

# Underlying causes of perinatal deaths among cases undergoing minimally invasive tissue sampling in Bangladesh

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## Background

- Perinatal death refers to the number of stillbirths and deaths in the first week of life (early neonatal mortality)
- The estimated global stillbirth rate~ 13.9 per 1,000 total births in 2019, declined from 16.7 in 2010
- Stillbirth reduction rate is significantly slow compared to the reduction of under 5 mortality due to less exploration of underlying factors of perinatal deaths and lack of standardized vital registration system
- Estimated perinatal mortality rate (PNMR) in Bangladesh (2014)~ 41 per 1,000 pregnancies
- The Child Health and Mortality Prevention Surveillance (CHAMPS) Network in seven countries aims to understand specific causes of childhood deaths through postmortem minimally invasive tissue sampling (MITS) and other information

## Objective

- To explore underlying causes (event that precipitated the fatal sequence of events) of perinatal deaths among cases undergoing MITS in Bangladesh

## Methods

- CHAMPS Bangladesh is working in Baliakandi upzila, a rural sub- district of Rajbari district in Faridpur
- Mortality Surveillance: Utilize notification systems which report all under-5 deaths and stillbirths to the local team within 24 hours of the child's death
- Specimen Collection: Collect tissue (liver, lung, heart, brain, bone marrow, and placenta, if available) and non-tissue (blood, CSF, NP/OP swab, and stool) specimens through the MITS procedure for further laboratory analysis
- Clinical Data Abstraction and Verbal Autopsy: Gather other information through clinical records and verbal autopsies (standardized interviews with family member or caregiver) to provide additional context for the expert panel review
- Molecular and Microbiologic Diagnostics: Conduct microbiology, HIV, tuberculosis, and malaria testing . Tissue histopathology is also done
- Expert Panel Review (DeCoDe): Review all information on each case and assign the underlying , immediate and other antecedent and maternal causes of death using World Health Organization (WHO) guideline. The panel also recommends action that could have potentially prevented these deaths

## Results

From Sep 2017 to July 2020, panel reviewed 151 cases and of these, 72 were stillbirths, 68 were early neonates and 11 were other under-5 children (Fig 1). We also analyzed maternal condition related to 140 perinatal deaths

