

Supplemental material

Supplemental Table S1. Demographic and clinical characteristics of 10,700 study participants in six sub-Saharan African sites

Supplemental Table S2. Diabetes care cascade by study site

Supplemental Table S3. Factors associated with odds of having diabetes across three sub-Saharan African sites with high HIV prevalence (Agincourt, Dikgale & Nairobi)

Supplemental Table S4. Factors associated with odds of having diabetes across two sub-Saharan African sites with low HIV prevalence (Navrongo & Nanoro)

Supplemental Table S5. Factors associated with awareness in high HIV prevalence sites (Agincourt, Dikgale, Nairobi & Soweto)

Table S1. Demographic and clinical characteristics of 10,700 study participants in six sub-Saharan African sites

	Soweto			Agincourt			Dikgale			Nanoro			Navrongo			Nairobi			Overall		
	Men	Women	Overall	Men	Women	Overall	Men	Women	Overall	Men	Women	Overall	Men	Women	Overall	Men	Women	Overall	Men	Women	Overall
	n=1,025 51%	n=1,002 49%	n=2,027	n=573 39%	n=892 61%	n=1,465	n=356 31%	n=812 69%	n=1,168	n=1,045 50%	n=1,039 50%	n=2,084	n=923 46%	n=1,091 54%	n=2,014	n=886 46%	n=1,056 54%	n=1,942	n=4,808 45%	n=5,892 55%	n=10,700
Age (years)	49 (44- 55)	49 (44- 54)	49 (44- 54)	51 (45- 56)	51 (46- 56)	51 (46- 56)	50 (45- 55)	51 (46- 56)	51 (45- 55)	50 (44- 55)	50 (45- 54)	50 (45- 55)	50 (46- 55)	52 (47- 56)	51 (46- 56)	48 (44- 53)	48 (44- 52)	48 (44- 53)	50 (45- 55)	50 (45- 55)	50 (45- 55)
Marital status (%)																					
Currently married/ Cohabiting	570 (56)	266 (27)	836 (41)	445 (78)	537 (60)	982 (67)	178 (50)	427 (53)	605 (52)	1,021 (98)	794 (76)	1,815 (87)	787 (85)	694 (64)	1,481 (74)	808 (91)	486 (46)	1,294 (67)	3,809 (79)	3,204 (54)	7,013 (66)
Never married/ cohabitating	265 (26)	51 (5.1)	316 (16)	75 (13)	59 (6.6)	134 (9.2)	103 (29)	185 (23)	288 (25)	14 (1.3)	3 (0.3)	17 (0.8)	15 (1.6)	5 (0.5)	20 (1.0)	13 (1.5)	70 (6.6)	83 (4.3)	485 (10)	373 (6.3)	858 (8.0)
Previously married	189 (19)	347 (35)	536 (26)	53 (9.2)	296 (33)	349 (24)	75 (22)	200 (25)	275 (24)	8 (0.8)	238 (23)	246 (12)	120 (13)	392 (36)	512 (26)	65 (7.3)	499 (47)	564 (29)	510 (11)	1,972 (33)	2,482 (23)
Missing	1 (0.1)	338 (34)	339 (17)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0.2)	4 (0.4)	6 (0.3)	1 (0.1)	0 (0)	1 (0.1)	0 (0)	1 (0.1)	1 (0.1)	4 (0.1)	343 (5.8)	347 (3.2)
Highest level of education (%)																					
No formal education	8 (0.8)	2 (0.2)	10 (0.5)	23 (22)	280 (31)	403 (28)	22 (6.2)	74 (9.1)	96 (8.2)	758 (73)	960 (92)	1,718 (82)	570 (62)	843 (77)	1,413 (70)	34 (3.8)	113 (11)	147 (7.6)	1,515 (32)	2,272 (39)	3,787 (35)
Primary education	117 (11)	636 (64)	753 (37)	235 (41)	340 (38)	575 (39)	113 (32)	273 (34)	386 (33)	181 (17)	58 (5.6)	239 (12)	206 (22)	177 (16)	383 (19)	447 (51)	663 (63)	1,110 (57)	1,299 (27)	2,147 (36)	3,446 (32)
Secondary education	748 (73)	147 (15)	895 (44)	175 (31)	223 (25)	398 (27)	204 (57)	440 (54)	644 (55)	86 (8.2)	10 (1)	96 (4.6)	118 (13)	57 (5.2)	175 (8.7)	383 (43)	276 (26)	659 (34)	1,714 (36)	1,153 (20)	2,867 (27)
Tertiary education	152 (15)	1 (0.1)	153 (7.5)	39 (6.8)	49 (5.5)	88 (6.0)	17 (4.8)	24 (3.0)	41 (3.5)	16 (1.5)	2 (0.2)	18 (0.9)	27 (2.9)	9 (0.8)	36 (1.8)	22 (2.5)	4 (0.4)	26 (1.3)	273 (5.7)	89 (1.5)	362 (3.4)
Missing	0 (0)	216 (22)	216 (10.7)	1 (0.2)	0 (0.0)	1 (0.1)	0 (0)	1 (0.1)	1 (0.1)	4 (0.4)	9 (0.9)	13 (0.6)	2 (0.2)	5 (0.5)	7 (0.4)	0 (0)	0 (0)	0 (0)	7 (0.2)	231 (3.9)	238 (2.2)
Employed (%)	670 (65)	547 (55)	1,217 (60)	197 (34)	303 (34)	500 (34)	160 (45)	279 (34)	439 (37)	1,026 (98)	1,030 (99)	2,056 (99)	599 (65)	659 (60)	1,258 (63)	860 (97)	966 (92)	1,826 (94)	3,512 (73)	3,784 (64)	7,296 (68)
Current smoker (%)	540 (53)	49 (4.9)	589 (29)	155 (27)	3 (0.3)	158 (11)	225 (63)	25 (3.1)	250 (21)	142 (14)	0 (0)	142 (6.8)	388 (42)	21 (1.9)	409 (20)	208 (24)	27 (2.6)	235 (12)	1,658 (35)	125 (2.1)	1,783 (17)
Hypertension (%)	550 (54)	552 (55)	1102 (54)	251 (44)	517 (58)	768 (52)	116 (33)	392 (49)	508 (44)	215 (21)	127 (12)	342 (17)	227 (25)	274 (25)	501 (25)	204 (23)	319 (30)	523 (27)	1,563 (33)	2,181 (37)	3,744 (35)
Known HIV positive (%)	189 (18)	121 (12)	310 (15)	186 (33)	304 (34)	490 (33)	73 (21)	175 (22)	248 (21)	5 (0.5)	4 (0.4)	9 (0.4)	9 (1.0)	6 (0.6)	15 (0.7)	67 (7.6)	171 (16)	238 (12)	529 (11)	781 (13)	1,310 (12)

