

RESUSCITATION AND MORBIDITY PATTERNS OF NEONATAL EMERGENCY, DEATHS IN LAO CAI PROVINCE

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ABSTRACT

Aims: To understand neonatal resuscitation and mortality in Lao Cai province.

Subjects and methods: Data collection of all neonatal medical records from January 1st to December 31st 2017 (including: neonatal admissions, resuscitations, deaths and withdrawals in the hospitals in the study from January 1, 2017 - December 31, 2017).

Results: Morbidity patterns of neonatal emergency showed 60% prematurity whereas other conditions like respiratory distress, infection and asphyxia accounted for 2.6 to 3.4%. 29.3% diagnosed with other emergencies such as trauma, tetanus and congenital heart diseases. In terms of treatment results, 71% were stabilized post-resuscitation, 16.9% did not improve and 13.1% became worse after unsuccessful resuscitation. Prematurity, asphyxia and respiratory distress were three main causes of neonatal deaths, which accounted for 63.1%, 15.4% and 13.8% respectively. The majority of newborns were resuscitated at Women and Children's hospital (298 cases), accounted for 68% of all cases in the province.

Conclusions: Neonatal resuscitation and mortality are closely associated with prematurity and asphyxia. Two most effective interventions are optimizing prenatal care for pregnant women and improving neonatal life support for all health care workers.

Keywords: Resuscitation, mortality, prematurity, asphyxia.

1. INTRODUCTION

Lao Cai is about 250km from Hanoi; it is a mountainous province, so the distance from the commune health station to district and provincial hospitals is quite far; the health system so still faces many difficulties. Due to a long distance, the emergency transportation has many risks. Mortality rate of children under 5 years of age of Lao Cai Province is 44% which is higher than the same of Northern Midland and Mountainous Region (33.4%) and much higher than the

national average rate (22.1%) [3], [4].

With the aim of reducing the neonatal mortality rate through improving neonatal resuscitation services in Lao Cai province, the study on neonatal resuscitation and mortality in Lao Cai province was carried out.

Objectives of the study:

To survey the neonatal resuscitation and mortality in provincial and district hospitals in the whole province of Lao Cai.

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2. METHODS

Retrospective study, data collection of all neonatal medical records from January 1st to December 31st 2017 (including: neonatal admissions, resuscitations, deaths and withdrawals in the hospitals in the study from January 1, 2017 - December 31, 2017) and 2017 reports from the above hospitals.

- Information collection of 501 death,

emergency and referral records at 11 hospitals in the study.

- Data processing: updating data, clarifying data and entering data using SPSS 18.0 software; Qualitative information is then encoded to the required subjects and objectives of topic.

- Data analysis using SPSS 18.0 software.

3. RESULTS

Table 1. General information on the number of emergency and death children in each hospital

| No. | Hospital | Death and withdrawal due to serious disease | | Emergency and referral | | Total |
|-------|-----------------------|---------------------------------------------|--------------|------------------------|--------------|-------|
| | | Qualified | Disqualified | Qualified | Disqualified | |
| 1 | General Hospital | 0 | 0 | 15 | 0 | 15 |
| 2 | Children's Hospital | 36 | 8 | 297 | 1 | 342 |
| 3 | Bat Xat Hospital | 1 | 0 | 12 | 0 | 13 |
| 4 | Sapa Hospital | 2 | 0 | 15 | 0 | 17 |
| 5 | Bao Thang Hospital | 3 | 0 | 9 | 0 | 12 |
| 6 | Bao Yen Hospital | 1 | 0 | 7 | 0 | 8 |
| 7 | Van Ban Hospital | 1 | 0 | 26 | 0 | 27 |
| 8 | Muong Khuong Hospital | 3 | 0 | 18 | 0 | 21 |
| 9 | Bac Ha Hospital | 5 | 0 | 15 | 0 | 20 |
| 10 | Simacai Hospital | 11 | 0 | 15 | 0 | 26 |
| Total | | 66 | 5 | 429 | 1 | 501 |

Comments: Out of 501 emergency records, there were 71 cases of death and serious disease requiring the withdrawal.

