

South Africa - Cardiovascular Risk in Black South Africans (CRIBSA) Study

Elvis Ndonwi, Keren de Buys, Don Matshazi, Naomi Levitt, Carl Lombard, Glenda Davison, Tandi Matsha, Andre Pascal Kengne, Sian Hemmings, Nasheeta Peer

Report generated on: January 28, 2025

Visit our data catalog at: <https://medat.samrc.ac.za/index.php>

Overview

Identification

ID NUMBER
CRIBSAStudy

Overview

ABSTRACT

Background: Our study investigated the association between transcription factor 7-like 2 (TCF7L2-rs7903146), angiotensin convertase enzyme (ACE-rs4646994), angiotensinogen (AGT-rs699), angiotensin II type 1 receptor (AGT1R-rs5186), fat mass and obesity-associated (FTO-rs17817499) and melanocortin 4 receptor (MC4R-rs17782313, rs12970134 and rs229616) single nucleotide polymorphisms (SNPs) with type 2 diabetes (T2D), obesity and hypertension in a Black South African population.

Methods: This cross-sectional study involved 560 Black South Africans aged 25 to 74 years. Participant demographic and lifestyle characteristics were self-reported; anthropometry and blood pressures (BP) measured; oral glucose tolerance tests used to diagnose T2D; and SNPs genotyped by polymerase chain reaction. The Benjamini-Hochberg method was used to control for multiple hypothesis testing, using a significance threshold of 0.12.

Results: Systolic BP was significantly higher in carriers of the G/G genotype of rs229616 within the MC4R gene compared to carriers of the G/A genotype ($p = 0.006$). In the same gene, logistic regression analysis showed that carriers of the minor C/C genotype of the rs17782313 SNP had a significantly higher risk of hypertension (OR = 1.37, $p = 0.023$). Moreover, carriers of the minor T/T genotype of the TCF7L2 rs7903146 SNP had a lower risk of T2D (OR = 0.66, $p = 0.043$).

Conclusion: TCF7L2-rs7903146 (C/C genotype) and MC4R-17782313 (C/C genotype) SNPs are potential genetic risk factors for T2D and hypertension in the Black South African population. Replicating these findings and exploring the role played by these genetic variants in downstream molecular pathways could aid in risk stratification and facilitate personalized approaches to healthcare delivery.

Producers and Sponsors

PRIMARY INVESTIGATOR(S)

Name	Affiliation
Elvis Ndonwi	SAMRC/CPUT, Cardiometabolic Health Research Unit, Department of Biomedical Sciences, Cape Peninsula University of Technology
Keren de Buys	SAMRC/Stellenbosch University Genomics of Brain Disorders Research Unit, Stellenbosch University
Don Matshazi	SAMRC/CPUT, Cardiometabolic Health Research Unit, Department of Biomedical Sciences, Cape Peninsula University of Technology
Naomi Levitt	Chronic Disease Initiative for Africa, Department of Medicine, University of Cape Town
Carl Lombard	Biostatistics Research Unit, South African Medical Research Council
Glenda Davison	SAMRC/CPUT, Cardiometabolic Health Research Unit, Department of Biomedical Sciences, Cape Peninsula University of Technology
Tandi Matsha	SAMRC/CPUT, Cardiometabolic Health Research Unit, Department of Biomedical Sciences, Cape Peninsula University of Technology
Andre Pascal Kengne	NCDRU, South African Medical Research Council
Sian Hemmings	Stellenbosch University Genomics of Brain Disorders Research Unit, Stellenbosch University
Nasheeta Peer	NCDRU, South African Medical Research Council

Sampling

No content available

Questionnaires

No content available

Data Collection

Data Processing

No content available

Data Appraisal

No content available

File Description

Variable List

SNP and Diabetes

Content

Cases 564

Variable(s) 61

Structure
Type:
Keys: ()

Version

Producer

Missing Data

Variables

ID	NAME	LABEL	TYPE	FORMAT	QUESTION
V1	SN		discrete	numeric	
V63	ID	ID	discrete	numeric	
V64	rs4646994		discrete	character	
V3	rs4646994_Code		contin	numeric	
V81	rs699		discrete	character	
V5	rs699_CODE		discrete	numeric	
V65	rs229616		discrete	character	
V8	rs229616_CODE		discrete	numeric	
V66	rs1297034		discrete	character	
V10	rs1297034_CODE		discrete	numeric	
V67	rs17817499		discrete	character	
V68	rs17817499_CODE		discrete	character	
V82	rs17782313		discrete	character	
V69	rs17782313_CODE		discrete	character	
V83	rs7903146		discrete	character	
V70	rs7903146_CODE		discrete	character	
V84	rs5186		discrete	character	
V71	rs5186_CODE		discrete	character	
V72	GENDER	GENDER	discrete	character	
V20	GENDER_Code	GENDER Code	discrete	numeric	
V21	Birth_Year	Birth Year	discrete	numeric	
V22	AGE	AGE	discrete	numeric	
V23	VSBP		discrete	numeric	
V24	VDBP		discrete	numeric	
V25	HRT		discrete	numeric	
V26	VSBP0		discrete	numeric	
V27	VDBP0		discrete	numeric	
V28	VHRT		discrete	numeric	

