

# Yeast like fungi associated with child death and illness from Bangladesh: Findings from CHAMPS Study

Shafina Jahan<sup>1</sup>, M Ishrat Jahan<sup>1</sup>, Mustafizur Rahman<sup>1</sup>, Afruna Rahman<sup>1</sup>, Sanwarul Bari<sup>1</sup>, Kyu Han Lee<sup>2</sup>, Emily S. Gurley<sup>2</sup>, Shams El Arifeen<sup>1</sup>, Muntasir Alam<sup>1</sup>

<sup>1</sup>icddr,b, Dhaka, Bangladesh; <sup>2</sup>Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, United States

## Background

Yeast like fungi constitute a significant proportion of hospital-based fungal infections worldwide. In the United States, these account for about 1-4% of nosocomial infections in neonatal intensive care units with 20-30% mortality rate. Invasive fungal infections are difficult to diagnose and very limited data is available from Bangladesh on the outcome of these infections especially for neonates.

## Objective

The aim of this investigation is granularly analyze the contribution of yeast like fungal infections in child death and illness from the Child Health and Mortality Prevention Surveillance (CHAMPS) project site in Bangladesh.

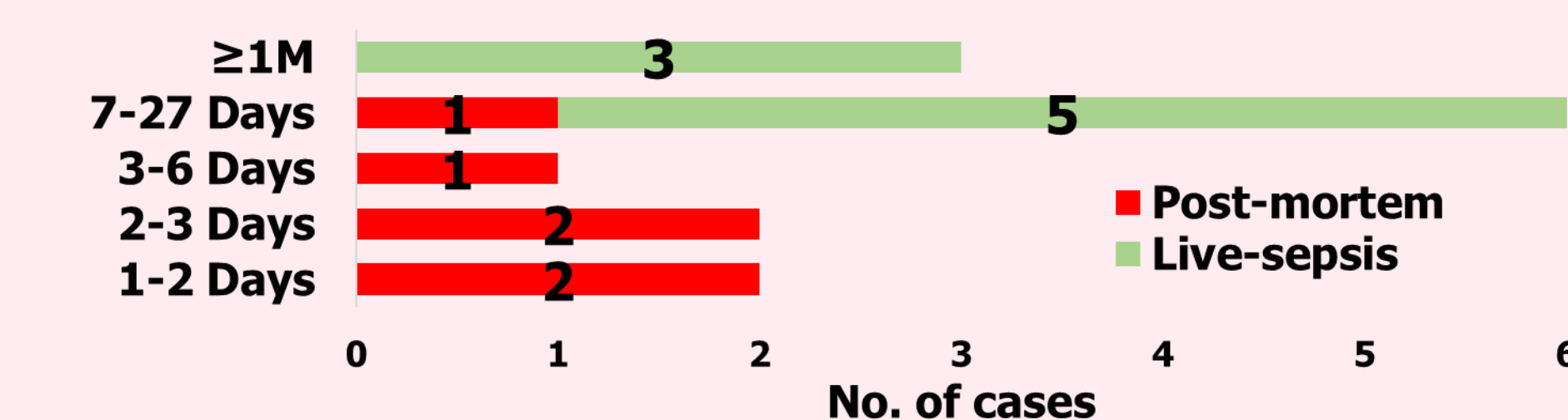
## Methods

Child Health and Mortality Prevention Surveillance (CHAMPS) aims to understand the causes of stillbirths and under-five deaths in sub-Saharan Africa and South Asia. From deceased stillbirths and under-5. Post-mortem tissue and non-tissue specimens were collected by minimally invasive tissue specimen(MITS) method. The specimens were tested using microbial culture, real-time PCR and immunohistochemistry. Isolated yeast like fungi were tested to the most commonly used antifungal agents using disc-diffusion method.

A panel of experts determined the cause of death Along with post-mortem specimens, blood samples were also collected from live under-5 children suspected of sepsis.

