Journal of Clinical Lipidology (2014) 8, 77–85

Journal of Clinical Lipidology

Lipid abnormalities in foreign-born and US-born patients in a medical group

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KEYWORDS:
Dyslipidemia;
Foreign-born;
Total cholesterol;
Low-density lipoprotein cholesterol;
High-density lipoprotein cholesterol;
Triglycerides

BACKGROUND: With an increasing foreign-born population in the United States, cardiovascular risk reduction through effective lipid treatment strategy is precluded by limited lipid profile information.

OBJECTIVE: This study compares the patterns of lipid abnormalities of foreign-born and US-born patients treated by a single medical group.

METHODS: We conducted a medical record review of 53,361 US-born and 6430 foreign-born patients in 2010.

RESULTS: Compared with US-born, a higher proportion of foreign-born patients are younger than 40 years (26% vs 14%), receive Medicaid (24% vs 8%), and are less likely to be obese (26% vs 43%). More foreign-born patients have diabetes (25% vs 22%), are poor (4.7% vs 3.6%), and not on lipid-lowering drugs (63% vs 56%). Place of birth is not associated with total cholesterol levels. Adjusted for social and demographic characteristics, however, foreign-born are more likely than US-born to have elevated low-density lipoprotein cholesterol (adjusted difference, 2.1; 95% CI, 0.6–3.7), depressed high-density lipoprotein cholesterol (adjusted difference, 6.1; 95% CI, 4.4–7.8), and elevated triglycerides (adjusted difference, 2.4; 95% CI, 0.8–4.1). Foreign-born patients, on lipid-lowering medications, are more likely to still have elevated levels of low-density lipoprotein cholesterol (adjusted difference, 3.5; 95% CI, 1.4–5.6).

CONCLUSION: Despite having a similar distribution of total cholesterol as their US-born counterparts, the other lipid fractions among foreign-born patients are more likely to be pathologic. Therefore, dyslipidemia screening tests need to include the lipid subfractions. The higher prevalence of dyslipidemias, both among foreign-born patients with and without lipid-lowering medications, challenges medical groups to intensify effective lipid treatment strategies.

Nearly 13% of the 2010 US population was born in another country.[1] Although foreign-born residents are usually healthy when they arrive, their health advantages decline over time, partly because of the deteriorating socioeconomic status that tends to come with longer US residency.[1] In 2010, more foreign-born persons lived in poverty than US-born natives (23% vs 13.5%), and 34.1% of the foreign-born lacked health insurance.[2] The length of US residency contributes to the development of unfavorable risk factors in foreign-born persons. For example, foreign-born tend to have higher body mass index (BMI; calculated as weight divided by height squared; kg/m^2)

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Submitted July 11, 2013. Accepted for publication October 29, 2013.

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http://dx.doi.org/10.1016/j.jacl.2013.10.007

and higher atherosclerotic risk (ie, 2% increase in intima media thickness) if they have lived in the United States for >10 years.[3,4]

The role of hyperlipidemia in the pathogenesis of atherosclerosis underscores the need for intensive lipid management, especially in a high-risk population such as the foreign-born, to reduce cardiovascular mortality. However, complete lipid profile information among foreign-born persons is lacking despite higher cardiovascular risk. Compared with race, country of origin is infrequently studied in cardiovascular disease research. Perhaps because collection of these data is not federally mandated or minority status is often used as exclusion criteria.[5]

Because the foreign-born are a fast-growing, vulnerable population that acquires unfavorable cardiovascular risk and socioeconomic profiles over time, it is crucial to identify their lipid abnormalities. We wanted to define the prevalence of lipid abnormalities in the foreign-born and compare them with lipid abnormalities of our US-born patients. Characterizing the burden of dyslipidemia in foreign-born persons creates an opportunity to target efforts to improve and intensify the implementation of culturally sensitive cardiovascular risk-reduction programs.

Methods

Patient selection

This is a single-site study with data collected retrospectively from January to December 2010. The HealthPartners Institutional Review Board approved the study. We analyzed the data obtained from electronic health record (EHR) of patients who were treated at one of the HealthPartners Medical Group clinics. We use the term *patients* instead of *subjects* because all persons whose data are included in the analysis were treated by a physician. We included patients who were at least 20 years old, had a complete lipid panel (low-density lipoprotein cholesterol [LDL-C], high-density lipoprotein cholesterol [HDL-C], total cholesterol, and triglycerides) collected as an outpatient and, with the exception of Hmong- and Spanish-speaking persons, country of origin information (Fig. 1). We assumed that Hmong-speaking patients came from Southeast Asia and that Spanish-speaking patients came from Latin America.

Characterizing country of birth and grouping of countries

We divided the patients into 2 main groups: US-born and foreign-born. We defined foreign-born as people who were born outside the United States but residing in the United States regardless of their legal immigration status. With the exception of Spanish- and Hmong-speaking patients, we included only patients with country of origin documented in the EHR. Following the United Nations Millennium Developmental Goals geographic divisions, we grouped the 24 countries represented by our patients into the following categories: Africa (Cameroon, Eritrea, Ethiopia, Kenya, Liberia, Nigeria, Somalia, South Africa, and Egypt), Eastern Asia (China and Korea), Southern Asia (India, Nepal, and Pakistan), Southeastern Asia (Cambodia, Laos, Philippines, Thailand, and Vietnam), Latin America (Mexico and El Salvador), Europe (Russia, Bosnia, and Herzegovina), and Canada. The list of countries in this analysis is limited by the origins of the study population.

Lipid classification and classification of covariates

We classified the lipid components as abnormal if the total cholesterol was ≥200 mg/dL, LDL-C was ≥130 mg/dL, HDL-C was ≤39 mg/dL (men) or ≤49 mg/dL (women), or triglycerides were ≥150 mg/dL. We classified patients as diabetic if they were taking diabetic medications or had a diagnosis of diabetes mellitus (*International Classification of Diseases, Ninth Revision, Clinical Modification* [ICD-9-CM] codes, 250.00–250.93). We classified patients as hypertensive if their systolic blood pressure was ≥130 mm Hg or the diastolic blood pressure was ≥85 mm Hg or they were taking medication for hypertension. Patients were classified as having cardiovascular disease (CVD) if they had one or more of the following ICD-9-CM codes: 410 to 414, 425, and 428 to 438. We used insurance claims, lists of prescribed medications, and medication reconciliation lists to determine the medications that the patients were taking. We collapsed age into 3 groups (≥20–39, 40–64, and ≥65 years). We classified the patients' race and ethnicity as white, black, Asian, Hispanic, mixed, or other race. We used the percentage of households below the poverty level in the patient's geographic code of residence to define their economic status. Poverty thresholds vary according to size of the family and ages of the members to determine poverty status.

Statistical analyses

We used frequency distributions, percentages, and means to describe the differences in sociodemographic characteristics, CVD risk factors, and lipid abnormalities between foreign-born and US-born patients. We tested the significance of the differences with χ^2 and t tests. We used general linear models to adjust for differences in age, sex, race, smoking, type of health care insurance, BMI, poverty, use of lipid-lowering drugs, CVD, hypertension, and diabetes. We were able to use general linear models because prevalence rates are at the center of the distribution space. In addition, we obtained adjusted abnormalities stratified by the use of lipid-lowering drugs. We used similar modeling to describe the prevalence of lipid abnormalities within the various foreign-born subgroups. We considered associations with a P value $< .05$ to be statistically significant.