V29	AVESBP		discrete	numeric
V30	AVEDBP		discrete	numeric
V73	SBPDBP	SBP/DBP	discrete	character
V74	HBP		discrete	character
V33	Weight	Weight (kg)	discrete	numeric
V34	Height	Height (m)	discrete	numeric
V35	BMI	BMI	discrete	numeric
V75	BMI_Category	BMI Category	discrete	character
V76	Obesity_Yes_No	Obesity	discrete	character
V38	WC	WC(cm)	discrete	numeric
V39	HC	HC(cm)	discrete	numeric
V40	WHR		discrete	numeric
V41	TRIG		discrete	numeric
V77	High_TG		discrete	character
V43	CHOL		discrete	numeric
V78	High_CHOL		discrete	character
V45	HDLC		discrete	numeric
V79	Low_HDLC		discrete	character
V47	LDLC		discrete	numeric
V85	High_LDLC		discrete	character
V49	GLUC0		discrete	numeric
V50	GLUC30		discrete	numeric
V51	GLUC120		discrete	numeric
V80	SMOKE	SMOKE	discrete	character
V53	UreammolL		discrete	numeric
V54	Creatinine	Creatinine	discrete	numeric
V87	SerumalbuminL		discrete	character
V56	GGTUL		discrete	numeric
V57	hsCRP		discrete	numeric
V58	Fructosamine		discrete	numeric
V59	Glycatedalbumin		discrete	numeric
V60	eGFR		discrete	numeric
V61	GGT		discrete	numeric

(SN)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: numeric
 Decimals: 0

Valid cases: 563
 Invalid: 1

ID (ID)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: numeric
 Decimals: 0

Valid cases: 563
 Invalid: 1

(rs4646994)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: character
 Width: 3

Valid cases: 537
 Invalid: 0

(rs4646994_Code)

File: SNP and Diabetes

Overview

Type: Continuous
 Format: numeric
 Decimals: 0

Valid cases: 537
 Invalid: 27

(rs699)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: character
 Width: 3

Valid cases: 555
 Invalid: 0

(rs699_CODE)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: numeric
 Decimals: 0

Valid cases: 555
 Invalid: 9

(rs229616)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: character
 Width: 3

Valid cases: 554
 Invalid: 0

(rs229616_CODE)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: numeric
 Decimals: 0

Valid cases: 554
 Invalid: 10

(rs1297034)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: character
 Width: 3

Valid cases: 552
 Invalid: 0

(rs1297034_CODE)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: numeric
 Decimals: 0

Valid cases: 552
 Invalid: 12

(rs17817499)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: character
 Width: 3

Valid cases: 540
 Invalid: 0

(rs17817499_CODE)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: character
 Width: 1

Valid cases: 540
 Invalid: 0

(rs17782313)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: character
 Width: 3

Valid cases: 556
 Invalid: 0

(rs17782313_CODE)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: character
 Width: 1

Valid cases: 556
 Invalid: 0

(rs7903146)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: character
 Width: 3

Valid cases: 548
 Invalid: 0

(rs7903146_CODE)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: character
 Width: 1

Valid cases: 548
 Invalid: 0

(rs5186)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: character
 Width: 3

Valid cases: 546
 Invalid: 0

(rs5186_CODE)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: character
 Width: 1

Valid cases: 546
 Invalid: 0

GENDER (GENDER)

File: SNP and Diabetes

Overview

Type: Discrete
Format: character
Width: 6

Valid cases: 563
Invalid: 0

GENDER Code (GENDER_Code)

File: SNP and Diabetes

Overview

Type: Discrete
Format: numeric
Decimals: 0

Valid cases: 563
Invalid: 1

Birth Year (Birth_Year)

File: SNP and Diabetes

Overview

Type: Discrete
Format: numeric
Decimals: 0

Valid cases: 553
Invalid: 11

AGE (AGE)

File: SNP and Diabetes

Overview

Type: Discrete
Format: numeric
Decimals: 0

Valid cases: 557
Invalid: 7

(VSBP)

File: SNP and Diabetes

Overview

Type: Discrete
Format: numeric
Decimals: 0

Valid cases: 557
Invalid: 7

(VDBP)

File: SNP and Diabetes

Overview

Type: Discrete
Format: numeric
Decimals: 0

Valid cases: 557
Invalid: 7

(HRT)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: numeric
 Decimals: 0

Valid cases: 557
 Invalid: 7

(VSBP0)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: numeric
 Decimals: 0

