



Epidemiological Profile of Perinatal Mortality at a Tertiary Care Center in Eastern Nepal

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Authors' contributions:

This work was carried out in collaboration among all authors. Author SS designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors DD and TB managed the analyses of the study. Authors AA and AD managed the literature searches. Author SPK designed the study and managed the literature search. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Perinatal mortality is a devastating pregnancy outcome affecting millions of families in many low and middle-income countries including Nepal. This is an important indicator of the quality of obstetric care. This study examined the epidemiological profile of perinatal mortality in a tertiary care center of Eastern Nepal.

Objective: The objective of this study was to know the socio- demographic profile of the perinatal death.

Materials and Methods: This is a prospective descriptive study. It was conducted in a tertiary care center of Eastern Nepal from July 2017 to June 2018. There were total of 278 perinatal death recorded in this period. All the fetal death after 22 weeks of gestation to 7th day of neonatal life were enrolled.

Results: Total number of obstetrics admission during the study was 12265. Total deliveries were 10564. Perinatal mortality rate was 26.31 per 1000 births, with predominance of Janajati ethnic group along with Terai geographical location: mothers age between 20- 35 years of age, nulliparity,

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unbooked antenatal care and gestational age less than 34 weeks. Almost 50% had presented with antepartum fetal death. The most common cause of stillbirth has been unexplained causes whereas prematurity was commonest neonatal death.

Conclusion: Perinatal mortality is a hurtful pregnancy outcome which serve as an important indicator of quality of health care services of the country. Various epidemiological aspects are associated with perinatal mortality. In this study most of the perinatal deaths were unexplained followed by intrapartum hypoxia. The reason for unexplained deaths could be attributed to inadequate antenatal care while that for intrapartum hypoxia may be because of improper fetal monitoring during labor. Therefore, to prevent such events in future it is imperative that all women should get adequate antenatal care and guidelines for proper fetal monitoring should be emphasized. However, the results may not be representative of the whole population as this is a single center study. Other large scale studies are needed in future.

Keywords: Neonatal death; perinatal mortality; SDG; stillbirth; Wigglesworth classification.

1. INTRODUCTION

Perinatal mortality is defined as the number of fetal death past 22 or 28 completed weeks of pregnancy plus the number of early neonatal death up-to 7 days of life, per 1000 total births [1]. It is an important indicator of the quality of obstetric care, particularly in developing countries. Perinatal mortality is an important contributor to infant mortality, which is related to attention to women's health during pregnancy, childbirth and assistance to newborn after birth [2].

It is estimated that every year over 4 million perinatal deaths occur worldwide; and almost all (98%) of these deaths occur in low-and-middle-income countries, mostly in sub-Saharan Africa and South Asia, including Nepal [3]. Achievement of Millennium Development Goals (MDG) 4 and 5 which talks about reducing child mortality and improving maternal health, requires a focus on antenatal, intrapartum and postpartum perinatal and maternal care [4]. Sustainable Development Goal (SDG) 3.2 by 2030, the target is to end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality at least as low as 12 per 1000 births.

For the period between 2001 to 2016, the perinatal mortality rate was found to be 42 per 1000 live births, and perinatal mortality rate was decreased significantly in 2011 and 2016 compared to 2001 [5].

Various factors like maternal literacy, poor socio-economic status, primigravida, and lack of knowledge of family planning are associated with perinatal mortality [6].

In a study done by Hoffman et al. showed, highest perinatal mortality among mothers whose age was between 21-30 years (51.2%), white race (83.8%), singleton pregnancy (91%), gestational age between 22- 30 weeks (47.3%). Approximately 60% of women had vaginal delivery and the most common cause of mortality was antepartum death which is around 70%. The perinatal mortality coefficient was 13.2/1000 births [7].

Despite the high burden of perinatal mortality globally, there have been very limited epidemiological studies that examine potential factors associated with perinatal mortality in Nepal. The main aim of this prospective study was to identify the epidemiological profile of perinatal mortality in tertiary care center of Eastern Nepal.

2. MATERIALS AND METHODS

This is a prospective, descriptive study conducted in the Department of Obstetrics and Gynecology at BP Koirala Institute of Health sciences, Eastern Nepal, which is a tertiary care center, from July 2017 to June 2018 after obtaining ethical clearance from the IRC (447/073/074) of the institute.

All the pregnant women were admitted through the obstetrics emergency. History was taken during admission and examination was performed. They were investigated according to the hospital protocol or according to the need of the patient. Women who had presented with diagnosed intrauterine fetal death after 22 weeks of gestation or birth weight weighing more than 500 grams if period of gestation is not known, were enrolled from the emergency and followed up till delivery. Those women who had fetal

death during hospital stay or intrapartum death were enrolled from antenatal ward/ delivery room. Neonatal admission from delivery room or referred from any other hospital to the neonatal pool were followed up and any neonatal death till 7 days of life were also enrolled from there. An informed consent was taken before the enrollment.

