

Cardiovascular risk scores in young adults with perinatally acquired HIV infection

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Background

- Adults infected with HIV have a 1.5 risk of cardiovascular disease (CVD) compared to uninfected controls and are actively managed to address CVD risk factors.
- BHIVA guidelines recommend monitoring lipids and CVD risk using the Framingham Risk Score (FRS) assessing 10 yr risk of coronary heart disease (CHD).
- The FRS is validated for ages 30 to 74 in Caucasian populations.
- Perinatally infected adolescents (PaHIV) have increased rates of dyslipidaemia and endothelial dysfunction, with frequent exposure to PIs and/or Abacavir (ABC) that is often intermittent, throughout cardiovascular development.
- Currently there is no validated tool assessing CVD risk in this population. We explore the FRS and DAD risk score in our transition cohort.

Methods

- Demographic data included age, gender, most recent non-fasting cholesterol differential, blood pressure (BP), diabetes and smoking status.(Table 1). Using this we and calculated FRS 10 year CVD risk.(Table2)
- DAD 5 year risk score of CHD was calculated using additional data (time on indinavir/lopinavir and current use of ABC). (Table 3)
- BMI, ethnicity, doctor diagnosed lipodystrophy (dLD), HIV viral load (VL), CD4 count and nadir, hepatitis B and C co-infection were recorded and compared with DAD and FRS score to test for statistically significant correlation. (Table 4)
- Statistics: Chi-squared, Mann-Whitney, Kruskal-Wallis and Kendall's correlation were used.
- VL was omitted from correlation with DAD risk due to confounding.

Results

- 81 PaHIV young adults were included; median age 20 (IQR 18, 22); 64 (79%) Black African; 44 (54%) female; 18 (22%) ever smoked; 31 (38%) are on a PI and 13 (16%) on ABC. (Tables 1 and 4)
- Median results: BMI 22.6 (IQR 20.7, 24.6); systolic BP 118.5 (IQR 110.5, 127.8); total cholesterol 4.0 (IQR 3.4, 4.7); HDL 1.2 (IQR 1.0,1.5); non-HDL 2.9 (IQR 2.2, 3.3), 6 (7.4%) had LDL>95th centile (3.3mmol/L). (Tables 1 and 4)
- The median DAD score (N=76) was 0.57% (IQR 0.34, 0.82) and FRS (N=74) varied from 1 to 4%, 50 had 1% risk; 24 above 1%. (Table 2 and 3)
- Factors not included in the calculation were compared to the FRS or DAD score.
 - dLD was associated with a higher mean rank DAD score (p=0.035) (Table 4)
 - CD4 nadir was negatively correlated with increasing DAD (-.204, p=0.004). (Figure 1)
 - There were no significant associations with the FRS > 1.

Conclusions

- CVD scores, not validated for young adults, produce very low risk projections.
- Extrapolation from adult studies suggest that PaHIV infected adults may have a particularly high CVD risk but established tools are inadequate to estimate risk.
- Alternative methods are urgently required such as imaging and other inflammatory markers- currently under investigation.

