1654. Chickenpox Outbreak in a Tribal District Rayagada, Odisha, India: Warrants Need for Vaccination

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Background. Chickenpox or varicella is caused by Varicella zoster virus. In India chickenpox outbreak is not uncommon as the vaccination against varicella is not included in the program. We report, chickenpox outbreak in a tribal district Rayagada, Odisha state of India a South Asian country. The outbreak investigation was undertaken to assess the characteristics and determinants of the outbreak and make appropriate recommendations for control and prevention of further transmission.

Methods. A door to door survey was made for case finding and line listing with detailed travel, exposure and vaccination history. Qualitative research tools including key informant's interview and focus group discussion were undertaken to understand community behavior and practice. Intravenous blood samples were collected for serological test to detect antibody to varicella-zoster virus.

Results. A total of 59 individuals out of 767 residents were affected with chickenpox in this outbreak with an attack rate of 8.73 per 100 populations. Age distribution indicated 69.5% belonged to the age group less than 14 years. No severe complication was reported. Blood sample of 33 case-patients was tested for Varicella zoster virus IgM antibodies and 24 (72.7%) found seropositive. The primary case was an 11-year-old girl who contracted infection in her residential school. None of the community members had received vaccination against chickenpox. Qualitative research indicated traditional beliefs and remedies prevailing in the communities that prevented case isolation and the modern treatment.

Conclusion. The study highlights the need for regular training of peripheral health workers for an effective awareness campaign to change beliefs and traditional practice and vaccination against Varicella zoster virus for prevention of such outbreaks.

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1655. Performance of Molecular and Serologic Tests for the Diagnosis of Scrub Typhus

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Background. Diagnosis of scrub typhus, caused by the bacterium *Orientia tsutsugamushi*, is challenging because of the overlap of its nonspecific symptoms with other infections coupled with the lack of sufficient data on the performance of diagnostic tests. Early diagnosis of scrub typhus is crucial to improve outcomes and this study evaluated the diagnostic performance of various tests.

Methods. Adult patients with acute febrile illness and manifestations suggestive of scrub typhus confirmed by positive PCR in the blood or eschar were characterized as cases. Patients with acute febrile illness and a confirmed alternate etiology such as culture-confirmed typhoid, smear/PCR positive for malaria, PCR/NS1 antigen positive for dengue, PCR positive for influenza, PCR/MAT positive for leptospirosis, PCR positive for spotted fever were characterized as controls with other infections. The healthy controls consisted of subjects from the same geographic region. We performed the following tests on blood samples for scrub typhus and calculated the sensitivity, specificity, positive predictive value, and negative predictive value: (1) Quantitative PCR using 47 kDa gene (qPCR); (2) Conventional PCR using 56kDa gene (cPCR); (3) Loop-mediated isothermal amplification assay (LAMP assay); (4) Immunofluorescence assay (IFA); (5) Enzyme-linked immunosorbent assay (ELISA); (6) Weil–Felix test (WF test); and (7) Immunochromatographic Rapid Diagnostic Test (RDT).

Results. Among the 302 participants, 152 had confirmed scrub typhus (cases) and 150 were controls. ELISA and RDT detecting IgM antibodies had excellent discriminative potential with sensitivities and specificities of 94%, 93% and 92%, 93%, respectively. False-positive IgM serology was observed with spotted fever and leptospirosis. The sensitivity and specificity of IFA were found to be 80% and 85%, respectively. qPCR exhibited excellent sensitivity (96%) and perfect specificity.

Conclusion. ELISA and RDT detecting IgM antibodies have excellent sensitivity and specificity while the sensitivity of IFA is suboptimal for the diagnosis of scrub typhus. Given its perfect specificity and superior sensitivity, qPCR is preferred for diagnostic confirmation in reference laboratories.

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1656. *Klebsiella pneumoniae* Antimicrobial Susceptibility to Carbapenems in Latin America Between 2000 and 2014

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Background. Antimicrobial resistance (AMR) to carbapenems in *Enterobacteriaceae* such as *Klebsiella pneumoniae* (KPN) is a major global public health concern. Infections caused by these pathogens are associated with high morbidity and mortality and perpetuated by limited safe alternative treatment options. This study aims to describe the antimicrobial susceptibility patterns amongst KPN to the carbapenems Latin America.

Methods. Surveillance laboratory data from 2000 to 2014 were obtained through the ReLAVRA network from 19 countries in Latin America. Longitudinal trends of mean percentage non-susceptibility for the region were conducted and evaluated with a significance level of $P < 0.05$.

Results. A total of 209,972 and 181,128 KPN isolates were reported from 2000 to 2014 for antibiotic susceptibility to imipenem and meropenem, respectively. From 2000 to 2014 an increasing trend was observed in the reported % KPN NS to imipenem ($P < 0.0001$) from 0.6% to 11.6% with an average annual percentage increase (AAPI) of 36.3% [95% CI: 39.8%–33%]. (Figure 1). Similarly, the % KPN NS to meropenem increased ($P < 0.0001$) from 0% in 2000 to 12.3% in 2014 with an AAPI of 49.5% [95% CI: 54%–44.6%] (Figure 2). For both antibiotics, the last 5 years of the timeframe (2010 to 2014) showed the highest rate of increase in NS. NS to carbapenems varied significantly between reporting countries, with the highest % KPN NS to imipenem and meropenem reported by Brazil, Guatemala, Nicaragua, and Peru.