Table 2. Distribution of emergency and fatal diseases by ethnic group

| Ethnic group | Emergency and referral | | Death - withdrawal due to serious disease | |
|--------------|------------------------|------|-------------------------------------------|------|
| | n | % | n | % |
| Dao (71) | 60 | 84,5 | 11 | 15,5 |
| Kinh (159) | 153 | 96,2 | 6 | 3,8 |
| Mong (129) | 93 | 72,1 | 36 | 27,9 |
| Nung (26) | 24 | 92,3 | 2 | 7,7 |
| Tay (50) | 43 | 86 | 7 | 14 |
| Giay (11) | 11 | 100 | 0 | 0 |
| Thai (5) | 5 | 100 | 0 | 0 |
| Other* (10) | 8 | 80 | 2 | 20 |
| Total (461) | 397 | 86,1 | 64 | 13,9 |

* Including: Ha Nhi, Muong, Phu La, Tu Di and Xa Pho

Comments: Number of patients with successful and stable emergency care and then referral to the higher level accounted for 86.1%.

Table 3. Distribution of emergency and death by the hospital

| Hospital | Emergency and referral | | Death and withdrawal due to serious disease | |
|----------------------------|------------------------|------|---------------------------------------------|------|
| | n | % | n | % |
| Children's Hospital(337) | 298 | 88,4 | 39 | 11,6 |
| General Hospital (16) | 16 | 100 | 0 | 0 |
| Bac Ha Hospital (21) | 14 | 73,7 | 5 | 26,3 |
| Bao Thang Hospital (12) | 9 | 75 | 3 | 25 |
| Bat Xat Hospital (14) | 13 | 92,9 | 1 | 7,1 |
| Bao Yen Hospital (9) | 8 | 88,9 | 1 | 11,1 |
| Muong Khuong Hospital (21) | 18 | 85,7 | 3 | 14,3 |
| Simacai Hospital (26) | 15 | 57,7 | 11 | 42,3 |
| Sapa Hospital (15) | 13 | 86,7 | 2 | 13,3 |
| Van Ban Hospital (28) | 27 | 96,4 | 1 | 3,6 |
| Total (497) | 431 | 86,7 | 66 | 13,3 |

Comments: The number of emergency pediatric patients admitted to the Obstetrics and Pediatrics Hospital was highest accounting for 68% and the least number to Bao Yen Hospital with only 9 patients who went to the emergency room in 2017. The rate of death and withdraw due to serious disease was highest in Simaca district (42.3%).

Table 4. Distribution of emergency and death by the age

| | In the first day | | From 1 st -28 th day | | p |
|------------------------------|------------------|------|--------------------------------------------|------|------|
| | n | % | n | % | |
| Emergency and referral (431) | 274 | 63,6 | 157 | 36,4 | 0,68 |
| Death and withdrawal (65) | 43 | 66,2 | 22 | 33,8 | |
| Total (496) | 317 | 63,9 | 179 | 36,1 | |

Comments: About 2/3 (63.9%) of neonatal emergencies were in the first day of delivery. The rate of neonatal mortality and withdrawal due to serious disease on the first day (66.2%) was 2 times higher than that of emergency newborns 2 days and older.