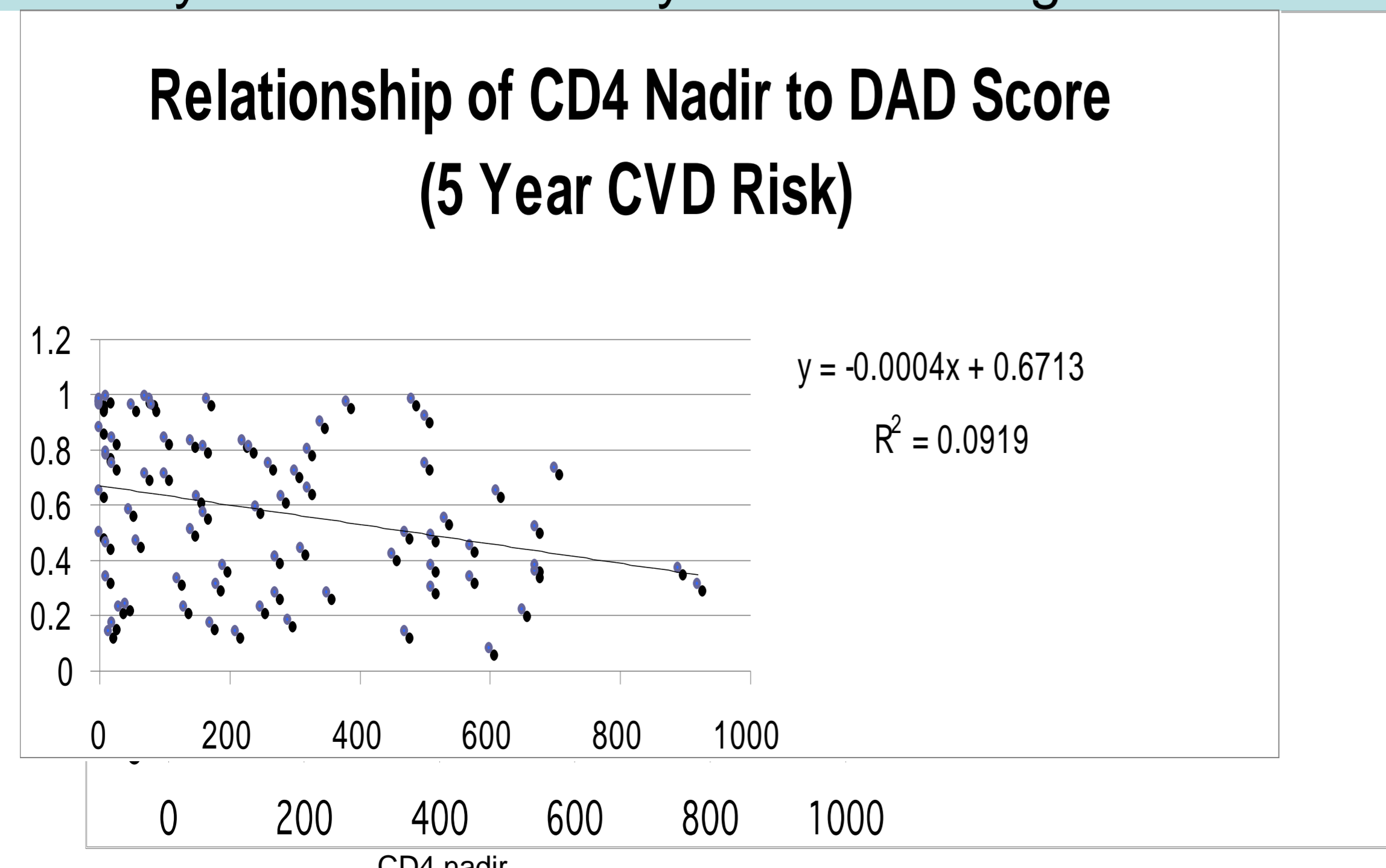


Figure 1: Relationship between CD4 nadir and DAD score

N=81	
Age (years) Median(IQR)	20(18,22)
Sex female N (%)	44 (54.3%)
Height (cm) N=60 median (IQR)	169 (161,174)
Weight (Kg) N=81 median (IQR)	63.9 (55.1,70.7)
Systolic BP (mmHg) N=79 median(IQR)	118 (110.5,127.8)
Smoking	
•Current smoker	13 (16.0%)
•Ex-smoker	5 (6.2%)
•Never smoked	59 (72.8%)
Cholesterols -median (IQR)	
•Total cholesterol (N=80)	3.99 (3.36,4.68)
•High density lipoprotein (N=80)	1.17 (1.03,1.47)
•Triglyceride (N=80)	0.98 (0.78,1.28)
•Non-HDL cholesterol (N=78)	2.85 (2.22,3.26)
•Low density lipoprotein L (N=78)	2.34 (1.77,2.73)

Table 1: Demographic data of cohort used to determine FRS score

FRS 10yr CVD risk (%)	N (%)
1	50 (61.7)
2	14 (17.3)
3	6 (7.4)
4	4 (4.9)

Table 2: Calculated Framingham risk scores

N=76	Median (IQR)
DAD 5 yr CVD risk score	0.572 (0.343, 0.822)

Table 3: Calculated DAD scores

Total N=81		FRS=1	FRS>1	P-value	Test	DAD correlation coefficient	P-value	Test
Race N(%)				0.544	Chi-squared		0.511	Kruskal-Wallis test
•Black African	64 (79%)	40 (65.6)	21(34.4)					
•Caucasian	4 (4.9%)	2 (66.7)	1 (33.3)					
•Mixed Race	5 (6.2%)	3 (75.0)	1 (25.0)					
•Other	5 (6.2%)	4 (100)	0 (0)					
BMI N=60 median (IQR)	22.57 (20.71,24.62)	N=35 38.35	N=22 26.00	0.279 (Exact 2-tailed)	ManW	-0.056	0.534	Kendall's tau b
Hep B co-infection N(%)	3(3.7%)	2 (66.7)	1 (33.3)	1.00	Chi-squared		0.344	Kruskal-Wallis test
Hep C co-infection N(%)	1(1.2%)							
Glucose (mmol/L) median (IQR)	4.6 (4.38, 5.2)	N=50 38.35	N=24 35.73	0.623 (2-tailed)	ManW			
Doctor diagnosed lipodystrophy N(%)	10 (12.3%)	5 (50)	5 (50)	0.175	Chi-squared		0.025	Kruskal-Wallis Test
Viral load (copies/ml) median (IQR)	50 (50,3450)	N=50 37.96	N=23 34.91	0.515 (Exact 2 sided)	ManW			
CD4 count (cell/ml) median (IQR)	480 (290,690)	N=50 38.26	N=24 35.92	0.940 (Exact 2 sided)	ManW	-0.031	0.696	Kendall's tau b
CD4% median (IQR)	27.5 (17.3,34.0)	N=50 38.26	N=24 35.92	0.661 (2 sided)	ManW			
CD4 Nadir (cells/ml)	210 (47,480)	N=50 37.01	N=24 38.52	0.777 (exact 2 sided)	ManW	-0.218	0.006	Kendall's tau b
Treatment								
•On PI N(%)	31 (38.3)	32 (71.1)	13 (28.9)	0.417	Chi-squ			
•On ABC N(%)	13 (16.0%)	7(58.3)	5 (41.7)	0.455	Chi-squ			
•No. of years on kaletra median(IQR)	0.0 (0.0, 2.0)	N=50 34.79	N=24 43.15	0.081 (2-tailed)	ManW			

Table 4: Data used to calculated DAD score plus additional data statistically compared to FRS and DAD scores