Medical Xpress

Frontline diagnosis and treatment of infant infections

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Trained frontline health workers can identify most young infants with possible bacterial infections in low and middle income countries (LMICs) but also may diagnose infections in many uninfected young infants, according to a study published this week in *PLOS Medicine*. The authors, led by Anne CC Lee at Brigham and Women's Hospital in Boston, also found that availability and affordability of first-line injectable antibiotics is low in many health facilities in Africa and South Asia, where, according to the authors, "the majority of global neonatal and child deaths and infections occur."

Case fatality from neonatal infections is as high as 40% in LMICs. To reduce these deaths, health care experts need to identify the factors that limit access to medical care and antibiotics in these countries. In this systematic review and meta-analysis, the researchers investigate quality of diagnosis in young infants, availability and cost of antibiotics, and unprescribed use of antibiotics for children in the LMIC demographic.

Meta-analysis of six studies indicated that combinations of simple clinical signs (e.g. poor feeding, fever, chest indrawing) predicted severe disease in young infants with a sensitivity of 87% and a specificity of 62% ("sensitivity" of a test indicates the percentage of people who will be correctly identified by the test as having the illness for which they are being tested; "specificity" indicates the percentage of healthy people that a test correctly identifies as healthy) compared to a physician's diagnosis with laboratory testing. Meta-analysis of eight studies indicated that frontline health workers (e.g. nurses, community health workers)

diagnosed possible bacterial infections in young infants with a sensitivity of 82% and a specificity of 69% compared to trained physicians. Analysis of data in 11 studies and additional surveys indicated that first-level (primary) health facilities in Africa and South Asia had low, variable stocks of recommended first-line injectable antibiotics and that the cost of these drugs was often high. The authors state: "A common finding was where specific antibiotics were free in the public sector, availability was low, and private sector availability and cost were high." By contrast, some oral antibiotics were widely available at low cost in most regions. Finally, meta-analysis of 11 studies indicated that, in LMICs, 25% of antibiotic purchases for the treatment of young children were obtained without a prescription. Together with low specificity of diagnosis, this last finding reinforces concerns about antibiotic overuse and growing antibiotic resistance in LMIC.

There are several limitations on interpretation of this analysis. As none of the studies provided data on the proportion of infants who were preterm or of low birth weight, the findings cannot be reliably applied to that subgroup. Data on specific antibiotic formulations or considerations in neonates were limited. Also of note, many studies on this topic did not include sensitivity and specificity data, and were therefore excluded; the included studies may not reflect the overall population. The authors state: "Improved data and advocacy are needed to increase the availability and appropriate utilization of antibiotics for young infant infections in LMICs."

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