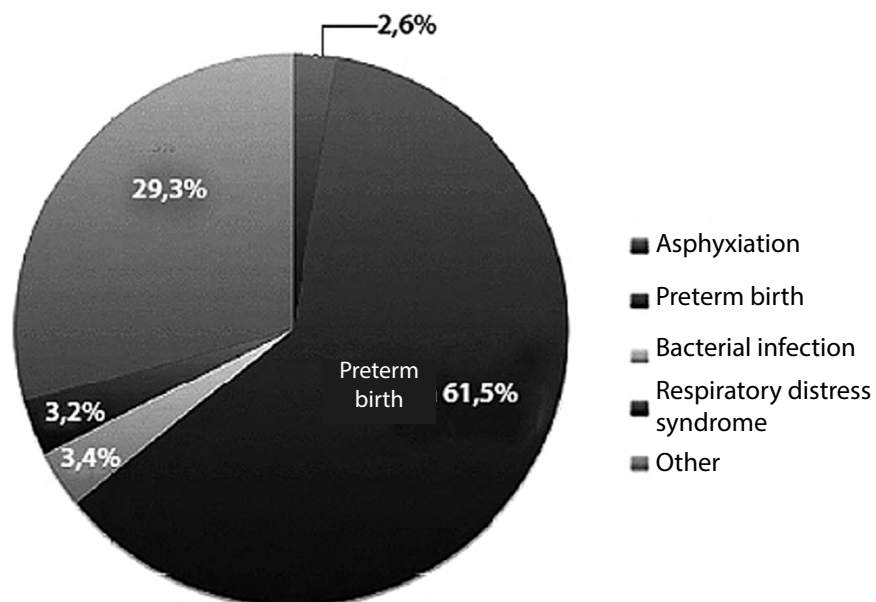
Table 5. Distribution of neonatal emergency and mortality by the birth weight

| | <1000g | | 1-1.500g | | 1.500-2.500g | | > 2.500 g | |
|----------------------------------------|---------------|------|---------------|------|---------------|------|--------------|-----|
| | n | % | n | % | n | % | n | % |
| Emergency and referral (433 - 100%) | 30 | 6,9 | 194 | 44,8 | 173 | 33,9 | 36 | 8,4 |
| Death and withdrawal (66 - 100%) | 21 (41,2%) | 31,8 | 31 (13,8%) | 46,9 | 11 (5,9%) | 16,7 | 3 (7,6%) | 4,6 |
| Total (499 -100%) | 51 (100%) | 10,2 | 225 (100%) | 45,1 | 184 (100%) | 36,9 | 39 (100%) | 7,8 |

Table 6. Distribution of neonatal emergency and mortality by the delivery place

| | At home | | Unexpected delivery | | Medical station | | Department of Obstetrics | | No information | | Total |
|------------------------|---------|------|---------------------|-----|-----------------|-----|--------------------------|------|----------------|-----|-------|
| | n | % | n | % | n | % | n | % | n | % | |
| Emergency and referral | 34 | 7,8 | 2 | 0,5 | 17 | 3,9 | 358 | 83 | 21 | 4,8 | 431 |
| Death and withdrawal | 14 | 21,3 | 0 | 0 | 3 | 4,5 | 47 | 71,2 | 1 | 1,5 | 66 |
| Total | 48 | 9,7 | 2 | 0,4 | 20 | 4,0 | 405 | 81,1 | 24 | 4,8 | 499 |

Comments: More than 80% of neonatal emergencies and deaths are department of obstetrics. There were 48 babies born at home and the rate of death and withdrawal due to serious disease in this group was 29.1% (14/48).

**Figure1.** Patterns of neonatal emergency at the hospital

Comments: More than 60% of emergencies were problems in premature infants. From 2.6 to 3.4% of emergencies were related to Respiratory distress syndrome, bacterial infection and asphyxiation. Other emergencies accounted for 29.3%, including trauma, tetanus, and congenital heart disease.