The demographic data, cause of death, gestational age, antenatal care, types of pregnancy (singleton or multiple) were recorded in pre designed proforma. The data were organized, processed and tabulated using Excel program. Descriptive analysis was done by using SPSS 21. Research data were analyzed in absolute numbers and percentage and the perinatal mortality coefficient formula was used to calculate the mortality coefficient, that is the sum of the number of stillbirth from 22 weeks of pregnancy and newborn that died before the seventh day of life multiplied by 1000, divided by the sum of all births in the given period.

A total of 278 samples were enrolled during the study period. The study estimated the

prevalence, epidemiological profile and causes of the perinatal mortality.

3. RESULTS

Total number of obstetrics admission during study period was 12265 and total deliveries were 10564. There were 278 cases of perinatal death during one year duration, resulting in a perinatal mortality coefficient of 26.31 per 1000 total births.

In Table 1. we present some demographic profiles of the mother who participated in this study, with a predominance of age between 20-35 years (78.78%), Janajati ethnicity (35.25%), Terai geographical location (77.34%), unbooked mothers and gestational age 22 to 34 weeks. Most of the mothers whose baby had perinatal death had antenatal care outside the institute. Approximately 67% of mothers had vaginal delivery.

Table 2. present type of death, which shows that almost 50% of death is antepartum fetal death followed by intrapartum death.

Table 1. Demographic profiles

Characteristics		n=278	Percentage (%)
Maternal age	<20	40	14.39
	20-35	219	78.78
	>35	19	6.83
Ethnicity	Brahman/ Chhetri	71	25.54
	Terai/Madhese	55	19.78
	Dalits	29	10.43
	Newar	12	4.32
	Janajati	98	35.25
	Muslim	13	4.68
Geographical location	Mountain	14	5.04
	Hill	49	17.62
	Terai	215	77.34
Booking visit	Booked	51	18.35
	Unbooked	227	81.65
Antenatal care	Received	234	84.17
	Not received	44	15.83
Types of pregnancy	Single	256	92.09
	Twin	22	7.91
Parity	1	139	50
	2-4	127	45.68
	>5	12	4.32
Gestational age(weeks)	<34	108	38.85
	34-37	77	27.70
	>37	93	33.45
Gender of the baby	Male	157	56.47
	Female	121	43.53

Table 3 and 4 shows causes of stillbirth and neonatal death respectively. The most common cause of death in stillbirth was unexplained (32.46%) whereas in neonatal death is due to prematurity (44%). Table 5 shows the Wigglesworth classification of perinatal death. Almost 45% of the delivered fetus were macerated followed by fresh stillbirth. Around 5% of the newborn had lethal congenital anomaly.

Table 2. Type of perinatal death

Type of death	n=278	Percentage%
Antepartum	137	49.28
Intrapartum	91	32.73
Neonatal	50	17.99

Table 3. Causes of death in stillbirth

Causes	n=228	Percentage%
Unexplained	74	32.46
IUGR	30	13.16
HTN	20	8.77
APH	21	9.21
Intrapartum hypoxia	64	28.07
Congenital anomaly	11	4.82
Others (maternal infection)	8	3.51

Table 4. Causes of death in neonatal death

Causes	n=50	percentage %
Asphyxia	13	26
Congenital anomaly	5	10
Prematurity	22	44
Septicemia	10	20

Table 5. Wigglesworth classification

Classification	n=278	Percentage, %
Fresh stillbirth	93	33.45
Lethal congenital anomaly	14	5.04
Macerated	123	44.24
Neonatal death	48	17.27

4. DISCUSSION

Perinatal death audits play vital role not only in reducing the perinatal mortality rate but also signifies the quality of health care services of any institution or health care center. Studies shows big differences in perinatal mortality coefficient in different continents, countries and regions of the world. In Nepal, neonatal deaths and stillbirths remain still an important health problem. Despite efforts made to reduce perinatal death, Nepal

has witnessed a stagnant neonatal and perinatal mortality rate in 2001(49 per 1000 births) and 2006 (45 per 1000 births) but slightly reduce in 2011 (38 per 1000 births) and 2016 (31 per 1000 births) according to Nepal Demographic and Health Survey [5]. Thus, still there is need for a detailed study to find out the root causes of perinatal death.

In this study perinatal mortality coefficient is 26.31 per 1000 births which is higher than the study done by Hoffmann et al [7]. They had found perinatal mortality rate of 13.2 per 1000 births. In another study conducted in a medical college of Nepal in 1 year duration, the perinatal death rate was 16.27 per 1000 births. Majority of death was due to congenital anomaly (19%) followed by hypertensive disorder (14%) [8].

