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Managing Multidrug Resistant Outbreaks in Abs General Hospital Neonatal Ward

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BACKGROUND AND OBJECTIVES

Multi drug resistant organisms (MDRO) are a rising concern worldwide and are considered to contribute to 5 million deaths/year worldwide. Due to a conflict context MSF is present in the most populated areas of Yemen (Figure 1). Since 2015, MSF has been supporting Abs General Hospital in Hajja governorate and began providing hemoculture testing in 2021 for patients with 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 measures and the implementation of an outbreak committee. Some of the challenges faced were the lack of knowledge among the staff about nosocomial infection, the impossibility to identify colonised patients and the low sensitivity of haemocultures together with delayed results (up to 7 days) and intermittent availability of blood culture bottles.

This study outlines the comprehensive measures implemented to counteract this trend and compares the MDRO incidence rate between the pre- and post- implementation period.

Measures were implemented in 2 steps:

- Step 1 (March 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 (Figure 2). All staff and biomedical equipment was divided and assigned to each area to avoid cross contamination. We sensitised both staff and patients on the importance of infection prevention control (IPC) measures using leaflets and presentations (Figure 3).
- Step 2 (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

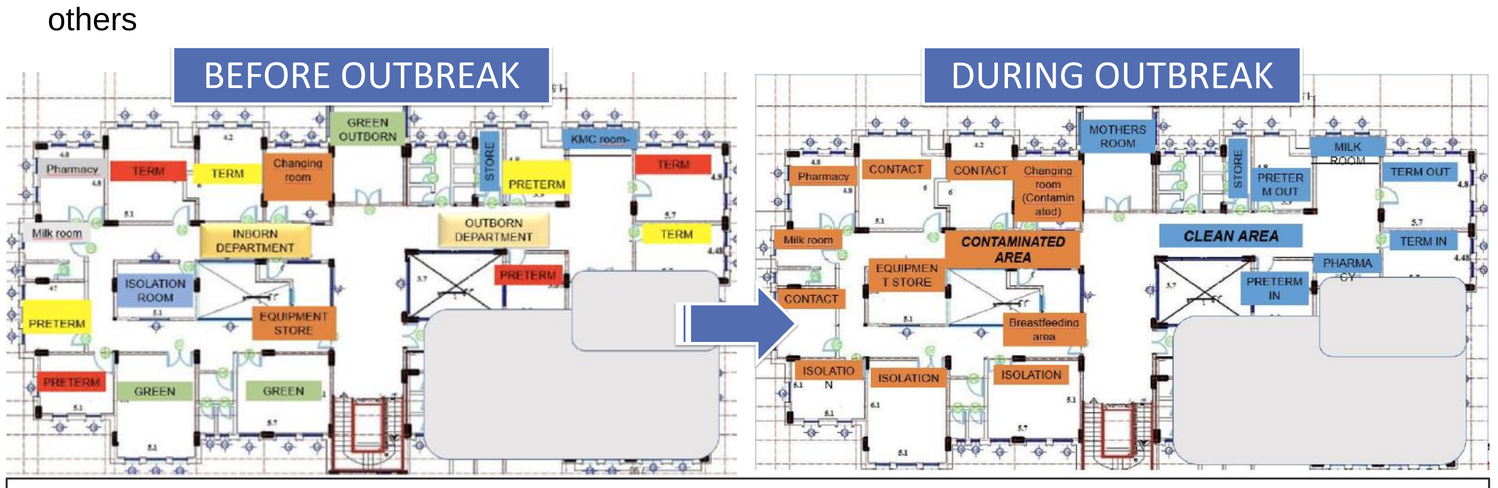


Figure 2: Distribution of the Neonatal Unit before and during the outbreaks

METHODS

MDRO incidence rate ratios (IRR) were compared using negative binomial regression across three periods:

Period 1 (P1) (November 22 – February 23): Control period.

Period 2 (P2) (March – August 23): After the division of the unit, staff sensitisation and first SOP.

Period 3 (P3) (September – December 23): After training of MDs for early recognition of sepsis signs.

