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# MANAGEMENT OF HOSPITAL-ACQUIRED MULTIDRUG-RESISTANT BACTERIAL OUTBREAKS IN ABS GENERAL HOSPITAL NEONATAL WARD: BEFORE-AND-AFTER COMPARISON

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## General data

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## Abstract

**Background and objectives:** Sepsis caused by multidrug-resistant organisms (MDRO's) has become a significant contributor to neonatal morbidity and mortality worldwide. MSF has supported Abs General Hospital (AGH) in Yemen since 2015, providing secondary health care in departments including the emergency room, paediatric ward, maternity, neonatology, inpatient therapeutic feeding centre, surgery, and mental health. In this setting, haemoculture testing was introduced in 2021 for diagnosis of sepsis not responding to first-line antibiotics. MDRO's, particularly extended-spectrum beta-lactamase (ESBL) *Klebsiella pneumoniae*, carbapenem resistant *Klebsiella pneumoniae* and ESBL *Serratia marcescens* have triggered nosocomial outbreaks in the hospital's neonatology ward despite intensified infection prevention control (IPC) measures and the implementation of an outbreak committee. We outline measures implemented to counteract such outbreaks and we report a comparison of MDRO incidence before and after implementation.
**Methods:** In February 2023, the hospital's neonatal unit was divided into two separate areas, one for confirmed cases and contact patients (considered as colonised), and another for new admissions. We sensitised staff and patients on the importance of IPC measures using leaflets and presentations. In September 2023, training for clinical staff using clinical descriptions of patients from earlier *K. pneumoniae* outbreaks was carried out to facilitate early treatment and isolation of suspected cases, noting common presenting symptoms including respiratory distress, thrombocytopenia, neutrophilia, and others. MDRO incidence rate ratios (IRR) were compared using negative binomial regression across three periods: P1 (Nov 22 – Feb 23), P2 (Mar – Aug 23), and P3 (Sept – Dec 23).
**Results:** In total 3322 admissions were registered during the three periods (including 103 patients with MDRO isolations in their haemoculture testing). We found a 63% decrease in MDRO incidence in P2 compared to P1 (IRR, 0.37, 95% confidence interval (CI) 0.07-1.12, p=0.08) and a 78% decrease in P3 compared to P1 (IRR 0.22, 95% CI 0.02-0.79, p=0.02).
**Conclusions:** Our findings suggest that the combined interventions were associated with a reduction in incidence of nosocomial infection. Although there are limitations including the absence of a control group, comparison of different time periods, and intermittent availability of haemoculture bottles that may have affected the results, we want to highlight the importance of adapting interventions to the available resources and of updating tools and protocols for timely detection and management.

## Ethics statement

This study fulfils the exemption criteria set by the MSF ethics review board and was approved for submission by the OCBA Medical Director.