Trends and determinants of early neonatal mortality in Nepal

Experience

Early neonatal death (ENND) is the death of a newborn within seven days of birth, and it represents 73% of all postnatal deaths worldwide [1]. While Nepal has made considerable progress in lowering its child mortality rate, the country still needs to do more to reduce neonatal mortality. In order to achieve the target set by the Sustainable Development Goals for 2030, Nepal's ENND rate needs to be 12 or less deaths per 1000 live births [2]. The National Health Policy 2019 envisioned a life-cycle approach to health services related to safe motherhood, with child, adolescent and reproductive health to be developed and expanded so as to improve the health indices of child mortality [3]. This evidence piece discerns the determining factors and trends of early neonatal health from 2006 to 2016.

Methodology

Data from the 2016 Nepal Demographic Health Survey (NDHS) was primarily analyzed for the determinants of early neonatal mortality, while data from NDHS 2006, 2011 and 2016 were examined to deduce trends. This was followed by a variable enquiry to examine the association with potential determinants, after which a multivariate logistic regression analysis was carried out to adjust the associated factors with early neonatal mortality. Additionally, the sampling weight of the 2016 NDHS was used to account for the sample design.

Upshots

Early neonatal death: Background characteristics

Descriptive statistics revealed that early neonatal death was higher in males (18 per 1000 live births) compared to female children (14 per 1000 live births).

The rate of early neonatal mortality by mothers age group showed that baby delivered by young age mothers (15-19 years) had 31 deaths per 1000 live births as well as by older age mothers (35-49 years), had 14 deaths per 1000 live births.

The death rate was found to be higher (25 per 1000 live births) when mothers had already given birth to four children compared to those with one child (8 per 1000 live births).

Birth intervals also appeared to play an integral role in ENNDs. Gaps of less than two years led to 96 deaths per 1000 live births, whereas intervals of more than two years had 9 per 1000 live births.

Economic statuses of families too contributed to early neonatal mortality with the rate being higher among children born into low-income families (24 deaths per 1000 live births). Additionally, education was also a contributing factor. For women with no education, the death rate was 19 per 1000 live births, and for those with primary education, the figure was 22 deaths per 1000 live births. On the other hand, when women had higher education, the rate was only 3 deaths per 1000 live births. Another instrumental determinant in neonatal deaths was the size of the child at birth. The death rate among children who were born smaller or larger than average was 24 deaths per 1000 live births, while the number was 10 deaths per 1000 live births among average-sized children.

Location of delivery had an important role in curbing neonatal mortality rates. Health facilities had 11 deaths per 1000 live births, while the number for home births was 22 deaths per 1000 live births. Anemic mothers and home births had 22 and 11 deaths per 1000 live births respectively.

In the context of neonatal mortality across provinces, Sudurpaschim and Karnali had the highest death rates at 25 per 1000 live births. Gandaki, on the other hand, had the lowest with 8 deaths per 1000 live births.

Table 1

| Characteristics	ENND/1000 Live Births
Mother's age-group	
15-19	31
20-34	12
35-49	14
Everborn Children	
Everborn children 1	8
Everborn children 2	16
Everborn children 3	18
Everborn chidren 4	25
Birth interval	
>2years	96
<2 years	9
Mother's education	
No education	19
Primary	22
Secondary	14
Higher	3
Place of residence	
Urban	12
Rural	21
Size at birth	
Average	10
Smaller than average	24
Larger than average	24
Place of delivery	
Health facility	11
Home	22
Provinces	
Province 1	17
Province 2	16
Bagmati Province	11
Gandaki Province	8
Province 5	14
Karnali Province	25
Sudurpaschim Province	25

Association between early neonatal death and background characteristics

Using the chi-square test, a bivariate analysis was carried out, which showed several determinants of early neonatal mortality: the size (smaller/larger than average) of the child at birth, mother's age at birth (below 20 years), higher number (>3) of ever born children, delivery at home, low/no education of mothers, area of residence (rural), and birth intervals of less than 2 years. All these factors were brought up for multivariate adjustment, which revealed that:

- Children who are smaller than average at birth are three times likely to die within seven days of birth (OR: 3.2; 95% CI: 1.1-8.9; $P<0.05$), while children who are larger than average at birth are almost four times likely to die within the same time period (OR: 3.6; 95% CI: 1.4-9.2; $P<0.01$).
- Early neonatal death rates are five times higher when the mothers are aged less than 20 years compared to when mothers are over 20 (OR: 4.9; 95% CI: 1.4-17.5; $P<0.05$).
- Fourth born or more children are five times more at risk of dying (OR: 4.9; 95% CI: 1.2-21.3; $P<0.05$).
- Birth intervals of less than two years (OR: 15.9; 95% CI: 5.9-42.0; $P<0.001$) are 15 times more likely to contribute to early neonatal mortality than intervals of more than two years.

Figure 1: Associated Determinants of Early Neonatal Mortality
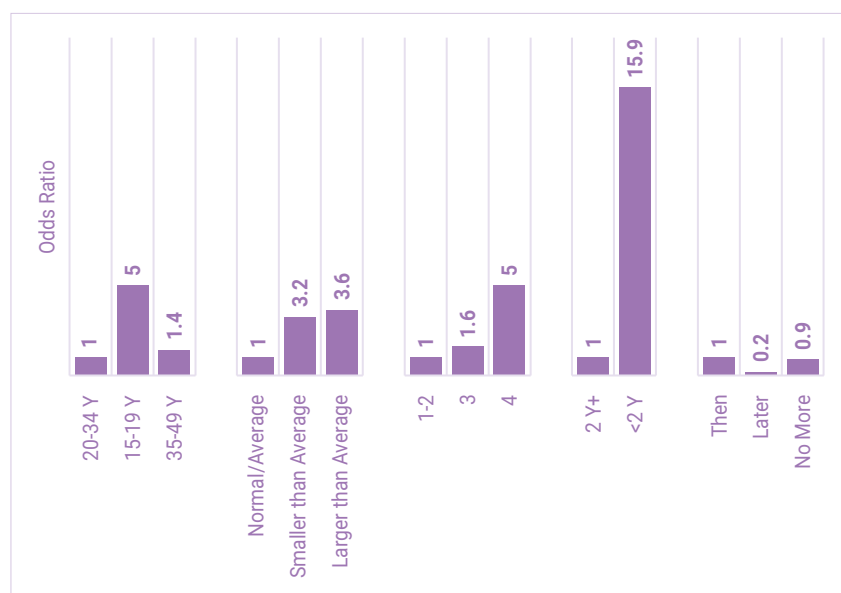
Endorsements

- Enforcement of increase in age of first child birth, such as making 20 the minimum age, as well as encouragement in family planning, should be a priority policy for all spheres of governments.
- Since size at birth is associated with neonatal mortality, focused nutritional interventions during pregnancy are crucial.
- Sudurpashchim and Karnali province need to design more focused interventions, such as increasing education and institutional deliveries, as well as economic upliftment.

References

1. Lehtonen L, Gimeno A, Parra-Llorca A, Vento M. Early neonatal death: A challenge worldwide. Semin Fetal Neonatal Med [Internet]. 2017 Jun 1 [cited 2020 Mar 19];22(3):153–60. Available from: http://www.sciencedirect.com/science/article/pii/S1744165X17300215
2. Kc A, Jha AK, Shrestha MP, Zhou H, Gurung A, Thapa J, et al. Trends for Neonatal Deaths in Nepal (2001–2016) to Project Progress Towards the SDG Target in 2030, and Risk Factor Analyses to Focus Action. Matern Child Health J [Internet]. 2020 Feb 1 [cited 2020 Mar 19];24(1):5–14. Available from: https://doi.org/10.1007/s10995-019-02826-0
3. Government of Nepal, Ministry of Health and Population. National Health Policy 2076. Government of Nepal; 2019.

NHSSP — Nepal Health Sector Support Programme

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