

# Analysis of Health Facility Based Perinatal Verbal Autopsy of Electoral Constituency 2 of Arghakhanchi District, Nepal

Manandhar SR,<sup>1</sup>Manandhar DS,<sup>2</sup>Adhikari D,<sup>2</sup> Shrestha J,<sup>2</sup>Rai C,<sup>3</sup>Rana H,<sup>3</sup>Paudel M<sup>3</sup>

<sup>1</sup>Pediatrics Department, Kathmadu Medical College Teaching Hospital, <sup>2</sup>Mother and Infant Research Activities (MIRA), <sup>3</sup>HealthRight International, Kathmandu, Nepal.

## ABSTRACT

**Background:** Verbal autopsy is a method to diagnose possible cause of death by analyzing factors associated with death through detailed questioning. This study is a part of the operational research program in electoral constituency no. 2 (EC 2) of Arghakhanchi district by MIRA and HealthRight International.

**Methods:** Two day essential newborn care training followed by one day perinatal verbal autopsy training and later one day refresher verbal autopsy training was given for health staff of EC 2 of Arghakhanchi district in two groups. Stillbirths of  $\geq 22$  wks or  $\geq 500$  gms and Early neonatal deaths (newborns died within 7 days of life) were included in this study. The Nepal Government approved verbal autopsy forms were used for performing autopsies. Perinatal deaths were classified according to Wigglesworth's Classification. Causes of Perinatal deaths were analyzed. Data were analyzed in the form of frequencies and tabulation in SPSS 16.

**Results:** There were 41 cases of perinatal deaths (PND) were identified. Among them, 37 PNDs were from Arghakhanchi district hospital, 2 PNDs from Thada PHC, and one PND each from Subarnakhal and Pokharathok HPs. Among the 41 PNDs, 26 were stillbirths (SB) and 15 were early neonatal deaths (ENND). The perinatal mortality rate (PMR) of Arghakhanchi district hospital was 32.2 per 1,000 births and neonatal mortality rate (NMR) was 9.8 per 1,000 live births. Out of 26 stillbirths, 54% (14) were fresh SBs and 46% (12) were macerated stillbirths. The most common cause of stillbirth was obstetric complications (47%) where as birth asphyxia (53%) was the commonest cause of ENND. According to Wigglesworth's classification of perinatal deaths, Group IV (40%) was the commonest cause in the health facilities.

**Conclusions:** Obstetric complication was the commonest cause of stillbirth and birth asphyxia was the commonest cause of early neonatal death. This study highlighted the need for regular antenatal check-ups and proper intrapartum fetal monitoring with timely and appropriate intervention to reduce the incidence of stillbirths and intrauterine asphyxia.

**Keywords:** Early neonatal death, Perinatal verbal autopsy, Stillbirth.

## INTRODUCTION

Verbal autopsy is a method of ascribing causes of death on the basis of information on events, signs and symptoms supplied by the deceased's caretakers<sup>1,2,3</sup>. It is a method to ascertain causes of death in the perinatal period in the hospital without performing actual autopsy. Generally autopsy is not performed in the hospital in Nepal when any

person dies; this is particularly true when a baby dies. Verbal autopsy helps to come to a diagnosis of possible cause of death by analyzing factors associated with death through detailed questioning. At least 2.65 million stillbirths in 3<sup>rd</sup> trimester are estimated to occur every year in world, which is 98% in low-income and middle-income countries, and 55% in rural families in Sub-Saharan Africa and

**Correspondence:** Dr Sunil Raja Manandhar, Kathmandu Medical College Teaching Hospital, Sinamangal, Kathmandu, Nepal. Email: drsunilraja@gmail.com, Phone: 9803812218.