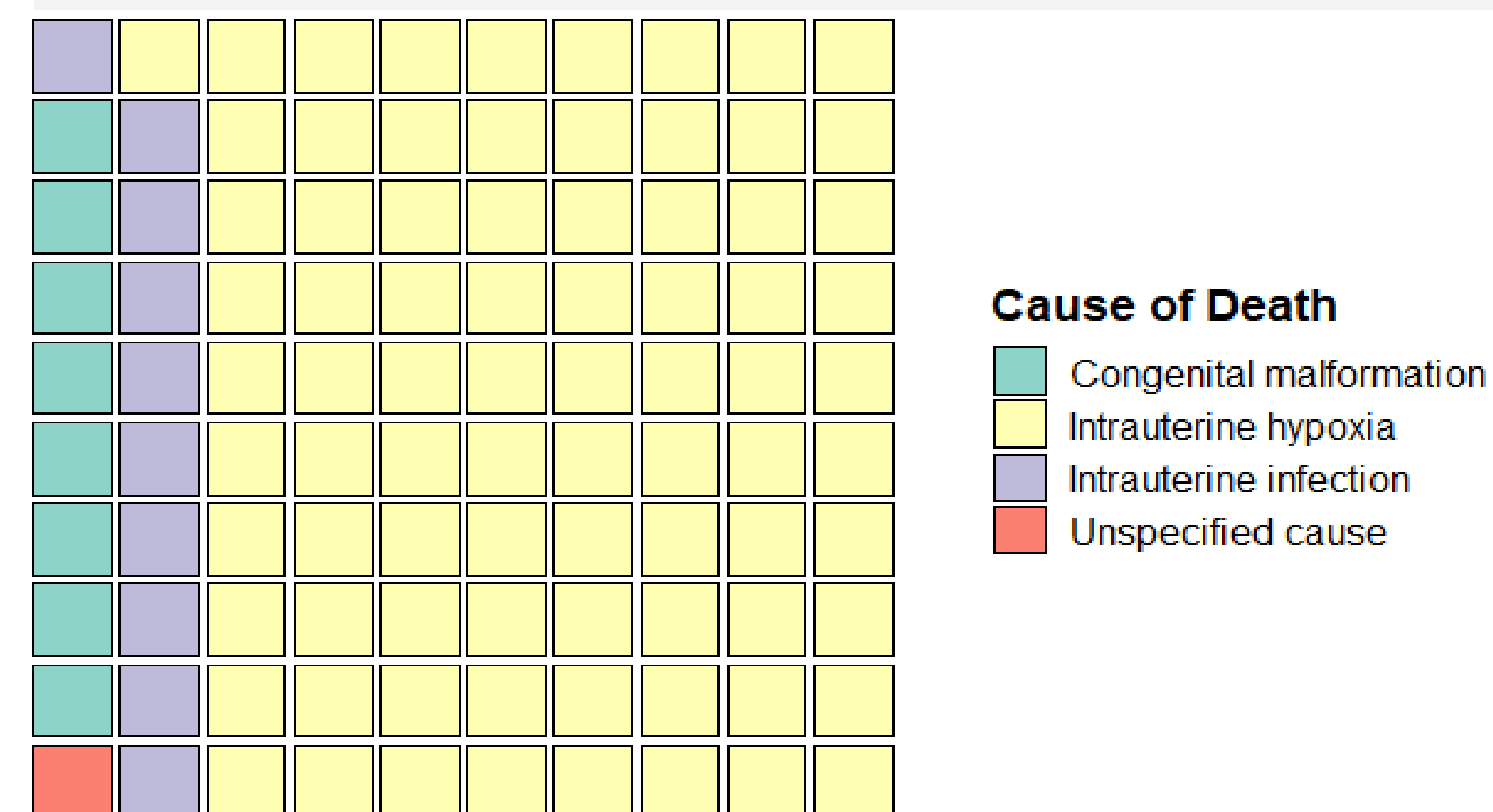


Fig 1: Underlying Cause of death among stillbirths (N=72)

