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Newborn babies with blood infection resistant to antibiotics: national implications

This research brief aims to

- Summarize key findings from the research on antimicrobial resistance (AMR) among newborn babies with blood infection at KIST MCTH
- Propose actions for the National AMR Coordinating Committee as well as maternity and children's hospitals

Antimicrobial resistance (AMR) means that medicines to treat infections may not work any more

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Key Messages

- We studied records of 308 babies born at KIST MCTH between June 2018 and December 2019, who developed blood infection while in hospital. We examined their blood samples to identify the bacteria, with results for 20 of the babies. The most common bacteria were "Staphylococcus aureus" (40%) and "coagulase-negative Staphylococcus" (25%).
- From the 20 samples, only one confirmed bacteria (5%) could be treated by any of the four common first-line antibiotics (ampicillin, amikacin, gentamicin, and cefotaxime).
- 85% of bacteria identified in 20 blood samples did not respond to at least one of the four commonly used antibiotic drugs, indicating a potentially dangerous rise in Antimicrobial Resistance (AMR) in Nepal.
- The research found scope for reducing need for antimicrobials, as 308 blood infections were discovered among newborns at KIST MCTH. The study suggests that improving hospital procedures can reduce blood infections in babies at the hospital and also control AMR.

Importance of the problem of AMR

Bacterial infections in babies may result in death and therefore it is important to quickly treat such infections with antibiotics. AMR leads to infections that cannot be treated by commonly available antibiotics. More information is required about the bacteria that cause blood infections in babies and whether they are resistant to commonly used antibiotics.

The research provided new information about newborn babies with blood infection (neonatal sepsis) and the extent that AMR threatens standard treatment for babies with blood infection in Nepal.

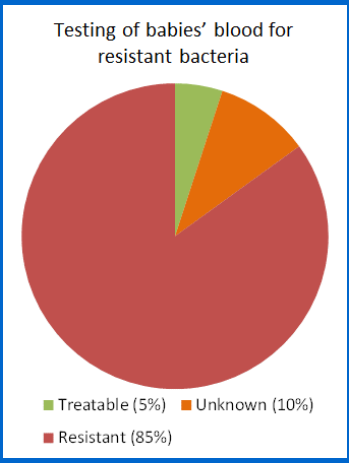
How was the research conducted?

The study was conducted by the Head of the Microbiology Department and faculty at the Neonatal Intensive Care Unit (NICU) at KIST Medical College and Teaching Hospital (MCTH), Lalitpur, along with national and international experts in clinical medicine, operational research and antimicrobial drug resistance. The research followed standard methods for data collection, compilation and analysis. The study examined records of 308 newborn babies born at KIST MCTH between June 2018 and December 2019, who developed blood infection while in hospital, prior to going home. Blood samples from 298 of the babies were examined by bacterial culture, to identify which bacteria were causing the blood infections, with results for 20 of the babies. The confirmed bacteria were treated with

common antibiotics to test for resistance or successful treatment.

Key findings

Only one of 20 (5%) blood samples from newborns with blood infection had bacteria that could be treated by any of four common first-line antibiotics (ampicillin, amikacin, gentamicin, and cefotaxime)



85% of bacteria were resistant to one or more of the most common antibiotics, indicating high rates of AMR

A high number of babies acquired blood infection while in postnatal care

Key findings

- The study found resistant bacteria (AMR) in 85% of 20 samples from babies with confirmed bacterial infection in the blood. These bacteria were resistant to at least one of the four most commonly used antibiotic drugs (ampicillin, amikacin, gentamicin and cefotaxime).
- Only 20 of 298 blood cultures led to identification of bacteria from the babies' blood samples, a very low confirmation rate of 7% pointing to challenges in the lab culture equipment or processes.
- Most of the 308 babies in the study were born at KIST MCTH and acquired blood infection (sepsis) while still in hospital, before going home.
- Of the 308 babies, seven (2%) babies died and 53 (17%) sick babies were discharged by their caregivers from the hospital against medical advice.
- Gaps were observed in the recording of patient and treatment details for the newborn babies. Delays in communication of laboratory results to the clinicians led to less informed treatment decisions.

Implications and recommendations

- National AMR Coordinating Committee should consider recommendations to address and control rising AMR among newborn babies in Nepal:
  - Work with WHO Country Office to strengthen clinical guidelines and surveillance of newborn babies with blood infection;
  - Define alternative treatments to four standard antibiotics used to treat neonatal sepsis at maternity hospitals in Nepal;
  - Reinforce infection prevention and control guidelines for neonatal care at maternity and NICU wards, to reduce antibiotic use;
  - Mandate reporting of cases of neonatal sepsis, along with antibiotic treatments, lab culture reports and clinical outcomes, required from maternity and children's hospitals in the Kathmandu Valley.
- Hospitals with OB/GYN, maternity and/or NICU wards should take the following actions:
  - Inform their clinicians, NICU and OBGYN/maternity faculty and staff about AMR among babies with blood infection, and explore alternatives to ampicillin, amikacin, gentamicin and cefotaxime.
  - Reduce blood infections among newborns by enforcing regular hand-washing and strengthening other IPC measures.
  - Ensure complete and timely bacterial culture from neonatal sepsis cases, and communicate results to clinicians and to the National AMR Coordinating Committee.

For more information, kindly refer to the original scientific publication in the Journal of Tropical Medicine and Infectious Disease:

Raghubanshi BR, Sagili KD, Han WW, Shakya H, Shrestha P, Satyanarayana S, Karki BMS. Antimicrobial Resistance among Neonates with Bacterial Sepsis and Their Clinical Outcomes in a Tertiary Hospital in Kathmandu Valley, Nepal. *Tropical Medicine and Infectious Disease*. 2021; 6(2):56.

https://doi.org/10.3390/tropicalmed6020056