Valid cases: 557
 Invalid: 7

(VDBP0)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: numeric
 Decimals: 0

Valid cases: 557
 Invalid: 7

(VHRT)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: numeric
 Decimals: 0

Valid cases: 556
 Invalid: 8

(AVESBP)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: numeric
 Decimals: 1

Valid cases: 557
 Invalid: 7

(AVEDBP)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: numeric
 Decimals: 1

Valid cases: 557
 Invalid: 7

SBP/DBP (SBPDBP)

File: SNP and Diabetes

Overview

Type: Discrete
Format: character
Width: 10

Valid cases: 553
Invalid: 0

(HBP)

File: SNP and Diabetes

Overview

Type: Discrete
Format: character
Width: 3

Valid cases: 559
Invalid: 0

Weight (kg) (Weight)

File: SNP and Diabetes

Overview

Type: Discrete
Format: numeric
Decimals: 1

Valid cases: 557
Invalid: 7

Height (m) (Height)

File: SNP and Diabetes

Overview

Type: Discrete
Format: numeric
Decimals: 1

Valid cases: 557
Invalid: 7

BMI (BMI)

File: SNP and Diabetes

Overview

Type: Discrete
Format: numeric
Decimals: 1

Valid cases: 557
Invalid: 7

BMI Category (BMI_Category)

File: SNP and Diabetes

Overview

Type: Discrete
Format: character
Width: 10

Valid cases: 557
Invalid: 0

Obesity (Obesity_Yes_No)

File: SNP and Diabetes

Overview

Type: Discrete
Format: character
Width: 3

Valid cases: 557
Invalid: 0

WC(cm) (WC)

File: SNP and Diabetes

Overview

Type: Discrete
Format: numeric
Decimals: 1

Valid cases: 556
Invalid: 8

HC(cm) (HC)

File: SNP and Diabetes

Overview

Type: Discrete
Format: numeric
Decimals: 0

Valid cases: 556
Invalid: 8

(WHR)

File: SNP and Diabetes

Overview

Type: Discrete
Format: numeric
Decimals: 1

Valid cases: 556
Invalid: 8

(TRIG)

File: SNP and Diabetes

Overview

Type: Discrete
Format: numeric
Decimals: 2

Valid cases: 554
Invalid: 10

(High_TG)

File: SNP and Diabetes

Overview

Type: Discrete
Format: character
Width: 3

Valid cases: 554
Invalid: 0

(CHOL)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: numeric
 Decimals: 2

Valid cases: 554
 Invalid: 10

(High_CHOL)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: character
 Width: 3

Valid cases: 554
 Invalid: 0

(HDL_C)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: numeric
 Decimals: 1

Valid cases: 554
 Invalid: 10

(Low_HDL_C)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: character
 Width: 3

Valid cases: 554
 Invalid: 0

(LDL_C)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: numeric
 Decimals: 2

Valid cases: 548
 Invalid: 16

(High_LDL_C)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: character
 Width: 3

Valid cases: 548
 Invalid: 0

(GLUC0)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: numeric
 Decimals: 1

Valid cases: 552
 Invalid: 12

(GLUC30)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: numeric
 Decimals: 1

Valid cases: 496
 Invalid: 68

(GLUC120)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: numeric
 Decimals: 1

Valid cases: 537
 Invalid: 27

SMOKE (SMOKE)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: character
 Width: 3

Valid cases: 554
 Invalid: 0

(UreammolL)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: numeric
 Decimals: 1

Valid cases: 553
 Invalid: 11

Creatinine (Creatinine)

File: SNP and Diabetes

Overview

Type: Discrete
 Format: numeric
 Decimals: 1

Valid cases: 553
 Invalid: 11

(SerumalbuminL)

File: SNP and Diabetes

Overview

Type: Discrete
Format: character
Width: 4

Valid cases: 553
Invalid: 0

(GGTUL)

File: SNP and Diabetes

Overview

Type: Discrete
Format: numeric
Decimals: 1

Valid cases: 553
Invalid: 11

(hsCRP)

File: SNP and Diabetes

Overview

Type: Discrete
Format: numeric
Decimals: 1

Valid cases: 553
Invalid: 11

(Fructosamine)

File: SNP and Diabetes

Overview

Type: Discrete
Format: numeric
Decimals: 1

Valid cases: 553
Invalid: 11

(Glycatedalbumin)

File: SNP and Diabetes

Overview

Type: Discrete
Format: numeric
Decimals: 1

Valid cases: 549
Invalid: 15

(eGFR)

File: SNP and Diabetes

Overview

Type: Discrete
Format: numeric
Decimals: 1

Valid cases: 551
Invalid: 13

(GGT)

File: SNP and Diabetes

Overview

Type: Discrete
Format: numeric
Decimals: 1

Valid cases: 553
Invalid: 11