South Asia where skilled attendance and caesarean sections are much lower than that for urban births. The stillbirth rate varies from 2.0 per 1000 total births reported in Finland to more than 40 per 1000 total births in Nigeria and Pakistan. Worldwide, 55% of all stillbirths occur in rural families in south Asia and Sub-Saharan Africa.<sup>4</sup> Among global causes of child death, neonatal deaths constitutes 41%, out of which Preterm births and its complication 12%, birth asphyxia 9%, sepsis 6%.<sup>5</sup>

This study is a part of the operational research program in electoral constituency no. 2 (EC 2) of Arghakhanchi district by Mother and Infant Research Activities (MIRA) and HealthRight International. One part of operational research is to train health facility staff on perinatal and neonatal care and setting up neonatal corners at health facilities, conducting perinatal verbal autopsies in the health facilities to improve perinatal quality care. The operational research study was started on 1<sup>st</sup> October 2010 till 14<sup>th</sup> April 2013 (Chaitra 2069). Objective of this study is to analyze causes of perinatal deaths and identify risk factors associated with perinatal deaths at health facilities of EC 2 of Arghakhanchi district, Nepal.

## METHODS

The study population was stillbirths and early neonatal deaths at health facilities of EC 2 of Arghakhanchi district, Nepal. Stillbirth (SB) is defined as a baby born  $\geq 22$  weeks of gestation or with a birth weight  $\geq 500$  grams with no signs of viability at birth.<sup>6</sup> Early neonatal death (ENND) is defined as the death of a baby born alive  $\geq 22$  weeks of gestation or birth weight of  $\geq 500$  grams that died within seven days of postnatal age.<sup>6</sup> The health facilities included in this study are Arghakhanchi District Hospital, Thada PHCC (Primary Health Care Centre), Pokharathok HP (Health Post), Siddhara HP, Subarnakhal HP and Narpani HP. Ethical approval for this operational research was taken by Ethical Review Board of Nepal Health Research Council (NHRC).

The operational research was implemented in Arghakhanchi district in the western development region of Nepal. Arghakhanchi is in the hills, with an area of 1,193 square kilometers. Available statistics from 2001 fail to disaggregate population

sub-groups adequately, but the main groups defined are Magar, Brahman, Chhetri, Dalit, Newar and Kumal.<sup>7</sup> The majority are Hindu Nepali speakers (96%) and Magar is the second most commonly spoken language. The per capita income in Arghakhanchi is \$207, compared to the national average of \$240. In 2001 in Arghakhanchi, 62.6% of men were literate, compared to 36.3% of women. The projected population (2001) for Arghakhanchi district is 242,129 over 45,959 households (average household size: 5.27).

Two day essential newborn care training followed by one day perinatal verbal autopsy forms filling training was given at Arghakhanchi district hospital on 24<sup>th</sup> and 27<sup>th</sup> April 2011 to health staff of EC 2 of Arghakhanchi district in two groups. Theoretical and practical knowledge of performing perinatal verbal autopsy was provided to the health staff. Refresher training on perinatal verbal autopsy was given on December 31<sup>st</sup> and January 1<sup>st</sup> 2012 in two groups. A total of 88 health staff (doctors, nurses, ANMs, HAs and AHWs) was given training by Dr. Sunil Raja Manandhar, Assistant Professor and Pediatrician of Kathmandu Medical College Teaching Hospital (KMCTH).

After the training, verbal autopsies were conducted from July 2012 to April 2013 for a total period of 10 months. A total of 41 cases of health facility based perinatal death were verbally autopsied and recorded during that time. The Nepal Government approved autopsy forms<sup>8</sup> were used for performing the verbal autopsies. Perinatal deaths were classified according to Wigglesworth's Classification<sup>9</sup>. Causes of Perinatal deaths were analyzed. Avoidable and unavoidable factors leading to perinatal deaths were analyzed. Data were analyzed in the form of frequencies and tabulation in SPSS 16

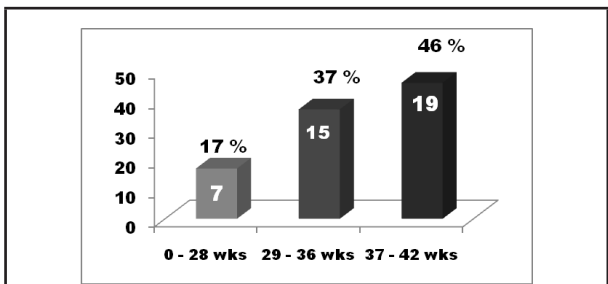
## RESULTS

There were 41 cases of perinatal deaths (PND) in the six participating health facilities of EC 2 of Arghakhanchi district, Nepal. Distribution of 41 perinatal deaths in the six participating health facilities are as follows:

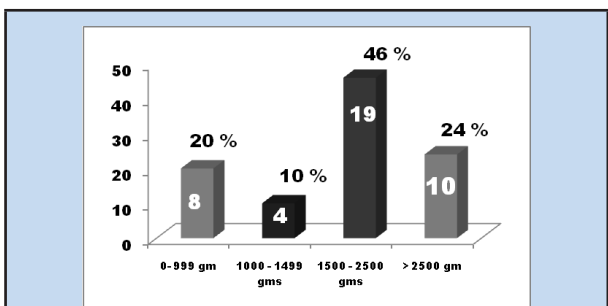
**Table 1. Distribution of perinatal deaths in six participating health facilities of EC 2 of Arghakhanchi district, Nepal .**

Serial No.	Name of health facility	No. of perinatal deaths (PND)
1	Arghakhanchi district hospital	37
2	Thada Primary Health Care Centre (PHCC)	2
3	Subarnakhal Health Post (HP)	1
4	Pokharathok Health Post (HP)	1
5	Siddhara Health Post (HP)	0
6	Narpani Health Post (HP)	0
	Total	41

Among the 41 PNDs, 26 were stillbirths and 15 were early neonatal deaths. In Arghakhanchi district hospital, within 10 months period (27<sup>th</sup> April 2011 - 13<sup>th</sup> April 2013), there were 1,147 births, out of which 26 babies were SBs and 15 babies died within 7 days of birth (ENNDs). The perinatal mortality rate (PMR) of Arghakhanchi district hospital was 32.2 per 1,000 births and neonatal mortality rate (NMR) was 9.8 per 1,000 live births. Out of 41 perinatal deaths, 54% (22) were male and 46% (19) were female. Most of the perinatal deaths (46%) were between 37 to 42 weeks of gestation, shown in Figure 1. Most of the perinatal deaths (46%) were between 1500 to 2500 grams, depicted in Figure 2.



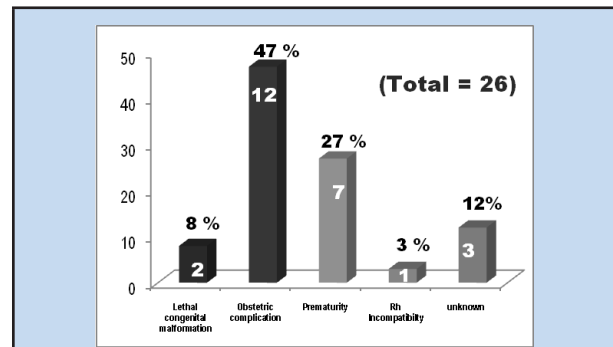
**Figure. 1 Gestational age of PNDs.**



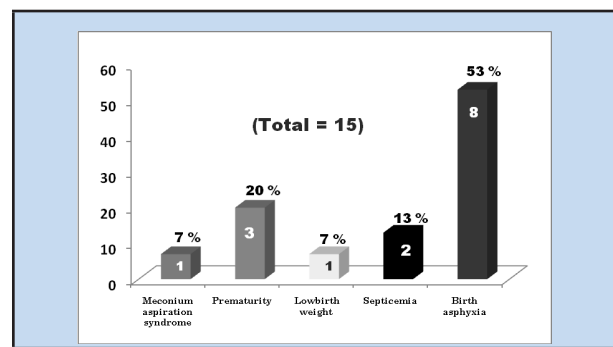
**Figure. 2 Birth weight of PNDs.**

Out of 26 stillbirths, 54% (14) were fresh SBs and 46% (12) were macerated stillbirths. While analyzing causes of stillbirths, the most common cause was obstetric complications (47%) followed

by prematurity (27%). 12% of SBs were classified as unknown due to unavailability of information regarding the death of the babies, as shown in Figure 3. Causes of obstetric complications were obstructed labor, cord around the neck, prolonged labor and placenta previa). Out of 41 cases, partographs were filled in 15% (6 cases ) only showing suboptimal intrapartum fetal monitoring care.



