

Background

- Cardiovascular disease (CVD) is the leading cause of death and disability in the US and globally.¹
- African-Americans bear a disproportionate burden of CVD risk factors¹
 - ❖ 43% of Black men and 47% of Black women have hypertension
 - ❖ African-Americans 2X as likely to have diabetes as Whites
 - ❖ 69% of Black men and 80% of Black women are overweight/obese
- Blacks are not monolithic- African-Americans, African-Caribbeans and African immigrants²

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Background

- Gaps in knowledge on CVD risk African immigrants in the US
- The number of African immigrants grew 40X between 1960-2007, from 35,355 to 1.4 million and 1/3 born in West Africa (Ghana/Nigeria)¹
- African immigrants may be at high CVD risk prior to migration²
 - ❖ HTN prevalence in Ghana -19% to 55%
 - ❖ HTN prevalence in Nigeria- 21% to 37%
 - ❖ Diabetes prevalence in Ghana- 0.2%(1963) to 6.3%(2002)
 - ❖ Diabetes prevalence in Nigeria-1.7%(1985) to 6.8%(2003)

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Acculturation

- Acculturation explains the process of cultural change and psychological change that results following meeting between cultures¹
- Unidimensional² vs. Bidimensional³ model

Berry's³ Bidimensional acculturation model

	Host dimension (D2)	
Ethnic dimension (D1)	<i>Assimilationist</i> ↓ ↑	<i>Integrationist</i> ↑ ↑
	<i>Marginalist</i> ↓ ↓	<i>Traditionalist</i> ↑ ↓

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Associations of Acculturation with CVD Risk

Outcome Variable	Study Population	Results
Diet and Exercise	Mexican-American children	(+) dietary fat intake (-) exercise ¹
Smoking	Hispanics, California	(+) smoking ²
	Mexican-Americans	(+) smoking (>effect in women) ³
Exercise and BMI	Mexican-American, Texas	(+) exercise (-) BMI ⁴
CVD risk factors, health behaviors	Overweight Mexican American women	(-) exercise habit ⁵
Obesity and Diabetes	Mexican-Americans, Texas	(-) obesity and diabetes ⁶

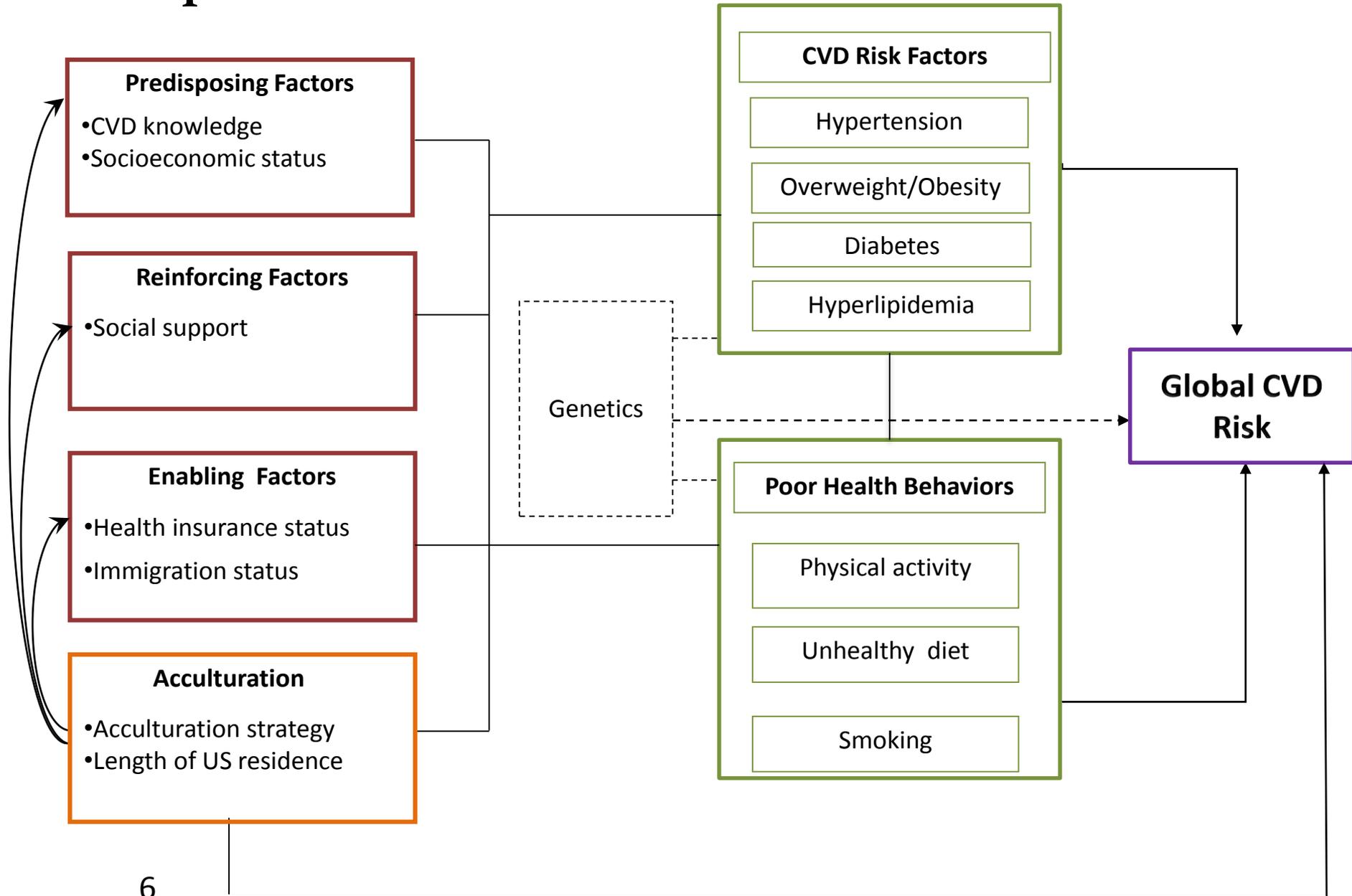
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Specific Aims