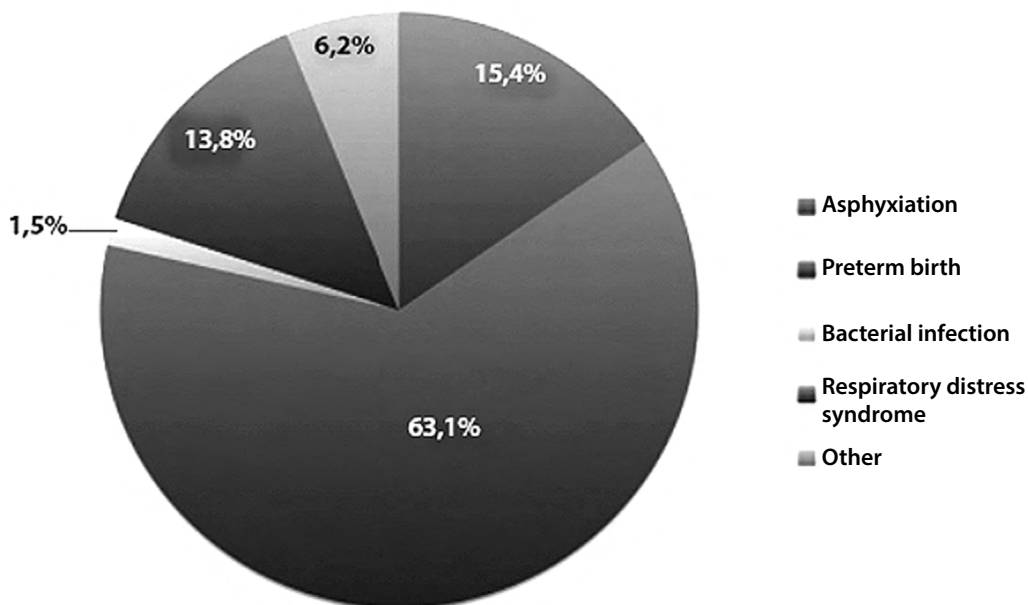


Figure 2. Patterns of neonatal death at the hospital

Comments: The main cause of death in emergency newborns was premature birth (63.1%), followed by the asphyxiation (15.4%), and the respiratory distress syndrome (13.8%).

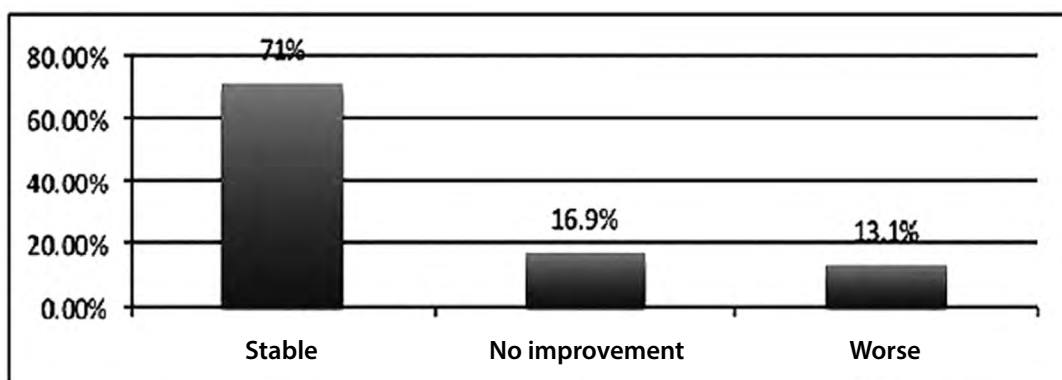


Figure 3. Evaluation of emergency effects after hospital admission

Comments: 71% of emergency patients was stable; 16.9% of emergency patients had no improvement and 13.1% of emergency patients was ineffective and worse.

4. DISCUSSION

Collected data at all Provincial and District hospitals in Lao Cai province in 2017 with 429 emergency records in the stable emergency group were included in the analysis. There were 66 records of unsuccessful, fatal and serious disease emergency group, accounting for 13.9% of the total number of emergency records. Surprisingly,

the number of Mong children in emergency was quite high (129). However, the rate of unsuccessful emergencies was highest (27.9%). The reason may be that pathology of newborns was detected late or when the newborns arrived at the hospital, they were in bad conditions. The same result was for newborns of the Dao (15.5%) and Tay (14%) ethnic groups. There were

16 newborns of Giay and Thai ethnic groups in emergency with good results. It is necessary to carry out more study of the factors associated with ethnic groups' use of emergency services to develop appropriate health education and communication programs that help with early detection and good management to save lives of newborns with health problems.