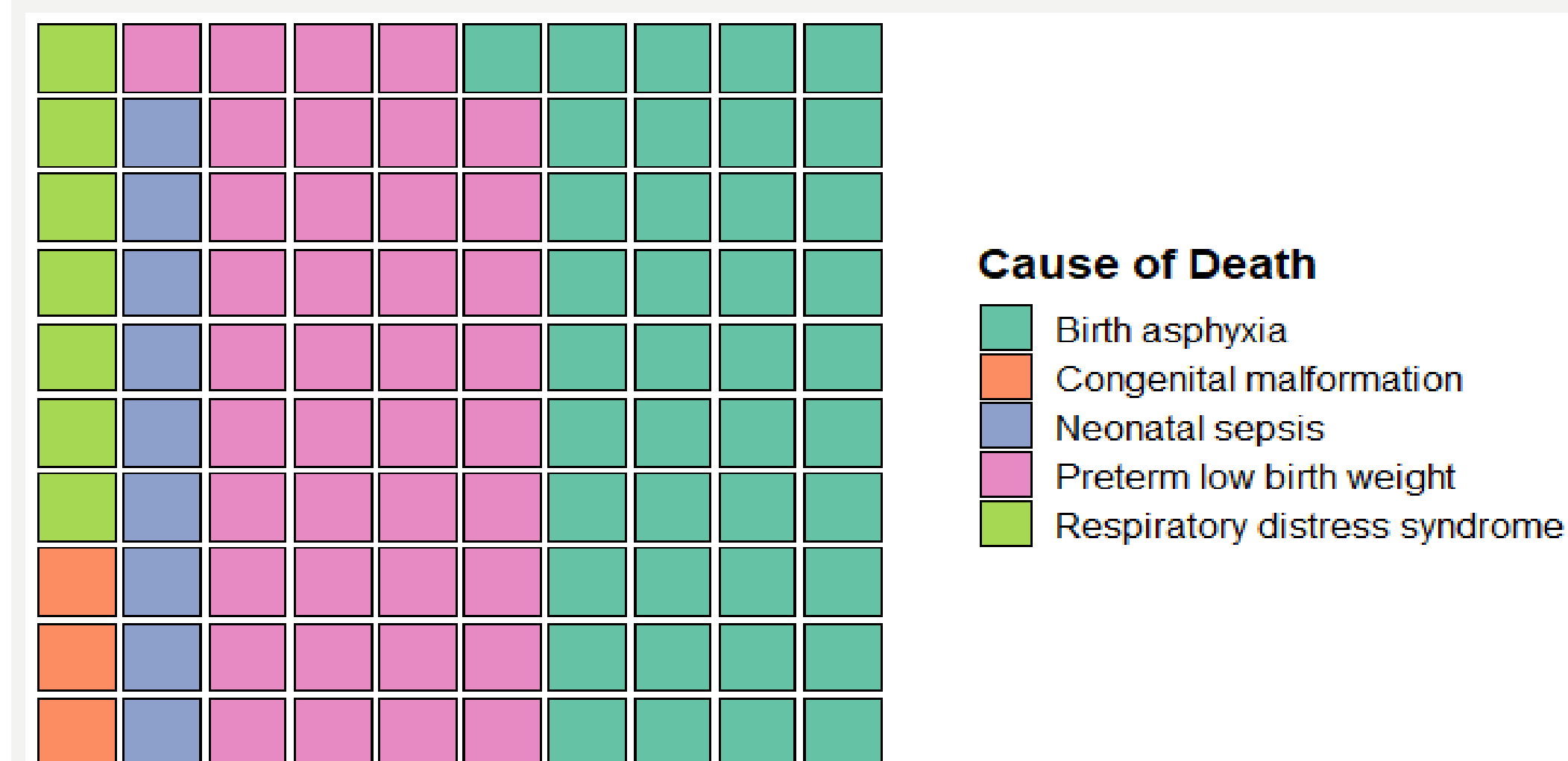


Fig 2: Underlying Cause of death among early neonatal deaths (N=68)

- The graph on the right (Fig 3) is showing major maternal conditions for 140 perinatal deaths
- Main medical condition related to cause of death were hypertension, diabetes, infection, anemia
- Common placenta related complications were abruptio placenta, placenta previa, chorioamnionitis and pregnancy related were Premature rupture of membrane, Oligohydramnios, Polyhydramnios, Twin pregnancy
- For a large number of early neonatal deaths, maternal condition was unknown due to inadequate maternal condition or there was no medical condition

- The waffle plot on the left (Fig 1) presents the underlying causes of stillbirth where one of the square presents 1% of each cases
- 81% of SB were due to IUH and maternal placenta and hypertension related complications were the key reasons
- Intrauterine infection and congenital malformation were the other leading causes for SB showed by purple and green squares respectively
- Out of 7 stillbirths due to intrauterine infection; 2 were caused by Streptococcus, 2 were by Ureaplasma and other 3 were by Varicella and Pseudomonas

- The waffle plot on the left (Fig 2) presents the underlying causes of 68 early neonatal deaths
- The main underlying causes for early neonatal deaths were preterm LBW (40%) and birth asphyxia (41%)
- Six neonatal deaths resulted from neonatal sepsis caused by mainly *Klebsiella pneumoniae*
- 7% of deaths occurred from respiratory distress syndrome (hyaline membrane disease)
- Only 3% death was from congenital abnormalities