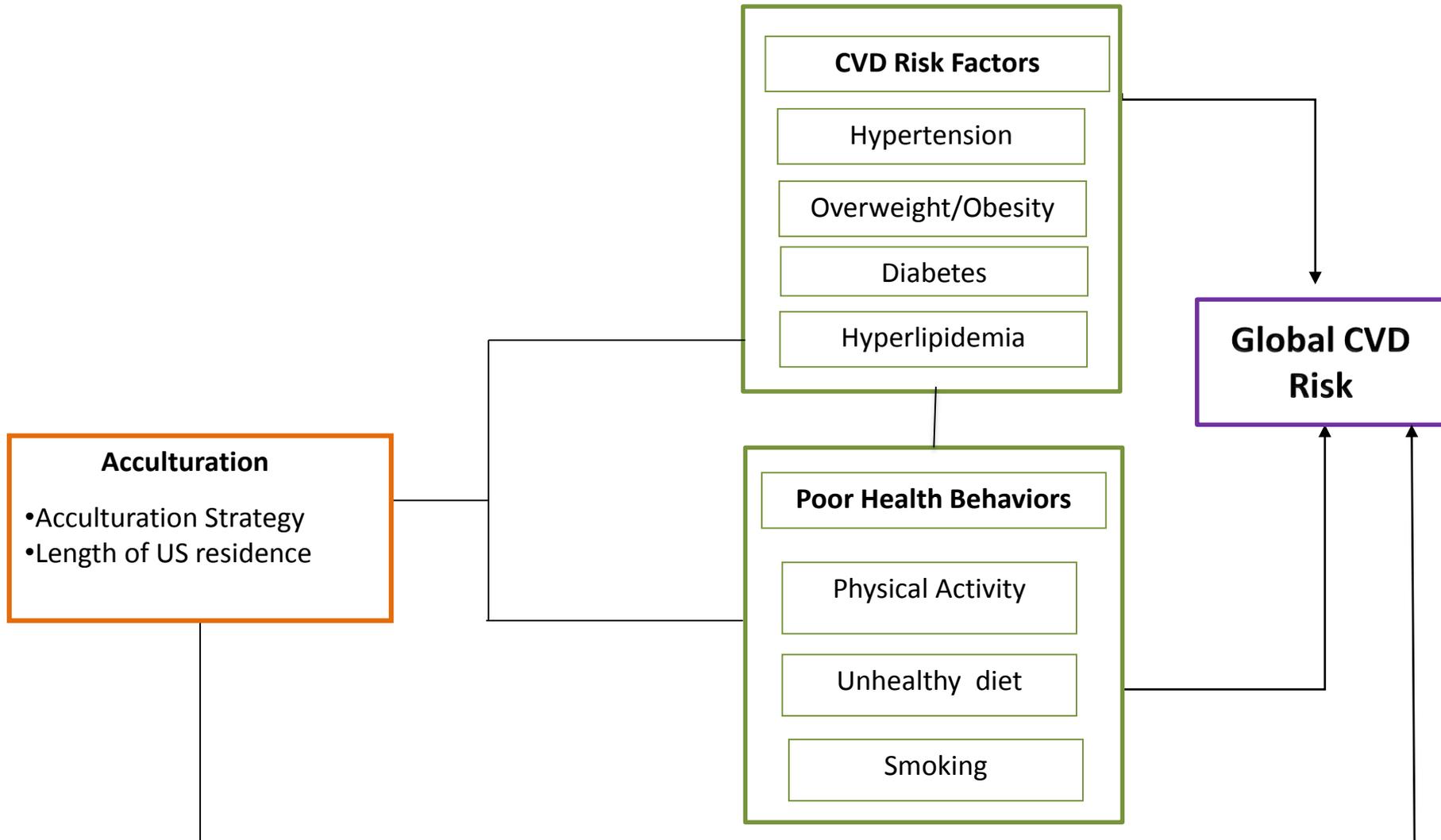
To examine in West African Immigrants:

