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Geospatial analysis and identification of space-time clusters of MDR-TB in South Africa, 2006-2012

M. Mudau [1,*], S. Machingaidze [2], N. Ismail [2], A. Nanoo [1], C. Ihekweazu [1]

[1] National Institute for Communicable Diseases, Johannesburg, South Africa
[2] National Institute of Communicable Diseases, Johannesburg, South Africa

Background: The utility of Geographic Information Systems (GIS) as tools for disease surveillance and health service allocation is increasingly recognized within the public health community worldwide. GISs have been previously used to study the geographic distribution of TB and to detect clusters in high TB prevalence settings. In South Africa, similar analyses have been done in limited geographic areas, but never on a national scale. Historical data on the burden of TB across the districts and provinces of South Africa has recently become available. We describe the geographical distribution of MDR-TB in South Africa and identify hotspots using GIS.

Methods & Materials: Data on all positive TB test results between 2006 and 2012 were obtained from the corporate data warehouse of the South African National Health Laboratory Service (NHLS). The data were deduplicated and cleaned, and MDR-TB rates calculated. Rates were visualised at district-level on chlorpleth maps. Moran's I statistic was used to determine whether the pattern of distribution of TB prevalence was random, dispersed or clustered across districts of South Africa. The Getis-Ord (Gi*) statistic was used to identify and map hotspots. All analysis were conducted using ArcGIS version 10.1 (ESRI, Redlands, California).

Results: Between 2006 and 2012, 94 844 new cases of MDR-TB were diagnosed nationally. This translates to 3% of all pulmonary TB cases diagnosed during that period. There was spatial heterogeneity in MDR-TB rates, with a statistically significant trend of increase. Districts in KwaZulu-Natal (KZN), Northern Cape (NC) and Western Cape (WP) had relatively high MDR-TB rates. There was statistically significant spatial clustering of MDR-TB rates throughout the study period (Moran's I > 1, p < 0.001). Hotspots were identified mainly in KZN, NC and WP between 2006 and 2009 and started emerging in Eastern cape in 2010.

Conclusion: Our results show that the burden of MDR-TB increased significantly between 2006 and 2012. There were high levels of spatial heterogeneity and clustering in the rates, highlighting differences in performance of provincial and district TB control programs. Persistent hotspots (districts with exceptionally high MDR-TB rates) were identified in three provinces. Further analysis is needed to identify the drivers of MDR-TB in these areas.

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Effect of nutritional counseling on LDL cholesterol among Thai HIV-infected adults

S. Chotivichien [1,*], R. Detels [2], L. Arab [2], W. Prasithsirikul [3], W. Manosuthi [3], S. Sinawat [4]

[1] Ministry of Public Health, Nonthaburi, Thailand
[2] University of California Los Angeles, Los Angeles, USA
[3] Bamrasnaradura Infectious Diseases Institute, Nonthaburi, Thailand
[4] Bureau of Technical Advisors, Nonthaburi, Thailand

Background: HIV-infected patients receiving antiretroviral therapy are increased risk of metabolic syndrome, including dyslipidemia. In this study, we determined whether individual nutritional counseling reduced dyslipidemia, particularly low-density lipoprotein (LDL) cholesterol, among HIV-infected patients with dyslipidemia not currently taking lipid lowering medication.

Methods & Materials: We conducted a randomized, 24-week study in HIV-infected patients with dyslipidemia who were on antiretroviral therapy and were eligible to initiate therapeutic lifestyle changes (TLC) according to National Cholesterol Education Program. Participants were randomly assigned into two groups. The intervention group received individual counseling with a nutritionist for 7 sessions (baseline, week 2, 4, 8, 12, 18 and 24) whereas the control group received nutritional counseling only at week 24. A 24-hr recall technique was used to assess dietary intake for both groups at baseline and at week 24. Lipid profile (total cholesterol, LDL, HDL and triglyceride) was measured at baseline and after 12 weeks and 24 weeks of therapy.

Results: Seventy-two patients were randomly assigned and 62 (86%) participants completed their lipid profile test. After 12 weeks of follow-up, significant changes in total cholesterol (-14.4 +/- 4.6 mg/dL, $P = 0.002$), LDL cholesterol (-13.7 +/- 4.1 mg/dL, $P = 0.001$) and triglyceride (-30.4 +/- 13.8 mg/dL, $P = 0.03$) were observed in the intervention group. A significant reduction in LDL cholesterol was also observed in the control group (-7.7 +/- 3.8 mg/dL, $P = 0.04$). However, there were no significant differences in change of mean lipid levels between groups at 12 weeks of follow up. After 24 weeks, compared with the control group, participants randomly assigned in the intervention group demonstrated significant greater decreases in serum total cholesterol (-19.0 +/- 4.6 vs 0.2 +/- 4.3 mg/dL, $P = 0.003$) and LDL cholesterol (-21.5 +/- 4.1 vs -6.8 +/- 3.8 mg/dL, $P = 0.009$). There were no significant changes in HDL cholesterol or triglyceride level in either group.

Conclusion: The study demonstrated that individual nutritional counseling for 24 weeks significantly improved dyslipidemia, particularly serum total cholesterol and LDL cholesterol among HIV-infected patients with dyslipidemia receiving antiretroviral therapy without lipid lowering medication use.

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