Conclusion. The increase in KPN NS to carbapenems observed in Latin America threatens effective treatment of infections caused by this pathogen. The extremely limited treatment options could lead to further increases in morbidity and mortality. Strengthening health systems and core country capacity to identify and deal with these emerging high-risk pathogens and resistance mechanisms, through surveillance is vital to inform public health actions, control measures, mitigate outbreaks and support further development of Public health actions against AMR at country and regional level.

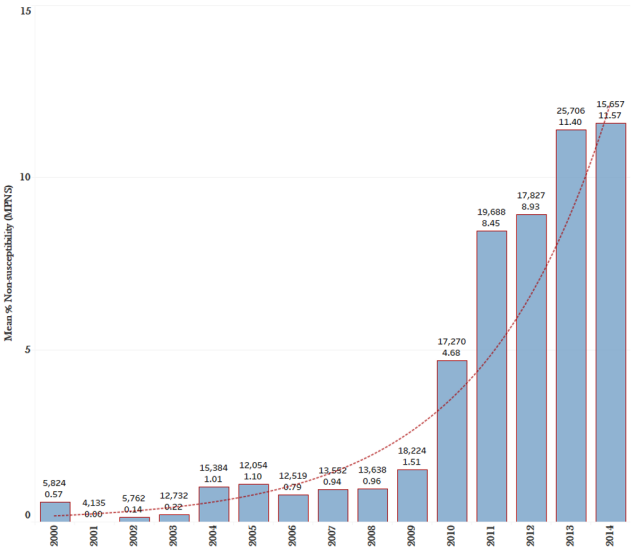

Figure 1. *K. pneumonia* mean percentage non-susceptibility (MPNS) to Imipenem, in Latin America

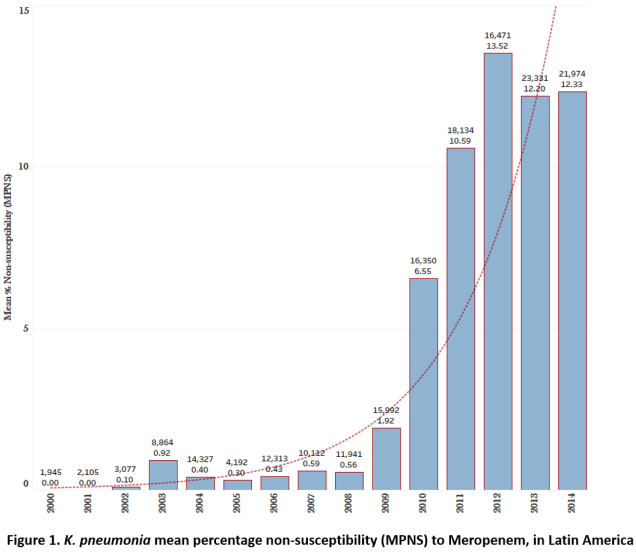

Figure 1. *K. pneumonia* mean percentage non-susceptibility (MPNS) to Meropenem, in Latin America

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1657. Notes From the Field: A Survey of Mobile Device Usage Among Individuals in KwaZulu-Natal, South Africa

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Background. mHealth (mobile health) is a promising tool to deliver healthcare interventions to underserved populations. Across low- and middle-income countries (LMIC), the prevalence of smartphones has risen to 42%. Effective mHealth deployment in LMIC requires an understanding of how LMIC populations use mobile technology. We characterized the use of mobile devices in rural KwaZulu-Natal, South Africa to tailor mHealth interventions for people living with HIV and at risk for acquiring HIV.

Methods. We surveyed participants in community settings and offered free HIV counseling and testing. Participants self-reported their gender, age, relationship status, living distance from preferred clinic, receipt of monthly grant, condomless sex frequency, and circumcision status (if male). Outcomes included cell phone and smartphone ownership, private data access, health information seeking, and willingness to receive healthcare messages. We performed multivariable logistic regression to assess the relationship between demographic factors and outcomes.

Results. Among 788 individuals surveyed, the median age was 28 (IQR 22–40) years, 75% were male, and 86% owned personal cell phones, of which 43% were smartphones. The majority (59%) reported having condomless sex and most (59%) males reported being circumcised. Although only 10% used the phone to seek health information, 93% of cell phone owners were willing to receive healthcare messages. Being young, female, and in a relationship were associated with cell phone ownership. Smartphone owners were more likely to be young and female, less likely to live 10–30 minutes from preferred clinic, and less likely to receive a monthly grant. Those reporting condomless sex or lack of circumcision were significantly less likely to have private data access.