1. The prevalence of *CVD risk factors* (overweight/obesity, hypertension, high blood glucose, hyperlipidemia) and *poor health behaviors* (smoking, physical inactivity and unhealthy diet).
2. The distribution of **10-year Pooled Cohort Equations (PCE) scores**
3. *Predisposing, reinforcing and enabling factors* as predictors of elevated CVD risk (≥ 3 CVD risk factors/ poor health behaviors or PCE score $\geq 7.5\%$)
4. Examine the association between *acculturation* and CVD risk factors, poor health behaviors and elevated CVD risk (≥ 3 CVD risk factors/ poor health behaviors or PCE score $\geq 7.5\%$)

Conceptual Framework: Modified Precede Proceed Model



Conceptual Framework: Modified Precede Proceed Model



Study Design and Setting

Study Design: Correlational-descriptive, cross-sectional

Sample size: Estimated 25,000 WAI, 50% prevalence of HTN and overweight/obesity, margin of error $\pm 6\%$, 95% CI= 264 participants

Setting: Churches in the Baltimore/Washington, DC metropolitan area

Participants

Target population: 1st generation WAI adults

Sampling: Quota sampling

Inclusion criteria:

- ✓ Adults 35-74 yrs
- ✓ Self identify as Ghana or Nigeria WAI
- ✓ Reside in the Baltimore/Washington, D.C. metro area
- ✓ Able to read and write English and provide informed consent

Exclusion criteria:

- ✓ Pregnancy
- ✓ Born in the US or in another African country
- ✓ Medical history of CVD (MI, CVA, HF, etc)

Recruitment, Screening and Data Collection Procedures

1. Screening for eligibility conducted
2. Informed consent obtained
3. Physical measurements conducted
4. Biochemical measurements conducted
5. Modified WHO STEPS Questionnaires administered
6. Immediate counseling provided on Global CVD risk & Heart Age
7. “Heart Risk Report Card” provided
8. Educational materials on CVD risk reduction distributed
9. \$10 gift card

Name: _____

Your results

	Current Level of Risk Factors	Ideal Level of Risk Factors
Blood pressure (mmHg)	_____	Goal: < 140/90
Fasting Blood Glucose (mg/dL)	_____	Goal: < 100
Total Cholesterol (mg/ dL)	_____	Goal: < 200
Triglycerides (mg/ dL)	_____	Goal: < 150
HDL-Cholesterol (mg/ dL)	_____	Goal: ≥ 40(Men) ≥ 50(Women)
LDL-Cholesterol (mg/ dL)	_____	Goal: < 100
Do you smoke?	_____	Goal: No
Body Mass Index (kg/m ²)	_____	Goal: 18.5 to 25
Waist Circumference (inches)	_____	Goal (Men): < 40 Goal (Women): < 35
Waist to Hip-Ratio	_____	Goal (Men): 0.90 Goal (Women): 0.85

Your risk of developing heart disease or dying from it is _____% in the next 10 years

Your “heart age” is _____ years

You should try to improve your risk factors (even if you have only one or two). A single risk factor (such as obesity) can greatly increase your risk of having heart disease later in life. You may also develop other risk factors as you become older. Make sure that you eat healthy food, exercise regularly, avoid smoking and avoid gaining extra weight. This may prevent or delay other risk factors from developing in the first place. It is very important that you know and understand all your risk factors!