The majority of newborns were treated at the Children's Hospital (298 newborns), accounting for 68% of the province's emergency patients. This is understandable because this Hospital is the highest level in the province, and all risky pregnancies visited this hospital; so newborns were also more at risk of health problems than newborns at lower levels. In addition, the hospital also received the emergencies from lower levels or self-hospitalized in case of emergency.

Bao Yen Hospital had the fewest emergency patients; in 2017 only 9 patients went to the emergency room. It is necessary to learn more about this situation due to few emergency newborns or limited quality of emergency in the hospital, so it cannot attract the patients or the patients may use more convenient services in other hospitals.

The highest rate of death and withdrawal due to serious disease was in the hospitals in Simaca district (42.3%) and Bac Ha district (26.3%), Muong Khuong district (14.3%), and Sapa (13.3%) district which should be prioritized for improvement. The number of emergencies was not much (26 children) but up to 11 cases died. The patients' condition upon access to the emergency, staff capacity and equipment, facilities and drugs are the factors with direct impact on the effectiveness of resuscitation. It is necessary to learn about the main cause for immediate intervention solutions. Experience from many studies has shown that neonatal mortality may be reduced by > 70% if appropriate intervention solutions are implemented in under-resourced settings.

63.9% of neonatal emergencies in the first day of birth and the high death and withdrawal due to serious disease rate at 66.2% was definitely related to care at birth and immediately after delivery. This data is also consistent with the analysis of the emergency patterns by the delivery place. 80% of neonatal emergencies and deaths was newborns in the Obstetrics department of all surveyed hospitals showed that urgent problems are mainly related to the delivery.

Prognosis and coordination of obstetricians in the care of risky delivery cases are essential for the timely emergency of neonatal emergencies. Doing this well will definitely increase the newborn's chances of survival. Support for breathing and resuscitation in the delivery room are acts which must be well practiced by the staff involved in the delivery.

The Provincial Hospitals and some of district hospitals have handled the emergencies in preterm and low birth weight infants. The remarkable achievement was more than 50% of children with birth weight <1000g have been successfully delivered to the emergency room (30/51). It is required to recognize the signs of newborns' late emergency, undone initial treatment and non-care on the way to the hospital which are definitely the reasons why the newborns are late, too emergency capacity of the hospitals. Encouraging the mothers to deliver at health facilities is still a long-term intervention strategy in combination with the direct support interventions to train village midwives and participate to support the delivery at the home to help and guide the mothers how to take care of children and recognize early signs of pathology so that they can be handled promptly. The primary pattern of emergency still occurs in preterm, low birth weight infants (61.5%) which shows that it is necessary to develop more aggressive strategy to prevent the preterm and low birth weight and special care for these newborns. The asphyxiation and bacterial infection emergencies has been

significantly reduced which show that the care and hygiene at and after delivery have been improved. Corresponding to the emergencies, the number of deaths due to preterm birth accounted for the highest rate (63.1%). The ability to emergency in preterm infants is very limited in neonatal care settings. Interventions should be prioritized in this area. Although the emergency rate due to asphyxiation only accounted for 2.6% of the total number of emergency newborns, the death rate accounted for 15% of the total deaths. As the result, it is necessary to apply the interventions to improve breathing emergency practice for health workers involved in delivery support.

General evaluation of emergency results for all newborns in the hospitals or referral cases from other levels shows that the successful rate to help the stable newborns is 71%. The rest has not improvement or is worse.

5. CONCLUSIONS

The emergency and death cases are mainly

related to preterm birth and asphyxiation. The maternal care during the pregnancy and improvement of neonatal resuscitation skills in the delivery room are effective interventions.

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