## Results

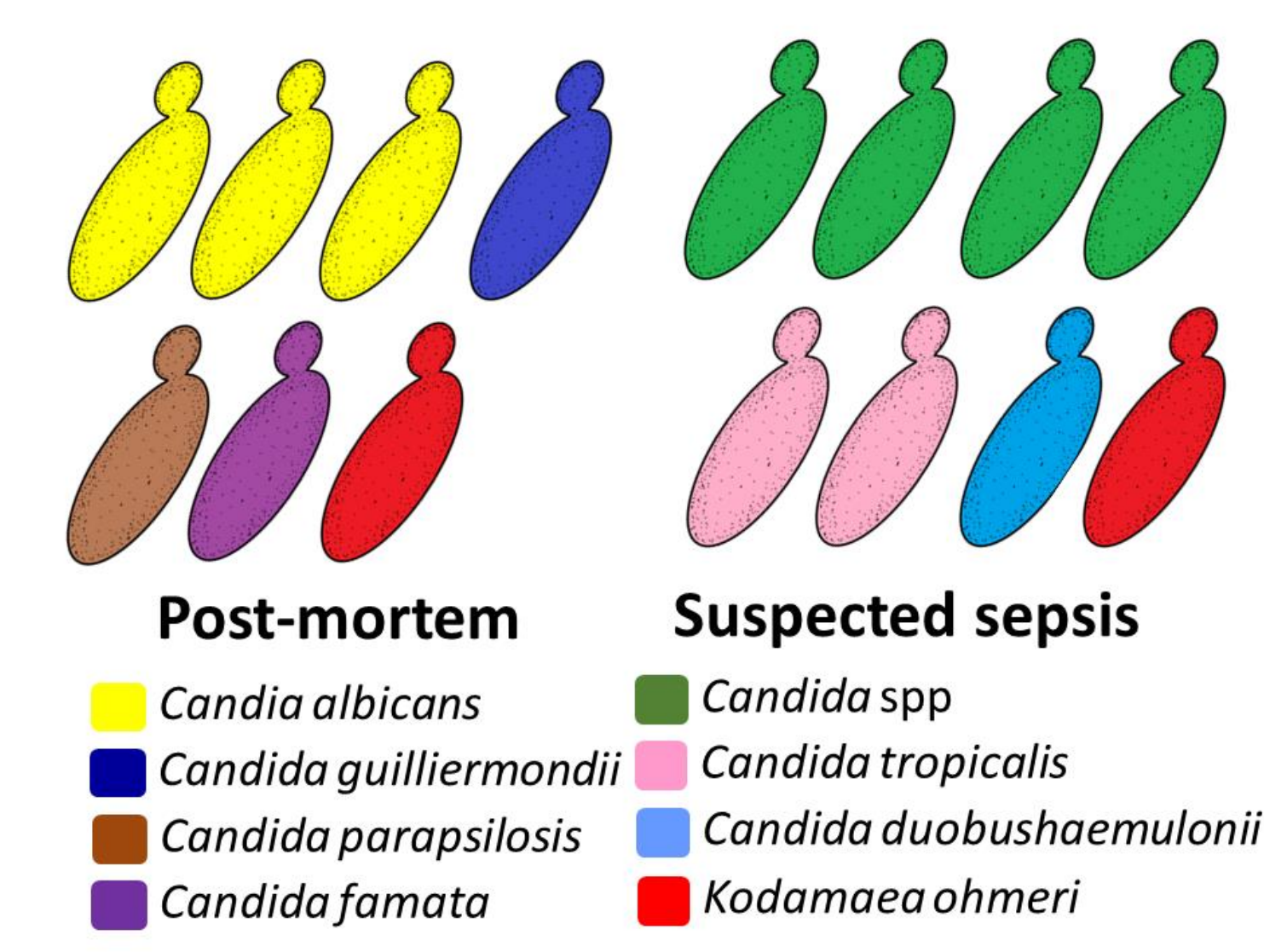
From August 2017 to May 2021, post-mortem specimens from the 265 cases and 250 live suspected sepsis cases were collected from stillbirths and under-5 deaths from Faridpur and Rajbari districts Bangladesh. Among post-mortem cases and living suspected sepsis cases, 153/265 (58%) and 102/250 (41%) were positive for infectious agents respectively. Among these cases, yeast like fungi were detected from different under-5 age category 6/153 (4%) post-mortem cases and 8/102 (8%) suspected sepsis cases (Fig. 1).



