There is a need to implement policies regarding antenatal care and pregnancy screening services in Pakistan.

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