

Antibiotic Resistance Profile of Bacterial Isolates Causing Death of Children Under Five Years Old in Eastern Ethiopia

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Background

Globally 5.6 million deaths in children aged below five years were reported in 2016; of these 46% occurred in neonates (UN 2017). Nearly half of these newborn deaths occur in five African countries including Ethiopia (WHO, 2017). Neonatal mortality in Ethiopia was 29 per 1000 live births (EDHS, 2016). Neonatal mortality was 6.5 and 22 per 1000 live births in Harar and Kersa respectively (HDSS, 2017). Some bacterial infections were reported as possible causes of death among children. However, estimating their magnitude, antibiotic resistance profile, and attributable mortality remains a challenge. Therefore, this analysis aims to determine antibiotics susceptibility patterns of isolates caused under-five children death in eastern Ethiopia.

Methods

This study is part of Ethiopia Child Health and Mortality Prevention Surveillance based at Hiwot Fana Specialized University Hospital and Harar and Kersa Demographic and Health Surveillance System field sites. A total of 63 post-mortem specimens were collected within 24 hours of death of under five children using Minimally Invasive Tissue Sampling (MITS) techniques from February 2019 and March 2020. The definite cause of death of 53/63 cases was determined by synchronizing the laboratory result with verbal autopsy, demographic and clinical data abstraction through experts panel discussion. Isolation and identification of bacterial pathogens was conducted using BACT/ALERT® 3D 60 culture followed by analytical profile index. Susceptibility pattern of bacterial isolates were tested against commonly prescribed antibiotics in the study area like Gentamicin, Ceftriaxone, Clindamycin, Erythromycin, Penicillin, Ampicillin, Amoxicillin-clavulanic acid, Trimethoprim-sulfamethoxazole and Ciprofloxacin. Clinical and Laboratory Standards Institute (CLSI, 2018) guideline was used to perform and interpret the antibiotic resistance pattern of the bacterial isolates.

Results

A total of 21/53 and 3 /53 cases with an infectious etiology as the immediate and underlying cause of death respectively. A total of 15/24 were confirmed by culture and the rest by TAC. From these, 3/15 were >12 month, 4/15 were >28 days, 3/15 were neonates, 3/15 early neonates and 2/15 were still birth. A total of 14(26.4%) deaths were due to sepsis with *Klebsiella pneumoniae* 6(40%), Non-Typhi Salmonella 3(20%), *Escherichia coli* 2(13.3%), *Pseudomonas aeruginosa* 1(6.7%), *Staphylococcus aureus* 1(6.7%) and *Streptococcus pyogenes* 1(6.7%) and one meningitis death due to *Neisseria meningitidis*. The isolation rate of multidrug resistance was 10/11(90.9%). Of these, 5/6 (83.3%) were *Klebsiella pneumoniae* isolates, 3/3 (100%), Non-Typhi Salmonella spp. and 2/2 (100%) *E.coli*. Most of the isolates were resistant to Gentamicine and Ceftriaxone 10 (83.33%) followed by 9(81.81%) Amoxicillin clavulante and Ampicilin 9(75%).

Conclusions

In this analysis multiple antibiotic resistant *K. pneumoniae*, non-typhoidal Salmonella, and *Escherichia coli* sepsis were attributable to the cause of under five children death. This work has demonstrated the importance of identification and antimicrobial resistance testing of bacterial pathogens. Additionally; demonstrated possible interventions and vaccine preventable infections in under five children.

Figure 1: Antibiotic Resistant Profile of Isolates



See more data at champshealth.org



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