Methods, providing the first opportunity to assess childhood cardiovascular (CVD) risk profiling in a setting where malignant ventricular arrhythmias leading to sudden cardiac death (SCD) in chagasic patients. The Pune Children’s Study—tracking of cardiovascular risk factors from childhood to young adulthood— the Pune Children’s Study

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To target preventive measures appropriately in early life, it is important to know what childhood cardiovascular (CVD) risk profiles mean in terms of predicting adult risk. Studies from high-income countries have reported tracking of individual risk factors from childhood to adulthood [1–7]; there are no reports of child–adult tracking in low- and middle-income countries (LMICs). The Pune Children’s Study is a cohort of 477 individuals born in the KEM Hospital, Pune, India in 1987–1989. We measured a range of CVD risk factors at 8 [8] (1996–7) and 21 (2009–11) years of age, using similar methods, providing the first opportunity to assess child–adult tracking in a LMIC. Ethical permission was obtained from the KEM Hospital Ethics Committee and informed consent was obtained from all the participants.

Weight was measured to the nearest 5 g, and height and waist circumference to the nearest 0.1 cm. Biceps, triceps, subscapular and suprailliac skinfolds were measured to the nearest 0.2 mm using calipers. Blood pressure was measured supine using a digital monitor; the average of two readings made 5 min apart was used for analysis. Fasting venous blood was drawn for plasma lipid, glucose, insulin and leptin measurements. An oral glucose tolerance test was performed giving 1.75 g/kg (8 years) and 75 g (21 years) anhydrous glucose in water, followed by a 120-minute blood sample (WHO protocol). Plasma glucose, cholesterol, HDL-cholesterol, and triglyceride concentrations were measured using standard enzymatic methods. Plasma insulin and leptin were measured using an immunoenzymometric assay and RIA respectively at 8 years, and a Delfia technique and ELISA at 21 years. Insulin resistance (HOMA-IR) was calculated at both ages using the online Oxford model (http://www.dtu.ox.ac.uk). Overweight was defined as BMI ≥ 25 kg/m² and < 30 kg/m², obesity as BMI ≥ 30 kg/m² (WHO criteria) and central obesity as waist circumference ≥ 90 cm in men and ≥ 80 cm in women (IDF criteria). Hypertension was defined as systolic blood pressure ≥ 130 mm Hg or diastolic blood pressure ≥ 85 mm Hg (IDF criteria). Impaired fasting glucose (IFG) was defined as fasting glucose ≥ 100 mg/dl and < 126 mg/dl, impaired glucose tolerance (IGT) as 120-minute glucose ≥ 140 mg/dl and <200 mg/dl, and diabetes mellitus (DM) as fasting glucose ≥ 126 mg/dl or 120-minute plasma glucose ≥ 200 mg/dl (ADA criteria). Hypercholesterolaemia was defined as total cholesterol ≥ 200 mg/dl (NCEP criteria), hypertriglyceridaemia as triglycerides ≥ 150 mg/dl, and low HDL-cholesterol as HDL-cholesterol < 40 mg/dl for men and < 50 mg/dl for women (IDF criteria).

Tracking of cardiovascular risk factors from childhood to young adulthood — the Pune Children’s Study☆

A R T I C L E   I N F O

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BMI: body mass index; BP: blood pressure.

Table 2

| Upper fourth risk category at 8 years | Disease outcome at 21 years | Positive predictive value | Negative predictive value | Sensitivity | Specificity |
|--------------------------------------|-----------------------------|---------------------------|---------------------------|-------------|-------------|
| BMI                                  | Overweight/Obesity          | 42%                       | 85%                       | 48%         | 82%         |
| Waist circumference                  | Central obesity             | 43%                       | 82%                       | 44%         | 81%         |
| Systolic BP                          | Hypertension                | 8%                        | 96%                       | 43%         | 76%         |
| Diastolic BP                         | Hypertension                | 8%                        | 96%                       | 43%         | 76%         |
| Cholesterol                          | Hypercholesterolaemia       | 17%                       | 98%                       | 75%         | 78%         |
| Triglycerides                        | Hypertriglyceridaemia       | 14%                       | 94%                       | 50%         | 76%         |
| HDL-cholesterol                      | Low HDL                     | 73%                       | 32%                       | 26%         | 78%         |
| Fasting glucose                      | Hyperglycaemia              | 26%                       | 83%                       | 33%         | 77%         |

BMI: body mass index; BP: blood pressure.
Rheumatic heart disease in modern urban America: A cohort study of immigrant and indigenous patients in Chicago

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It is widely reported that the natural history of rheumatic heart disease (RHD) is more aggressive in developing countries, manifesting symptoms and requiring interventions at a younger age than in industrialized nations [1–5]. As the demographics in urban America shift with growing immigrant minorities from Latin America and other developing countries, it is possible that the demographics and natural history of RHD in the U.S. are changing as well. We compared the natural history and disease burden between immigrant and indigenous patients in Chicago.

A retrospective cohort study design was implemented. In a query of electronic health records, we identified 1257 adult patients with clinical or echocardiographic documentation of rheumatic valvular heart disease, heart valve prosthesis, or valvular intervention in the period between January 1, 2005 and December 31, 2011. A detailed chart review excluded 1153 subjects with valvular surgeries for indications other than RHD. Review of echocardiographic images of the remaining 104 patients excluded 13 patients for lacking diagnostic rheumatic valvular deformity [6]. One patient was lost to follow-up. In the 90 remaining subjects, the latest echocardiographic examination on records and the last one prior to valvular intervention (if different) were reviewed to determine the presence and severity of stenotic and regurgitant valvular lesions [7,8]. The pulmonary arterial systolic pressure was calculated [9].

Among the 90 subjects included in the study 33 (37%) were immigrants, raised and acquired the disease outside the U.S. and 57 (63%) were indigenous raised and acquired RHD in the U.S. Women comprised 79% of both groups. All immigrant patients migrated from developing countries [Latin America (16); East Asia (7); South Asia (3); Sub-Saharan Africa (3); Middle East (2); East Europe (2)]. African Americans comprised 98% of the indigenous group, which is significantly greater than their proportion in the general echocardiography laboratory population (81%) [odds-ratio = 131.95, confidence interval (CI) = 1.8–95.5, P < 0.001].

The study cohort was followed for a mean of 10 ± 8 years (900 patient-years). During follow-up, immigrants had higher event rate of the primary endpoint of valvular intervention [22 (67%) vs. 25 (44%), hazard-ratio = 3.0 (CI = 1.6–5.5); P < 0.001] and had their first intervention at younger age, by an average of 11 years. Similarly, immigrants had a higher rate of the secondary endpoint of symptomatic onset of RHD [28 (85%) vs. 35 (61%), hazard-ratio = 2.9 (CI = 1.7–4.8); P < 0.001] and had their symptom onset at younger age, by an average of 13 years (Fig. 1, Table 1). By age 40 years, immigrants were more likely to be diagnosed with RHD (33% vs. 14%, P = 0.03), have symptom onset (33% vs. 9%, P = 0.008), and undergo valvular interventions (33% vs. 7%, P = 0.02). Immigrants were more likely to present with atrial fibrillation as a first manifestation of the disease (Table 1).

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