Talk to your doctor about all the results you were given today and how to keep your heart healthy!

Statistical Analyses

- *Descriptive statistics* (T-test and X^2 test/ Fisher's exact)
- *Inferential statistics* (Multivariable logistic regression)
- Two-tailed α with $p < 0.05$ considered significant



Pooled Cohort Equations (PCE) Scores

- Estimates the 10-year risk of Atherosclerotic Cardiovascular Disease(ASCVD)
- Variables-sex, age, HDL-C, TC, diabetes status, SBP, HTN treatment, smoking status and race. ¹
- Variable dichotomized into
 - ❖ $<7.5\%$ PCE score (low to intermediate risk) ¹
 - ❖ $\geq 7.5\%$ PCE score (elevated risk) ¹

1. Goff DC,Jr, Lloyd-Jones DM, Bennett G, et al. 2013 ACC/AHA guideline on the assessment of cardiovascular risk: A report of the American college of Cardiology/American heart association task force on practice guidelines. Circulation. 2013. doi: 01.cir.0000437741.48606.98 [pii].

Summative Measure of CVD Risk Factors/ Poor Health Behaviors

- Having ≥ 3 CVD risk factors/poor health behaviors is associated with a **10-fold increase** in CVD risk ^{1,2}
- Summative measure of the number of CVD risk factors/poor health behaviors calculated
- Variable dichotomized into
 - ❖ < 3 CVD risk factors/poor health behaviors (low to intermediate risk) ^{1,2}
 - ❖ ≥ 3 CVD risk factors/poor health behaviors (elevated risk) ^{1,2}

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Acculturation Measures

1. Length of US residence (*proxy*)

- ❖ Continuous variable
- ❖ Dichotomous variable: <10 years vs. ≥10 years^{1,2}

2. Acculturation Strategies³

Ghanaian/Nigerian subscale (D1)	American subscale (D2)	
	<i>Assimilationist</i>	↓ ↑
	<i>Marginalist</i>	↓ ↓
	<i>Integrationist</i>	↑ ↑
	<i>Traditionalist</i>	↑ ↓

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RESULTS



Demographics

Characteristic [Mean \pm SD or N (%)]	Total (N=253)	Males (n=106)	Females (n=147)	p-value
Age	49.5 \pm 9.2	49.7 \pm 9.2	49.3 \pm 9.2	0.7196
Educational status				
<High school	61(25)	19(18)	42(29)	0.055
High school	38(15)	14(13)	24(17)	
\geq College	150(60)	72(69)	77(54)	
Employed	181(79)	81(90)	100(72)	0.001**
Married	193(76)	94(90)	99(67)	0.001**
Household income				
<\$25,000	44(18)	16(15)	28(20)	0.007**
\$25,000-\$50,000	113(46)	39(38)	74(52)	
>\$50,000	88(36)	49(47)	39(28)	
Health insurance, Yes	127(52)	56(55)	71(49)	0.387
\geq 10 years of US residence (%)	170(67)	81(76)	89(61)	0.008**
Green-Card/US-citizen	194(77)	84(80)	110(75)	0.385
Country of birth				
Ghana	152(60)	60(57)	92(63)	0.338
Nigeria	101(40)	46(43)	55(37)	

**p<0.05

Cardiovascular Disease Risk

Characteristic [Mean \pm SD or N (%)]	Total (N=253)	Males (n=106)	Females n=147)	p-value
Elevated blood pressure	28(20)	11(20)	17(21)	0.945
Hypertension diagnosis	98(40)	40(39)	58(41)	0.785
Hypertension treatment	63(53)	17(36)	46(64)	0.003**
Hypertension control (On antihypertensives)	24(56)	9(75)	15(48)	0.115
Hypertension control (No antihypertensives)	11(48)	7(58)	4(36)	0.292
Prediabetes	24(11)	12(14)	12(9)	0.323
Diabetes diagnosis or FBG \geq 126mg/dL	40(16)	18(17)	22(15)	0.594
Diabetes diagnosis	30(13)	14(15)	16(12)	0.449