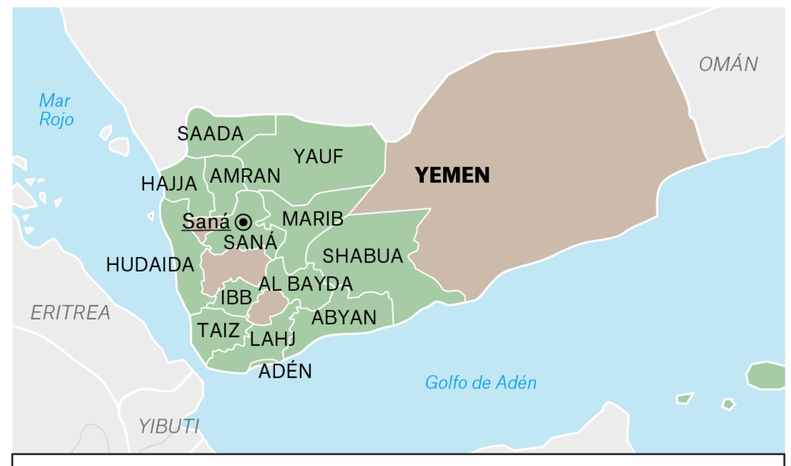


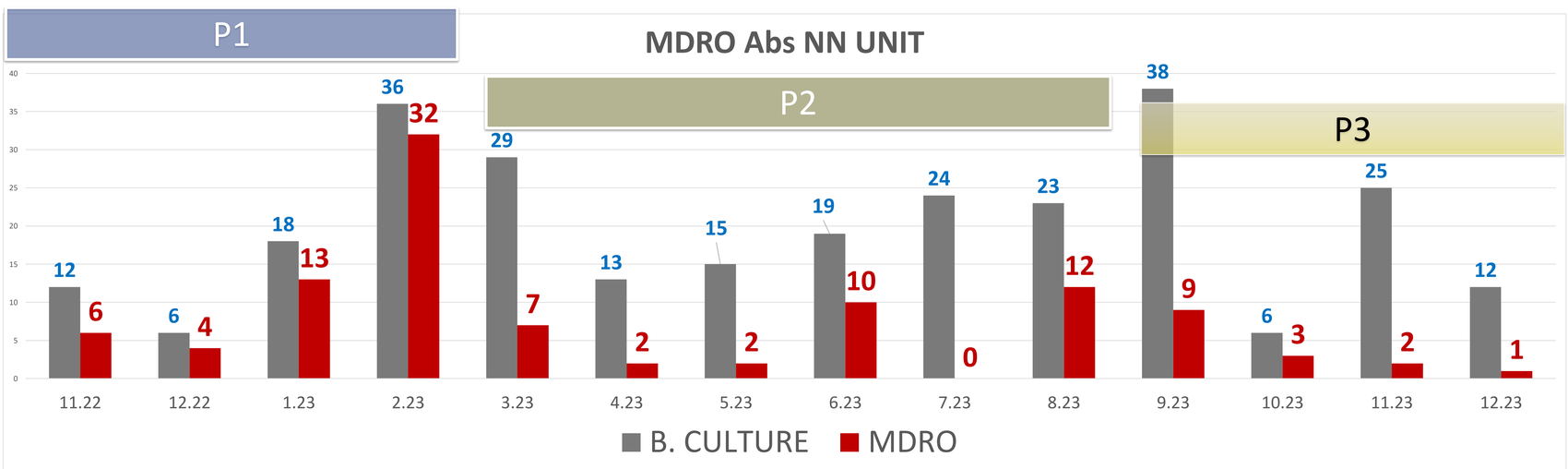
Figure 1: Yemen political map with governorates with MSF projects in green

Figure 3: ESBL Klebsiella information leaflets in English and arabic

RESULTS

Since the implementation of these interventions, MDRO isolation in neonatology has significantly dropped. We analysed the data across the 3 periods described above; In total 3322 admissions (including 103 MDRO isolations) were included. We saw a 63% decrease in MDRO incidence in P2 compared to P1 (IRR=0.37, 95%CI 0.07-1.12, p=0.08) and an 78% decrease in P3 compared to P1 (IRR=0.22, 95%CI 0.02-0.79, p=0.02).

The graphic below shows the number of MDR bacteria isolated in blood cultures (red) and the total number of blood cultures collected (grey) every month.



DISCUSSION

Our findings suggest that the combined interventions were associated with a reduction in incidence of nosocomial infection. Although there are limitations to this study as the absence of a control group and comparison of different time periods 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 ERB and was approved for submission by the OCBA Medical Director