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Epidemiology and antibiotic resistance profile of bacterial meningitis in Morocco from 2015 to 2018

Youssef Ikken
National School of Public Health, Morocco

The most common causes of bacterial meningitis are Neisseria meningitidis, Streptococcus pneumoniae, and Haemophilus influenzae type b, and these are responsible for 75,000, 118,400, and 83,000 deaths worldwide, respectively and lead to severe neurological morbidity, despite advances in antimicrobial therapy. In our study, over a 4-year study period from 2015 to 2018, altogether 183 isolates of bacterial meningitis were collected from 12 hospitals covering the entire Moroccan territory. Neisseria meningitidis represented 58.5%, Streptococcus pneumoniae 35.5%, and Haemophilus influenzae type b 6%. H. influenzae type b mainly affected 5-year-olds and unvaccinated adults. N. meningitidis serogroup B represented 90.7% followed by serogroup W135 with 6.5%. Decreased susceptibility to penicillin G (DSPG) for all isolates accounted for 15.7%, with 11.6% being resistant to penicillin G (PG) and 4.1% decreased susceptibility. Cumulative results of all strains showed 2.7% decreased susceptibility to amoxicillin and 3.3% resistant, 2.2% of isolates were resistant to third-generation cephalosporin and 2.2% were decreased susceptible, 5.5% were resistant to chloramphenicol and 2.7% were resistant to rifampin. The frequency of DSPG observed in our study is more common in S. pneumoniae than in N. meningitidis ($P < 0.05$). The phenotypic profile of N. meningitidis DSPG or PG-resistant is associated with mutations in the penA gene responsible for this reduced susceptibility to PG, in our study, N. meningitidis DSPG isolates were associated with co-resistance with chloramphenicol and rifampin ($P < 0.05$) and resistance to third generation cephalosporin – C3G –(Cefotaxime and Ceftriaxone) and amoxicillin ($P < 0.001$). These isolates have been found to be highly susceptible to antibiotics used for treatment and prophylaxis chemotherapy and the observed resistance remains rare. The impact of introduction of conjugate vaccines against H. influenzae type b and S. pneumoniae (PCVs) is an advantage in reducing meningitis cases due to these two species.

Recent Publications:

Youssef Ikken, Amina Benaouda, Latifa Ibn Yaich , Farida Hilali, Yassine Sekhsokh, Réda Charof. "Simultaneous detection of Neisseria meningitidis, Streptococcus pneumoniae and Haemophilus influenzae by quantitative PCR from CSF samples with negative culture in **Morocco"**, Acta Microbiologica et Immunologica Hungarica AMicr (2021), (manuscript number: 1344), Accepted on January 9, 2021.

Youssef Ikken, Réda Charof, Amina Benaouda, Farida Hilali, Sanae Akkaoui, Mostafa Elouennass, and Yassine Sekhsokh. "Epidemiology and antibiotic resistance profile of bacterial meningitis in Morocco from 2015 to 2018", Acta Microbiologica et Immunologica Hungarica AMicr (2020), https://doi.org/10.1556/030.2020.01222

Soumaya Chaiboub , Hassan Berny, Bouchra Razzouk, Zakaria Mennane, Aicha Qasmaou,Karima Hallout, Youssef Ikken, Reda Charof. "Serotypes and Antibiotic Susceptibility of Streptococcus pneumoniae Isolates from Invasive Pneumococcal Disease in Morocco (Meningitis Cases)".Der Pharma Chemica, 2017, 9(22):38-41. https://www.derpharmachemica.com/search-results.php?keyword=meningitis+

Oumzil H, Ikken Y, Belbacha I, et al, P11.24, "Landscape of hsv2 and hiv infections among msms in morocco: results from a respondent driven sampling survey", Sexually Transmitted Infections 2015; 91:A182. http://dx.doi.org/10.1136/sextrans-2015-052270.472

Biography:

YOUSSEF IKKEN is PhD Student-Researcher at Faculty of Medicine and Pharmacy of Rabat-Morocco. He has a Master in Medical Biotechnology from Faculty of Medicine and Pharmacy, Master in Quality Management, Occupational safety and health, Environment from Faculty of Science and Technology of Settat and in preparation from the master of Public health epidemiology (FETP) from National School of Public Health. He is holder of a patent in the field of microbiology.

Member of the staff of the National Institute of Hygiene – Rabat - Ministry of Health, Member of the staff of the department of health at Skhirate-Temara prefecture, Member of Covid-19 Rapid Prefectural intervention Team, External Consultant of the European Center for Disease Prevention and Control (ECDC), Laboratory supervisor and auditor, Trainer of health personnel in biotechnology- microbiology- epidemiology and health programs.

ikkenyoussef@gmail.com