A nosocomial outbreak of multiresistant ESBL-positive *Klebsiella pneumoniae* in a neonatal intensive care unit in Port-au-Prince, Haiti, July 2014-Sept 2015

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Introduction

MSF coordinates projects in a wide range of contexts, which have recently expanded to include more specialised care such as neonatology. Between July 2014 and Sept 2015, the neonatal ward of the Centre de Référence des Urgences Obstétricales (CRUO) in Port-au-Prince, Haiti, experienced a nosocomial outbreak of multiresistant ESBL-positive *Klebsiella pneumoniae*. Control measures included strict implementation of infection control and prevention methods (particularly hand hygiene), revision of antibiotic protocols, infrastructure adjustments, routine prevalence screening, and active communication with all healthcare staff. We report on the epidemiological and microbiological characteristics of this outbreak.

Methods

A suspected case was any neonate who developed clinically compatible sepsis during admission. Between 1 July and 5 Aug 2014, only deaths due to sepsis were recorded. After this, for each admitted neonate with sepsis, demographic information and available data on risk factors were recorded, such as birth weight, gestational age, and delivery method. When possible, bacterial cultures (from swabs and blood) were conducted on suspected cases. We calculated relative risks of death for possible risk factors, with corresponding 95% confidence intervals.

Ethics

This retrospective study met the criteria of the MSF Ethics Review Board for exemption from ethics review. Ethics approval was granted by the ethics committee of the Haiti Ministry of Health.

Results
Between July 2014 and Sept 2015, 257 suspected cases were reported (7.6% of all admissions during this period); 43 (17%) of these were confirmed cases of \textit{K. pneumoniae} and 8 (3%) showed evidence of other pathogens on blood culture. The case fatality ratio (CFR) for suspected cases decreased from 100% in July-Sept 2014 to 26.7% in July-Sept 2015. The overall mortality in the neonatal wards decreased from 29.7% to 10.7% in the same period. Compared with admissions not linked to sepsis during the outbreak period, gestational age <37 weeks and birth weight <2000 g were significantly associated with being a sepsis case (adjusted odds ratios 3.7 [95% CI 2.3-6.1] and 2.9 [1.8-4.7], respectively). In April 2015, multi-locus sequence typing of \textit{K. pneumoniae} isolates from cases confirmed a single type of \textit{K. pneumoniae} (ST37), suggesting a single source of nosocomial transmission in the neonatal wards.

\textbf{Conclusion}

CRUO faced a serious outbreak of nosocomial transmission of a multidrug-resistant bacterial pathogen with high morbidity and mortality. Although the CFR was reduced during the outbreak period, continued clusters of cases appeared despite numerous stringent control measures. The outbreak highlights the urgent need to develop strategies for improved antibiotic stewardship and infection control and prevention in MSF settings such as CRUO. The delivery of highly specialised care in vulnerable populations can be improved by sharing our experiences in these new and challenging operational territories.

\textbf{Conflicts of interest}

None declared.