**p<0.05

Cardiovascular Disease Risk

Characteristic [Mean \pm SD or N (%)]	Total (N=253)	Males (n=106)	Females (n=147)	p-value
Low density lipoprotein-cholesterol(LDL-C) \geq 130 (%)	84(33)	38(36)	46(31)	0.448
High density lipoprotein-cholesterol (HDL-C<40(M)/<50(F) (%)	74(29)	25(24)	49(33)	0.093
Total Cholesterol TC \geq 200	69(27)	28(26)	41(28)	0.795
Triglycerides (TG) \geq 150	43(17)	24(23)	19(13)	0.042
Fasting blood glucose	94.3 \pm 1.7	96.4 \pm 2.4	93.9 \pm 2.3	0.2903
Body Mass Index (kg/m ²)	29.8 \pm 4.8	28.4 \pm 3.9	30.8 \pm 5.1	<0.001**
Normal (18.5-24.9)	30(12)	20(19)	10(7)	0.002**
Overweight (25-29.9)	112(45)	51(49)	61(43)	
Obese (\geq 30)	105(43)	33(32)	72(50)	
Waist circumference>35 (F)/40 (M)*	127(53)	24(23)	103(75)	<0.001**
Waist to hip ratio>0.90 (M)/0.85 (F)*	151(60)	50(47)	101(69)	0.001**
Current tobacco smoker	1(0.4)	1(1)	0(0)	0.236
Physical inactivity	135(56)	58(57)	77(55)	0.754
Pooled Cohort Equations Score	6.1 \pm 6.8	7.7 \pm 6.4	5.0 \pm 6.9	0.002**
PCE \geq 7.5 %	66(28)	33(35)	33(23)	0.047**

**p<0.05

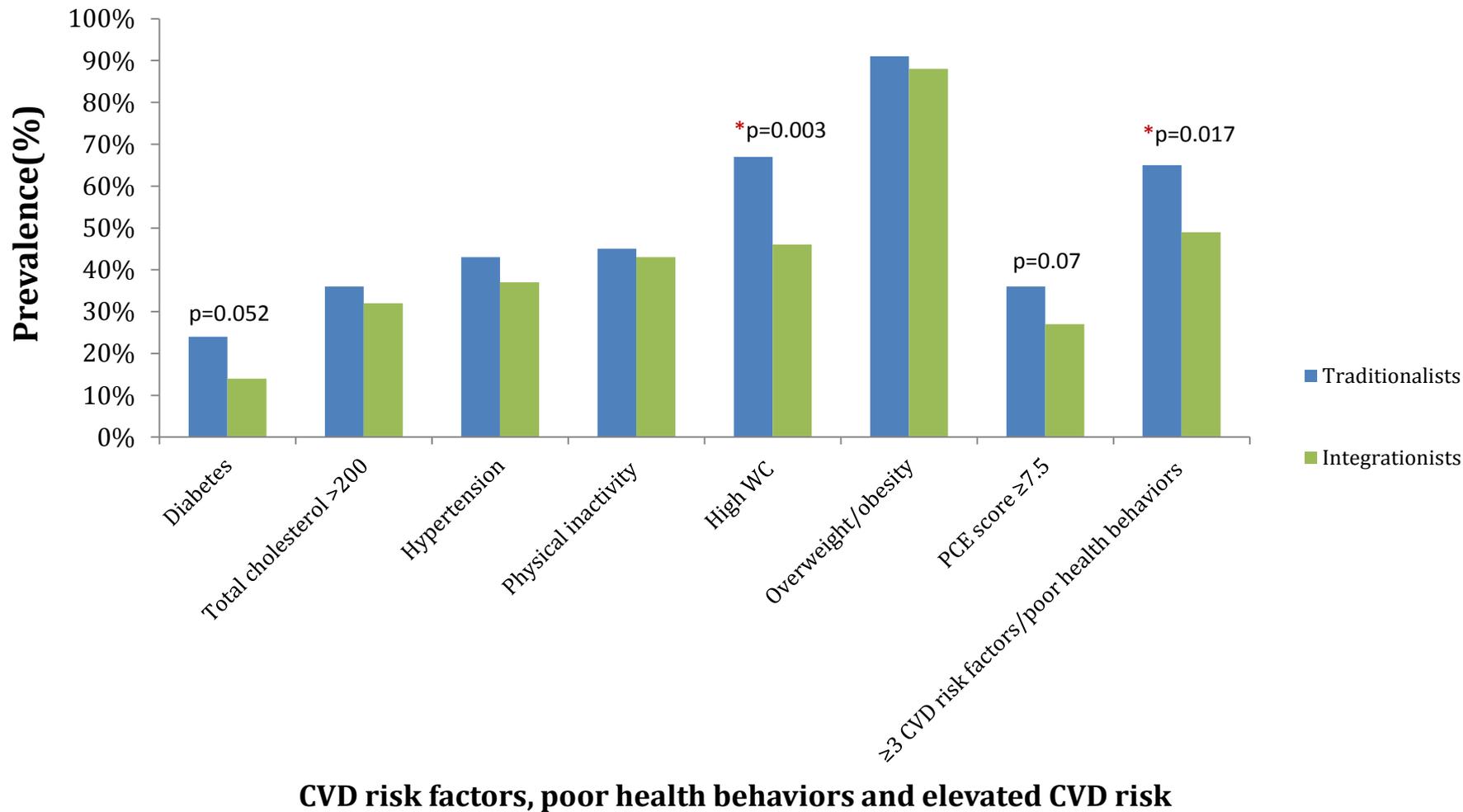
Comparison of Socio-Demographic Variables by Acculturation Strategy