Another study done in Georgia, found out the perinatal death rate of 13.6 per 1000 births in 2017 which is also less than the result of this study. About 80% of stillbirth didn't have any cause of death, majority of death occurred before the onset of labor and major cause of neonatal death was prematurity and congenital malformation which is comparable to our study [9].

In a verbal autopsy study conducted in a district of Nepal from 2006- 2008, perinatal mortality rate was 60 per 1000 births which is very much higher than the findings of this study.

In a demographic survey conducted in Pakistan, they found perinatal mortality rate of 54.1 per 1000 births. This was associated with lower socioeconomic status, illiteracy, higher parental age, short birth spacing and poor obstetric history. Eighty four percentage of stillbirths were fresh and obstetric complications were the leading cause (67%) [10].

In a study conducted in Eastern and Central Districts of Nepal, they found that birth asphyxia, infection and prematurity were the measure causes of stillbirth and neonatal death [11,10]. This result is similar to our study which also showed prematurity, intrapartum hypoxia, hypertension were common causes of deaths.

A multi-center prospective study conducted in Nepal, [12] revealed that high parity (>4) low birthweight (1999 gram) and older maternal age(>35 years) were associated with perinatal mortality. In our study mothers between 21-35 years of age and nulliparity were more common.

The survey was carried out in 2 Kathmandu based hospital and 2 in rural district hospital. The perinatal death rate was 48.0 and 23.7 per 1000 births in Kathmandu based hospital whereas in rural setting were 96.2 and 42.5 per thousand births.

In the study conducted by Shrestha et al, [13] found that perinatal mortality occurred more frequently among nulliparous women and those having preterm birth which is similar to result of our study.

In above study mothers residing in Terai, and Janajati ethnicity had reported maximum perinatal death whereas in study done by Ghimire et al., [5] showed mountain region and Dalit ethnicity was associated with more death.

According to National Vital statistics reports of USA 2013, the fetal mortality rate after 20 weeks of gestation was 5.96 per 1000 total deaths. Early fetal death was reduced than previous year whereas late fetal death (after 28 weeks) was relatively stable since 2006. The fetal mortality was lower in women aged 25-34 years and higher for teenagers and those aged 35 or more [14]. The higher risk among teenager may be due to biological immaturity, low socioeconomic status and literacy. Higher age of the mother is independent risk factor for fetal death and also due to more prevalence of medical disorder like hypertension, diabetes, multiple gestation [15]. The fetal mortality rate for male fetus was 6% higher than for female fetus which was 12 % in this study.

In a 13 years review study conducted in teaching hospital Kathmandu, perinatal mortality rate was 21.5 per 1000 births, which is comparable to our findings. Deaths due to congenital malformation was static whereas death due to prematurity was increased by almost 70 % in last 5 years [16].

In a retrospective socio-demographic study conducted in India, the perinatal death rate was found to be 17.07 per thousand births. Maximum death was seen among women between 19-24 years of age (55.97%), 56.52% were nulliparous, 72.28% were residing in rural area. Almost 57% women were illiterate, and 67.93% were unbooked which was comparable to our findings [17]. Almost in 33% of perinatal death cause was unexplained and around 50% cases had presented with antepartum fetal death. Most of the cases who had perinatal death were unbooked (81.65%) and had presented with diagnosed fetal death. Most of the antepartum

fetal death had presented in obstetric emergency with ultrasound report of diagnosed intrauterine fetal death, and were referred from other hospital for the delivery.

Global scenario shows that, most of the developing countries has more than 50% of stillbirth than in developed countries, where interventions has largely reduced early neonatal mortality.

Hence identifying cause of death in those cases were difficult as they had not done antenatal checkup regularly.

Providing antenatal care and counselling to those women and identifying high risk pregnancy on time may help to reduce perinatal death.

5. CONCLUSION

Perinatal mortality is a hurtful pregnancy outcome which serve as an important indicator of quality of health care services of the country. Various epidemiological aspects are associated with perinatal mortality. In this study most of the perinatal deaths were unexplained followed by intrapartum hypoxia. The reason for unexplained deaths could be attributed to inadequate antenatal care while that for intrapartum hypoxia may be because of improper fetal monitoring during labor. Therefore, to prevent such events in future it is imperative that all women should get adequate antenatal care and guidelines for proper fetal monitoring should be emphasized. However, the results may not be representative of the whole population as this is a single center study. Other large scale studies are needed in future.

CONSENT

An informed consent was taken before the enrollment.

ETHICAL APPROVAL

This study was conducted after getting ethical clearance.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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