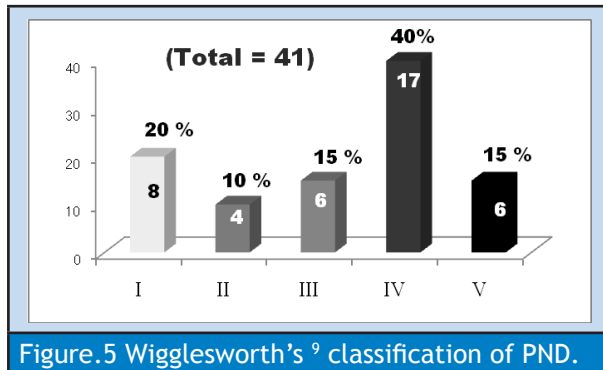
**Figure. 3 Causes of SB.**



**Figure. 4 Causes of ENND.**

Analysis of the causes of the 15 early neonatal deaths showed the commonest cause of ENND was birth asphyxia (53%) followed by prematurity (20%). 13% of ENNDs were due to septicemia and 7% each were due to meconium aspiration syndrome and low birthweight, as shown in Figure 4.

According to Wigglesworth’s classification,<sup>6</sup> group IV; intrapartum hypoxia (40%) was the commonest cause of Perinatal deaths (PND) in the health facilities. Second commonest cause of perinatal deaths was in group I (20%) suggesting high incidence of macerated SBs. 15% each were classified in group III (prematurity) and in group V (sepsis), where as 10% were in group II ( lethal congenital anomaly) as depicted in Figure 5.



Analysis of the resuscitative procedures used by health personnel after receiving essential newborn care and perinatal verbal autopsy training, showed that out of 21 perinatal deaths, health staff used bag and mask ventilation in 42% (9) cases, and in 10% (2) cases used chest compression in addition to bag and mask ventilation. One (5%) cases required tactile stimulation .. The results are shown in Table 2.

Table 2. Resuscitative Procedures done by health worker.

S. No.	Name of Resuscitation Procedure	No	%
1	Not required	2	10
2	Tactile simulation	1	5
3	Bag and Mask Ventilation	9	42
4	Bag and Mask with Chest compression	2	10
5	All	4	19
6	Don't know	3	14
	Total	21	100

## DISCUSSION

Perinatal mortality rate and neonatal mortality of this Arghakhanchi district hospital seems to be low. It could be due to less no. of delivery (average 3 deliveries per day) at the hospital and difficult cases might have been referred to higher centre . As the commonest cause of stillbirth was obstetric complications and out of them 46% (12) of stillbirths were macerated, indicating sub optimal or no antenatal care in the community and intrauterine deaths occurring before coming to the hospital. A 13 yrs perinatal mortality trend study done at TUTH (Tribhuvan university teaching hospital) by Shrestha M et al <sup>10</sup> found macerated SB contributed 49% of total stillbirths showing a need of awareness among pregnant women on fetal movement perception. Similarly, 8 yrs perinatal

mortality trend study done at KMCTH (Kathmandu medical college teaching hospital) by Manandhar SR et al <sup>11</sup> also found that macerated stillbirths (Wigglesworth's classification Group I) contributed 19% - 47% of the total PNDs and highlighted a need of reduction of stillbirths to reduce the PMR. To reduce such problem (stillbirths), awareness to be raised among pregnant women regarding the need for at least the recommended four antenatal care visits, reporting to a health facility if there is a decrease fetal movement, and conducting ANC (Antenatal check up) and delivery services from a trained health personnel, preferably a skilled birth attendant (SBA), at least in the health facility of the district.

In this study, most common cause of early neonatal death was birth asphyxia (53%) suggesting sub-optimal intrapartum fetal monitoring and neonatal resuscitation. A study done in Egypt by Campbell O et al <sup>12</sup> also found perinatal asphyxia contributing 44% among perinatal deaths. In developing countries, rates of birth asphyxia are several folds higher, ranging from 4.6 per 1000 in Cape Town <sup>13</sup> to 26 per 1000 in Nigeria, <sup>14</sup> and case fatality rates may be 40% or higher.<sup>15</sup> In this study, as it was observed partographs were filled only in 15% cases, ensuring use of partographs in all labor cases and proper intrapartum fetal monitoring with immediate cesarean section or instrumental delivery in the health facility will reduce such a high incidence of perinatal asphyxia (40%).