Mean±SD or N(%)	Assimilationist N=2	Marginalist N=5	Traditionalist N=80	Integrationist N=166	p-value*
Female	1(50)	5(100)	60(75)	81(49)	<0.0001
Age at migration (yrs)	36.5±3.5	44.4±13.6	39.5±11.5 ^a	33.9±8.0 ^a	<0.0001
Length of US residence (yrs)	25.5±23.3	8.4±5.6	10.8±7.6 ^a	15.0±8.9 ^a	0.0003
Percentage of life in US	37.0±25.8	17.1±12.5	21.7±14.7 ^a	29.7±14.9 ^a	0.0001
Employed	2(100)	1(20)	56(70)	139(84)	0.013
Income					
<\$25,000	1(50)	0(0)	21(26)	22(13)	0.006
\$25,000-\$50,000	1(50)	3(60)	39(49)	73(44)	
>\$50,000	0(0)	2(40)	20(25)	71(43)	
Green card/citizen	2(100)	4(80)	61(76)	127(77)	0.836
Health insurance	2(100)	1(20)	37(46)	90(54)	0.241

a., Acculturation strategies with the same superscript were significantly different (p < 0.05).

*T-test/ χ^2 test comparing Traditionalist to Integrationist

Prevalence of CVD Risk Factors, Poor Health Behaviors and Elevated CVD Risk by Acculturation Strategy



Association between CVD Risk Factors/Poor Health Behaviors, Elevated CVD Risk and Length of Residence: Males (N=106)

CVD risk factors/poor health behaviors	AOR (95%CI)	
	≥10years	P-value
Overweight/obesity [∞]	5.10(1.28-20.33)	0.021
Hypertension [†]	0.61(0.17-2.14)	0.436
Hyperlipidemia (TC>200) [†]	1.20(0.35-4.13)	0.772
Diabetes [†]	3.97(0.42-37.44)	0.228
Physical inactivity [†]	0.49(0.15-1.59)	0.236
Elevated CVD risk	≥10years	P-value
≥3 CVD risk factors/poor health behaviors [†]	1.22(0.39-3.85)	0.728
*PCE Score≥7.5%	8.02(2.09-30.80)	0.002

AOR-Adjusted Odds ratio, CI=confidence interval, TC-Total cholesterol

†Adjusted for age, education, income, insurance, employment,

[∞] Adjusted for age, education, income, insurance, employment, physical activity

* Adjusted for education, income, insurance, employment.

