

Antibiotic Resistance Genes Associated with ESBL and CRGNB in Breastmilk and Oral Swab Samples of Preterm Mother-Infant dyads

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INTRODUCTION

Misuse of antibiotics induces antimicrobial resistance (AMR), encoded by ARGs. Antibiotic-naive neonates have ARGs in their stool samples, raising the question whether these are acquired through breast milk. Preterm mother-infant dyads are frequently exposed to antibiotics increasing the risk of selecting out ARGs.

OBJECTIVES

To study preterm mother-infant dyads for the presence of ARGs associated with extended spectrum beta lactamases (ESBL) producing bacteria and carbapenem-resistant gram-negative bacilli (CRGNB) in breastmilk and neonatal oral swab samples.

MATERIAL AND METHODS

Study Type: Prospective cohort study

Subjects Screened: 130 Mother-Neonate dyads

Subjects Enrolled: 100 Mother-Neonate dyads

Gestation Age: >36 weeks, neonates feeding breastmilk

Samples: Breastmilk and oral swab samples were obtained aseptically from enrolled mothers and their neonates respectively.

DNA was isolated and multiplex I, II, III and VI PCR assays were run to detect 15 common ARGs for ESBL and CRGNB.

Positive and negative controls were run alongside

RESULTS

The percentages of ARGs in breast milk and oral swab samples of neonates are shown in Figure 1a and 1b. Figure 2a, 2b, 2c and 2d represents the gel electrophoresis image of the

confirmed β -lactamases and carbapenemases producing ARGs of multiplex I, II and III and VI. Some of the ARGs were found both in milk and oral swabs:

- blaTEM-2%
- blaSHV- 6%
- blaCTX-M1-11%
- CIT- 5%

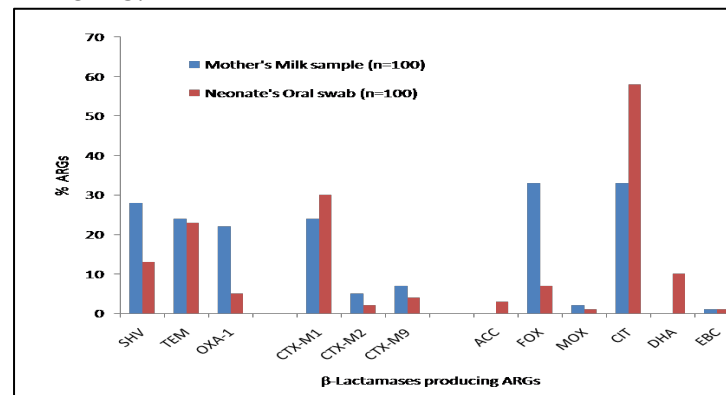


Figure 1(a): β -lactamase producing ARGs among mother milk samples and oral swab samples of neonates

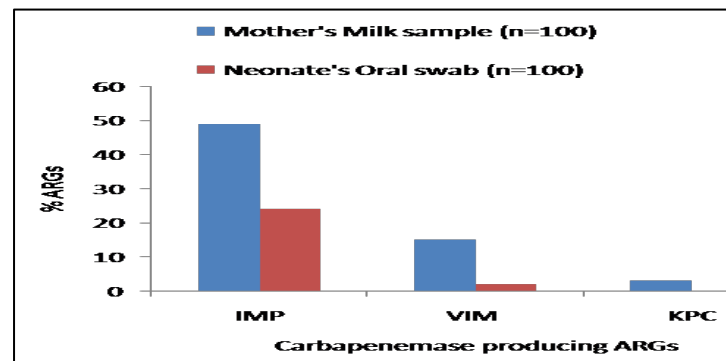


Figure 1(b): Carbapenemases producing ARGs among mother milk samples and oral swab samples of neonates

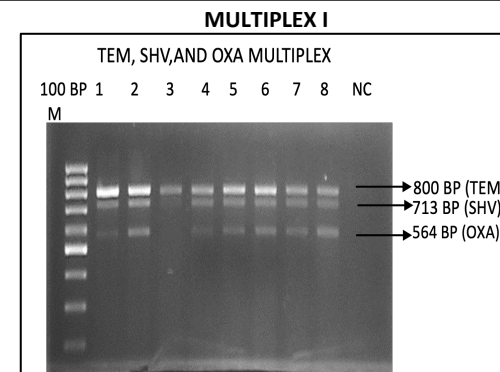


Fig 2(a): Lane M: Molecular marker, Lane 1-8 DNA samples, Lane NC: Negative control

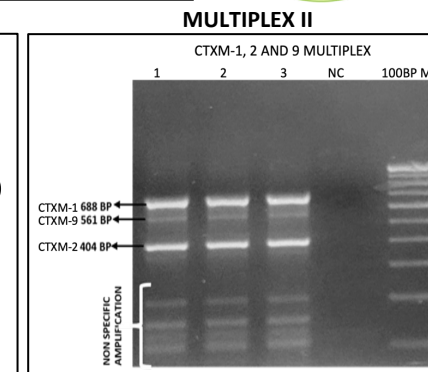


Fig 2(b): Lane M: Molecular marker, Lane 1-3 DNA samples, Lane NC: Negative control

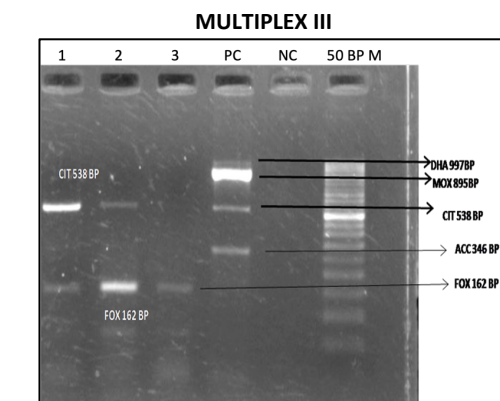


Fig 2(c): Lane M: Molecular marker, Lane 1-3 DNA samples, Lane NC: Negative control

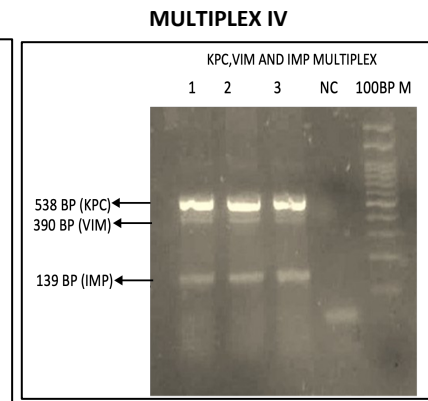


Fig 2(d): Lane M: Molecular marker, Lane 1-3 DNA samples, Lane NC: Negative control

CONCLUSION

There was a high prevalence of 15 common ARGs coding for ESBL and carbapenemases in preterm breastmilk and oral swab samples. Some neonatal oral swabs shared common ARGs with the breast milk of their mothers. ARGs are commonly found in mother's milk and neonatal oral cavity and ARGs may be transferred to the neonates through the breast milk.