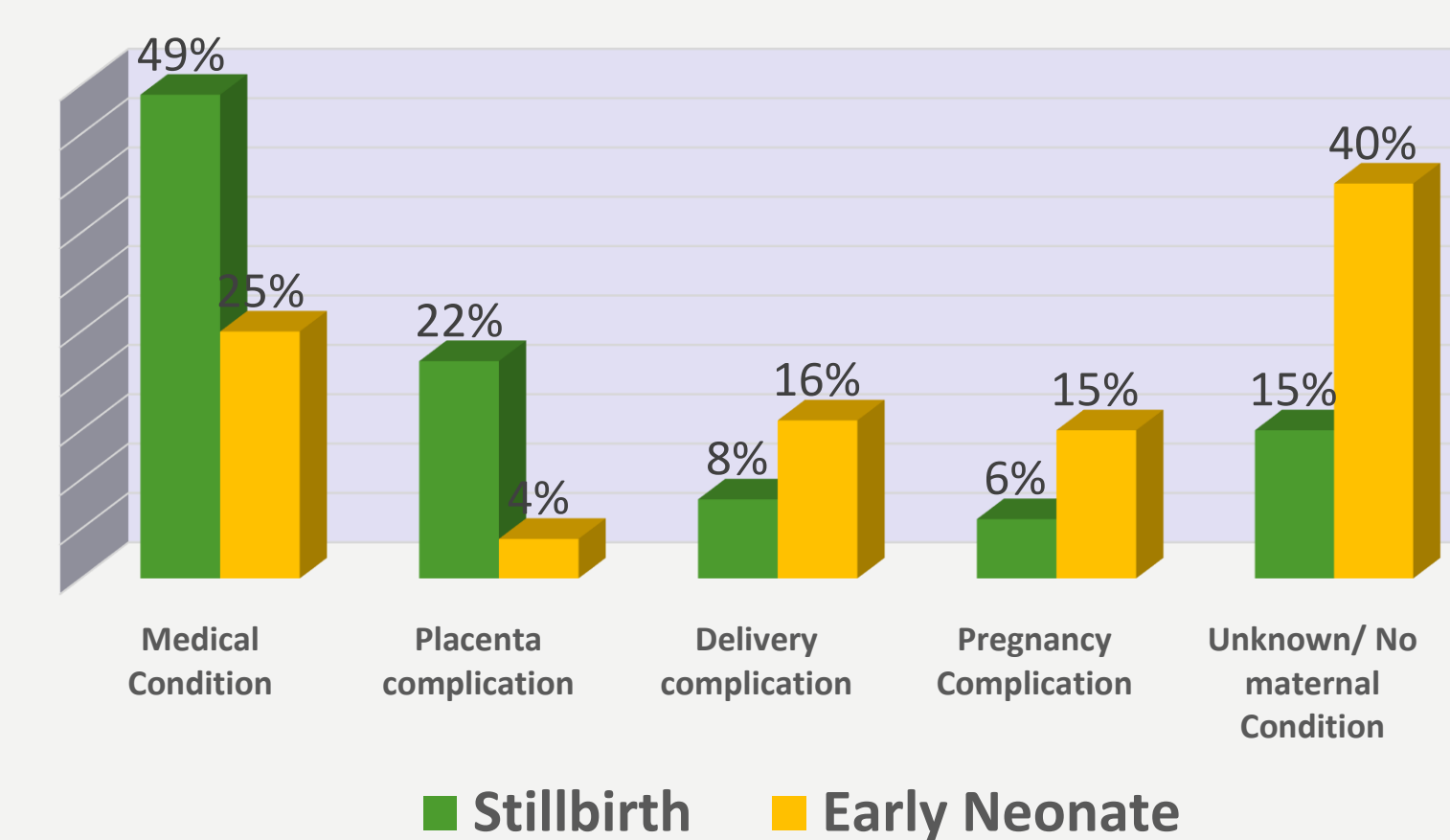


Fig 3: Maternal Condition

## Recommendation from panel

- 128 (91%) of these deaths were considered preventable by the DeCoDe expert panels
- Expert panel concluded 78 (61%) of 128 preventable deaths as preventable through regular quality antenatal care (ANC) from skilled health care provider
- Recommendations for other 42 (35%) preventable cases include the following common themes-
  - Improved clinical management and quality of care at the facility level
  - Improved health-seeking behavior
  - Improved infection prevention and control

## ANC visits are common but at facilities with poor readiness

- In 2019, we started pregnancy surveillance to better understand the ANC and Postnatal Care (PNC) in Baliakandi
- From there we found, most women are seeking ANC but not from quality health facility
- A cross-sectional survey of health facilities serving the Baliakandi population in 2019 concluded that most of the ANCs by Baliakandi women were taken from the facilities where the readiness score was lower and only 8% visits were made from a health facility where readiness score is around 90%

## Limitation

- Certain types of deaths are underrepresented (e.g. children who die at home) in this study. So these are not representative of all perinatal deaths

## Conclusion

- Quality ANC from skilled health care provider can prevent such perinatal deaths
- Lack of robust information from the mother about infection during pregnancy
- Identify the gaps in providing quality ANC
- Adequate on-site laboratory facilities for evidence based quality ANC
- Exploration of the barriers behind inappropriate clinical management

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