Conclusion. Most participants were willing to receive healthcare messages via phone, indicating that mHealth interventions may be feasible in rural KwaZulu-Natal. Smartphone-based mHealth interventions specifically geared to prevent or support the care of HIV in young women in KwaZulu-Natal may be feasible. mHealth interventions encouraging condom use and medical male circumcision should consider the use of non-smartphone SMS and be attuned to mobile data limitations.

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1658. Lipase and Factor V (but not Viral Load) Are Prognostic Factors for the Evolution of Severe Yellow Fever Cases

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Background. Yellow Fever (YF) is still a major threat in developing countries and a cause of outbreaks in Africa and Latin America, despite a highly efficacious vaccine. In 2018, the Brazilian state of São Paulo witnessed a new YF outbreak in areas where the virus has not been detected before. In our study, we included all patients who were admitted to Intensive Care Units of Hospital das Clínicas, University of São Paulo Medical School during the 2018 YF outbreak. The aim is to describe the clinical and laboratorial characteristics of severe cases of YF, evaluate viral parameters such as viral load and genotype among these cases, and determine markers associated with fatal outcome.

Methods. Acute severe YF cases (n = 62) were admitted to the Intensive Care Unit of a reference hospital and submitted to routine laboratorial evaluation on admission. YFV-RNA was detected in serum and urine by RT–qPCR and then sequenced. Patients were classified in two groups: survival or death.

Results. In the univariate analysis the following variables were associated with outcome: ALT, AST, AST/ALT ratio, total bilirubin, CKD-EPI, ammonia, lipase, factor V, INR, lactate, and bicarbonate. Logistic regression model showed two independent variables associated with death: lipase (OR 1.018, 95% CI 1.007 to 1.030, P = 0.002), and factor V (OR –0.955, 95% CI 0.929 to 0.982, P = 0.001). The estimated lipase and factor V cut-off values that maximized sensitivity and specificity for death prediction were 147.5 U/L (AUC = 0.879), and 56.5% (AUC = 0.913). Patients who were discharged from the hospital continued to be followed-up in the outpatient clinic. Seven patients had their urine and blood screened weekly for YFV until the test was negative. After the onset of symptoms, viremia and virúria were present for a maximum period of 28 days and 47 days, respectively.

Conclusion. YF acute severe cases show a generalized involvement of different organs (liver, spleen, heart, kidneys, intestines, and pancreas), and different parameters were related to outcome. Factor V and lipase are independent variables associated with death, reinforcing the importance of hemorrhagic events due to fulminant liver failure and pointing to pancreatitis as a relevant event in the outcome of the disease.

Parameter	Survival (n = 21)	Death (n = 41)	*P* value
Age (years), median (IQR)	42 (27.5 - 48)	45 (35.5 - 58)	0.208
Gender, n (%) Male	16 (32%)	34(68%)	0.525
Female	5 (41.7%)	7 (58.3%)	
Days of symptoms *, median (IQR)	6 (4.5 - 7)	5 (4 - 7)	0.489
ALT (U/L), median (IQR)	2,694 (1,416 – 3,642)	5,009 (3,242 – 7,734)	**<0.0001**
AST (U/L), median (IQR)	3,384 (2,333 – 5,097)	11,350 (6752 – 15,820)	**<0.0001**
AST/ALT, median (IQR)	1.33 (1.16 - 1.7)	2.04 (1.67 - 2.77)	**<0.0001**
Total bilirubin (mg/dL), median (IQR)	3.38 (1.18 - 5.58)	5.85 (4.16 - 8.09)	**<0.0001**
CKD-EPI (mL min−1 1.73 m−2), median (IQR)	85 (65.5 - 114)	11 (6 - 25)	**<0.0001**
Ammonia (µmol/L), median (IQR)	53 (41.5 - 62.5)	90 (62.5 - 141.5)	**<0.0001**
Lipase (U/L), median (IQR)	66 (49 - 139.5)	531 (159 - 1560)	**<0.0001**
Factor V (%), median (IQR)	90 (62 - 121.5)	32 (11 - 42.5)	**<0.0001**
INR, median (IQR)	1.33 (1.15 - 1.51)	2.5 (1.97 - 3.51)	**<0.0001**
Lactate (mg/dL), median (IQR)	16 (11 - 21.5)	39 (24.5 - 61.75)	**<0.0001**
Bicarbonate (mmol/L), median (IQR)	20.7 (18.95 - 23.4)	14.7 (11.7 - 18.7)	**<0.0001**
Viral load (log10 copies/mL), median (IQR)	6.1 (5.47 - 7.05)	6.1 (5.53 - 7.22)	0.623

*Table 1. Demographic and clinical laboratory data for 62 patients with severe yellow fever, classified according to their outcome (survival or death). Univariate analysis. ALT, alanine aminotransferase; AST, aspartate transaminase; CKD-EPI, Chronic Kidney Disease Epidemiology Collaboration; INR, international normalized ratio; IQR, interquartile range; p<0.05 was considered significant. * days of symptoms up to day of hospitalization*