Significant OR and AOR at p<0.05

Association between CVD Risk Factors/Poor Health Behaviors, Elevated CVD Risk and Length of Residence: Females (N=147)

CVD risk factors/poor health behaviors	†AOR (95%CI)	
	≥10years	P-value
Overweight/obesity [∞]	1.23(0.26-5.82)	0.789
Hypertension†	2.60(1.04-6.51)	0.041
Hyperlipidemia (TC>200) †	1.1(0.41-2.48)	0.985
Diabetes†	0.58(0.18-1.91)	0.371
Physical inactivity†	0.88(0.39-2.02)	0.780
Elevated CVD risk	≥10years	P-value
≥3 CVD risk factors or poor health behaviors†	1.21(0.52-2.81)	0.652
*PCE Score ≥7.5%	2.20(0.79-6.06)	0.127

AOR-Adjusted Odds ratio, CI=confidence interval, TC-Total cholesterol

†Adjusted for age, education, income, insurance, employment

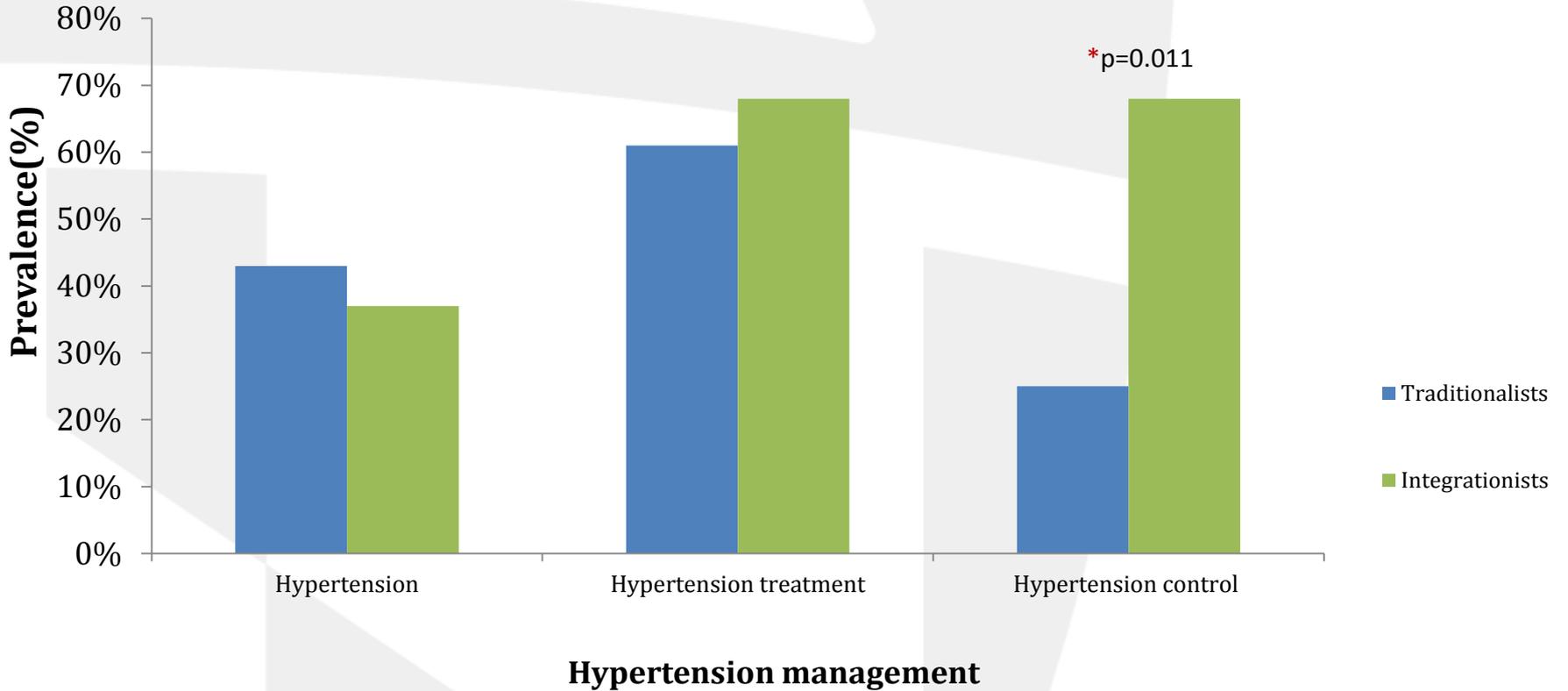
[∞] Adjusted for age, education, income, insurance, employment, physical activity

* Adjusted for education, income, insurance, employment*Significant OR and AOR at p<0.05