**Fig. 1.** Distribution of age groups of cases with yeast-like fungi

## Diversity of yeast like fungi detected from under-5 population

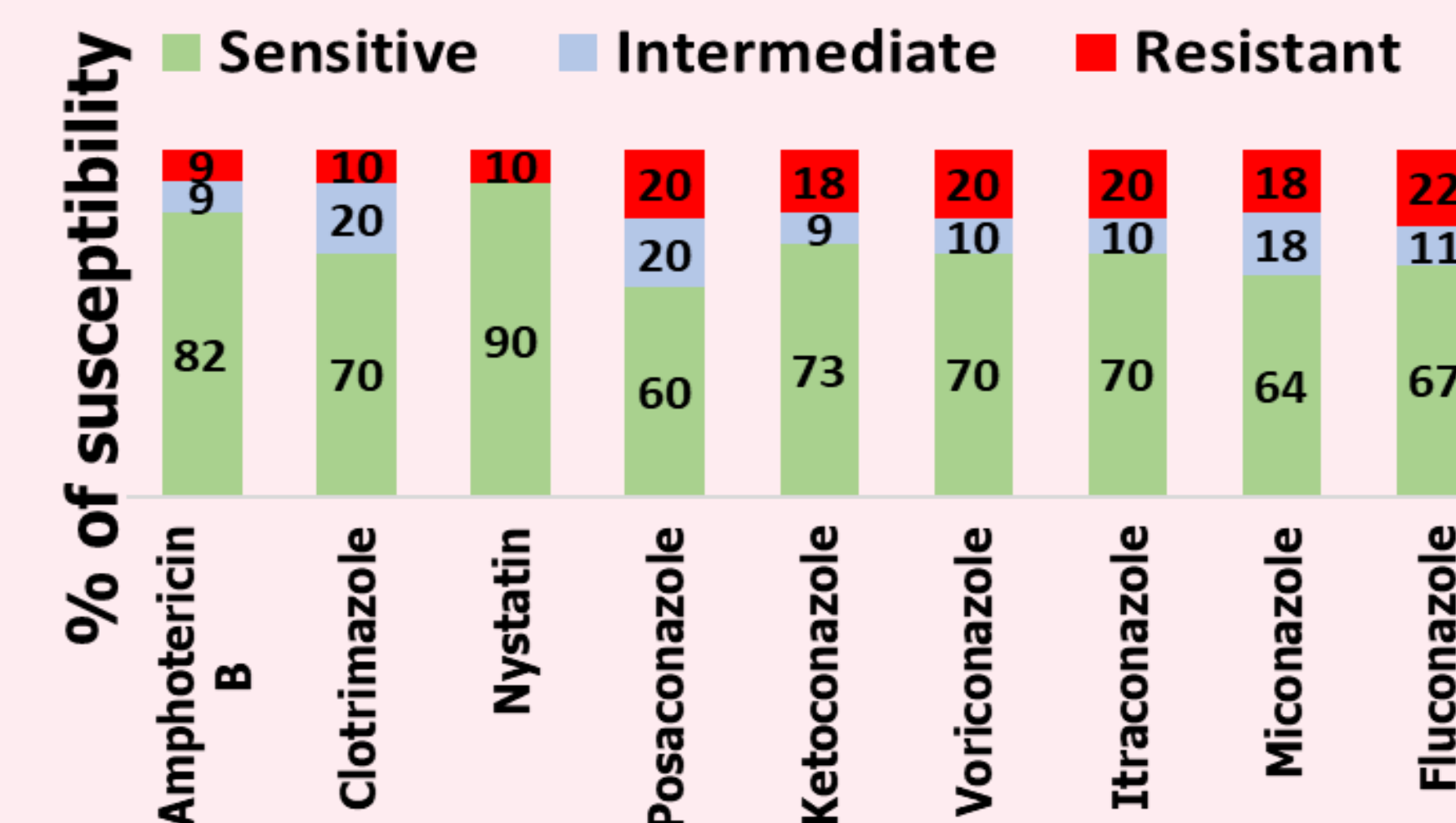
Different *Candida* spp and *Kodamea ohmeri* were detected from post-mortem and suspected sepsis cases (Fig. 2).



**Fig. 2.** Frequency of identified fungal isolates from post-mortem and suspected sepsis cases

## Antifungal susceptibility of isolated yeast like fungi

In total, 82% of the yeast fungal isolates were found to be susceptible to amphotericin B. ≥62% were susceptible to azole group antifungal agents. (Fig. 3). The *Candida duobushaemulonii* strain was resistant to all tested antifungal agents.



**Fig. 3.** Antifungal susceptibility of yeast like fungal isolates.

## Cause of Death

Among the post-mortem specimens, the panel identified *Candida albicans* as cause of death for one

case(16%). The organism was detected using PCR and immunohistochemistry (Fig. 4)



**Fig. 4.** Identification of *Candida albicans* by immunohistochemistry done from lung tissue.

## Source of Infection

Two (33% of 6) post-mortem case can be considered hospital mediated considering 72 hours of hospital stay before death. Remaining cases indicate possible vertical transmission or infection during delivery.

## Conclusion

Our data indicates that 4-8% child death/illness is caused by yeast like fungi in our study setting. Diverse species from genus *Candida* is associated with these cases. Susceptibility against amphotericin and azole group antifungals indicates scope for implementation of antifungal stewardship. Nationwide surveillance is necessary to understand the real scenario of neonatal fungal infection in Bangladesh.