## CONCLUSIONS

Obstetric complication was the commonest cause of stillbirth. This study highlighted the need for regular antenatal check-ups and proper intrapartum fetal monitoring with timely and appropriate intervention to reduce the incidence of stillbirths. Birth asphyxia (53%) was the commonest cause of early neonatal deaths indicating poor intrapartum fetal monitoring and delay in immediate intervention along with poor neonatal resuscitative measures at health facilities. To reduce the incidence of intrapartum hypoxia delivery by SBA with immediate intervention like CS delivery should be performed, at least in Arghakhanchi district hospital.

## ACKNOWLEDGEMENTS

We would like to express hearty thanks to Dr. Yam Bahadur Basnet, DHO Arghakhanchi district, Mr. Lila Ram Gautam, DPHO, and the Arghakhanchi district public health office team for their kind support and cooperation during this operational research process. Special thanks to the health staff, including medical officers, nurses and paramedical staff of the Arghakhanchi District Hospital, Thada PHC, Narpani HP, Pokharathok HP, Subarnakhal HP and Siddhara HP. Thanks are due to all the staff involved in the collection of data in the community and in the health facilities and to the mothers and relatives who agreed to be interviewed in a distressing situation.

## REFERENCES

1. Garenne M, Fauveau V. Potential and limits of verbal autopsies. *Bull WHO*. 2006;84: 164-5.
2. Soleman N, Chandramohan D, Shibuya K. Verbal autopsy: current practices and challenges. *Bull World Health Organ*. 2006.4(3):239-45.
3. Baiden F, Bawan A, Binka R, et al. Setting international standards for verbal autopsy. *Bull World Health Organ*. 2007;85(8):570-1.
4. Joy E Lawn, Hannah Blencowe, Robert Pattinson, Simon Cousens, Rajesh Kumar, Ibinabo Ibiebele et al. Stillbirths: Where? When? Why? How to make the data count? *The Lancet series vol 377* April 23, 2011.
5. R E Black, S Cousens, H L Johnson, J E Lawn, I Rudan, D G Bassani et al. Global, regional, and national causes of child mortality in 2008: a systematic analysis. *Lancet* 2010; 375: 1969–87.
6. Ghai OP, Gupta P and Paul VK. In: Piyush Gupta, V.K. Paul eds. *Ghai Essential Pediatrics*, 6<sup>th</sup> edition, Delhi: Dr. Ghai, 92:pp.
7. District Profile of Nepal 2008, Eds: Joshi, SR and Bhandari H. Intensive Study and Research Centre, Kathmandu (citing data from the Population Census 2001, National Report, GoN, National Planning commission Secretariat, Central Bureau of Statistics.)
8. Government of Nepal, Family health division / DoHS, Teku and maternity hospital, Thapathali, Kathmandu eds. *Instruction manual for maternal and perinatal death review*, 2005, pp 36 – 41.
9. Wigglesworth JS. Monitoring perinatal mortality. A pathophysiological approach. *Lancet*. 1980 Sep 27; 2(8196):684–6.
10. Shrestha M, Shrestha L, Basnet S and Shrestha PS. Trends in Perinatal Mortality in Tribhuvan University Teaching Hospital: 13 Years Review. *J Nepal Paediatr Soc* 2012 ,May-August /Vol 32/Issue 2 pp 150 -53.
11. Manandhar SR, Manandhar DS, Shrestha J and Karki C. Analysis of Perinatal Deaths and Ascertaining Perinatal Mortality Trend in a Hospital. *J Nepal Health Res Counc* 2011 Oct;9(19):150-53.
12. Campbell O, Gipson R, Mohandes AE, et al. The Egypt national perinatal/neonatal mortality study 2000. *J Perinatol*. 2004;24:284-9.
13. Hall DR, Smith M, Smith J. Maternal factors contributing to asphyxia neonatorum. *J Trop Pediatr* 1996;42:192-5.
14. Kinoti SN. Asphyxia of the newborn in east, central and southern Africa. *East Afr Med J* 1993;70(7):422-33.
15. Bang AT, Bang RA. Diagnosis of causes of childhood deaths in developing countries by verbal autopsy: suggested criteria The SEARCH Team. *Bull World Health Organ* 1992; 70(4):499-507.