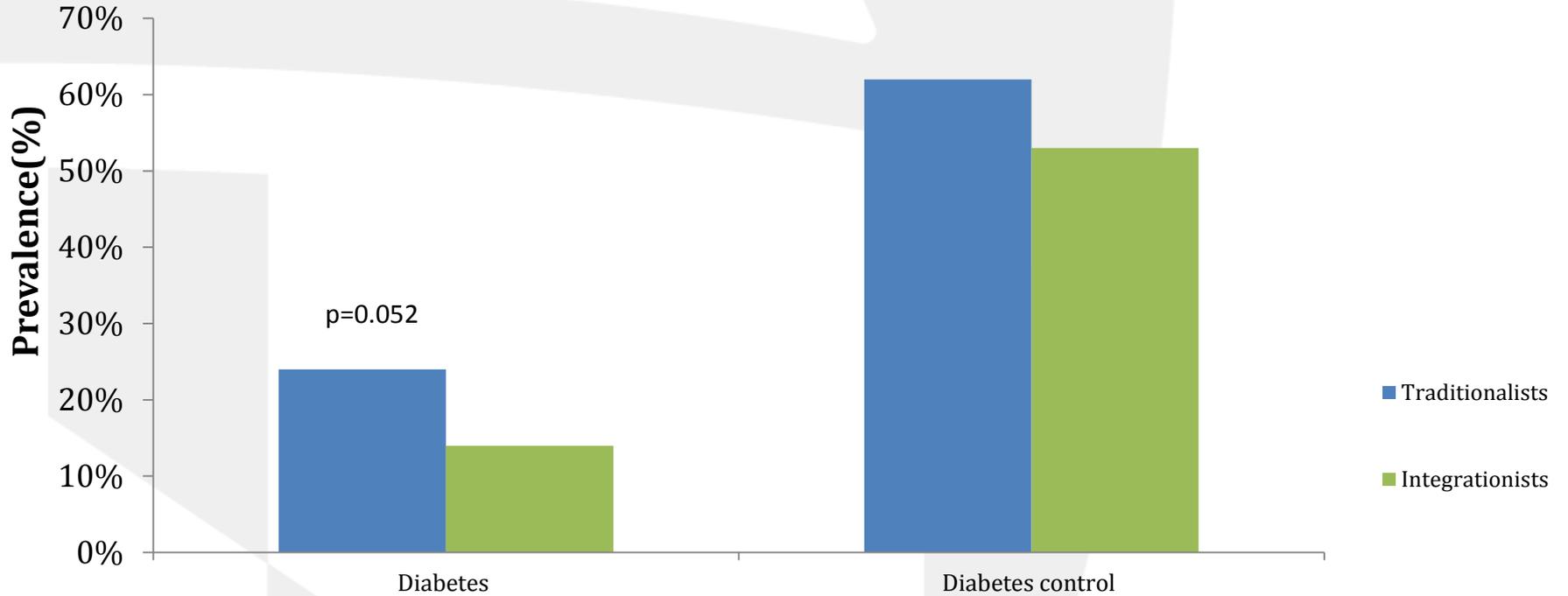
Association between Acculturation and Elevated CVD Risk

	Adjusted		
	AOR	95%CI	P-value
≥3 CVD risk factors or poor health behaviors			
*Length of US residence (proxy)	1.06	1.0-1.10	0.001
+Acculturation Strategies			
Integrationist	0.46	0.24-0.87	0.017
Traditionalist	<i>Ref</i>	<i>Ref</i>	<i>Ref</i>
Pooled ASCVD risk score ≥7.5%			
*Length of US residence (proxy)	1.09	1.05-1.13	<0.0001
+Acculturation Strategies			
Integrationist	0.38	0.18-0.78	0.008
Traditionalist	<i>Ref</i>	<i>Ref</i>	<i>Ref</i>
* Adjusted for gender, education, income, insurance status, employment status			
+ Adjusted for length of US residence, gender, education, income, insurance status, employment status			
<i>Ref</i> -Reference group			

Hypertension Management by Acculturation Strategy



Diabetes Management by Acculturation Strategy



Hypertension management

Summary

- High prevalence of CVD risk factors, poor health behaviors and elevated CVD risk
- Acculturation may be associated with CVD risk with paradoxical findings observed in the two measures of acculturation
 - ❖ Increasing years of residence associated with higher CVD risk
 - ❖ *Integrationists* had a lower adjusted odds of elevated CVD risk than *Traditionalists*

Limitations & Strengths

Limitations

- Cross-sectional study
- Non-probability sampling
- Residual confounding variables

Strengths

- Community-engaged research
- Global ASCVD risk
- Socio-economically diverse sample

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