Family history of diabetes (%)	NA	NA	NA	85 (15)	161 (18)	246 (17)	53 (15)	134 (17)	187 (16)	24 (2.3)	12 (1.2)	36 (1.7)	12 (1.3)	10 (0.9)	22 (1.1)	112 (13)	213 (20)	325 (17)	286 (6.0)	530 (9.0)	816 (7.6)
Body mass index (kg/m ²)	24.2 (20.6-28.5)	32.9 (28.5-37.6)	28.4 (23-33.9)	23 (20.3-26.6)	28.6 (24.1-33.2)	26 (22.1-31.3)	20.6 (18.9-24.1)	30.1 (25.3-35.9)	26.9 (21.1-33.1)	21.1 (19.2-23.4)	19.8 (18.1-21.6)	20.4 (18.6-22.6)	20.6 (19-22.3)	21.4 (19.6-23.9)	21 (19.3-23.1)	22.2 (20-25)	26.9 (23-31.7)	24.4 (21.1-28.6)	21.7 (19.5-24.9)	25.5 (20.8-31.9)	23.2 (20.1-28.6)
Hip circumference (cm)	97.4 (90.0-105.3)	117.5 (109.0-127.0)	107.0 (95.7-118.5)	94.0 (89.0-102.0)	105.0 (97.0-113.0)	100.0 (93.0-110.0)	87.6 (83.3-94.9)	108.7 (98.5-118.9)	101.9 (90.1-114.3)	89.5 (85.6-94.9)	87.8 (83.4-92.5)	88.8 (84.5-93.7)	83.0 (79.0-88.0)	88.0 (83.0-94.0)	86.0 (81.0-91.0)	93.0 (87.4-98.9)	101.0 (94.0-110.0)	97.0 (90.0-104.6)	90.6 (85.0-98.0)	99.0 (89.0-112.0)	94.2 (86.6-105.3)
Subcutaneous fat (cm)	1.4 (0.9-2.0)	.1 (2.5-3.9)	2.2 (1.3-3.2)	1.2 (0.7-1.7)	2.2 (1.5-3.0)	1.7 (1.1-2.7)	0.8 (0.5-1.2)	2.2 (1.6-2.9)	1.7 (0.9-2.6)	0.8 (0.6-1.2)	0.9 (0.6-1.2)	0.9 (0.6-1.2)	0.7 (0.5-0.9)	1.0 (0.7-1.5)	0.8 (0.6-1.2)	1.0 (0.7-1.5)	2.0 (1.4-2.4)	1.5 (1.0-2.1)	0.9 (0.6-1.4)	1.7 (1.0-2.6)	1.2 (0.8-2.1)
Visceral fat (cm)	6.2 (5-7.8)	4.7 (3.5-5.9)	5.5 (4.2-6.9)	6.3 (5.2-7.8)	5.9 (4.2-7.3)	6.1 (4.6-7.5)	5.9 (4.7-7.4)	6.7 (4.9-8.5)	6.4 (4.9-8.2)	4.3 (3.5-5.2)	4.3 (3.6-5.1)	4.3 (3.5-5.1)	4 (3.3-4.8)	3.3 (2.8-4.1)	3.6 (3-4.5)	5 (3.9-6.3)	4.6 (3.6-5.8)	4.8 (3.7-6)	5 (3.9-6.5)	4.5 (3.4-6)	4.7 (3.6-6.2)
Physical activity categories (%)																					
Absent	63 (6.2)	167 (17)	230 (11)	106 (19)	143 (16)	249 (17)	3 (0.9)	8 (1)	11 (1.3)	227 (22)	110 (11)	337 (16)	64 (7.1)	154 (14)	218 (11)	6 (0.7)	19 (1.8)	25 (1.3)	469 (9.8)	601 (10)	1,070 (10)
Insufficient	134 (13)	283 (28)	417 (21)	21 (3.7)	58 (6.5)	79 (5.4)	16 (4.5)	27 (3.3)	134 (6.9)	37 (3.5)	34 (3.3)	71 (3.4)	35 (3.9)	59 (5.4)	94 (4.7)	41 (4.6)	93 (8.8)	134 (6.9)	284 (5.9)	554 (9.4)	838 (7.9)
Sufficient	828 (81)	552 (55)	1,380 (68)	443 (78)	686 (77)	1,129 (78)	334 (95)	776 (96)	1,780 (92)	781 (75)	895 (86)	1,676 (80)	807 (89)	874 (80)	1,681 (84)	839 (95)	941 (89)	1,780 (92)	4,032 (84)	4,724 (80)	8,756 (82)

Continuous variables are summarised as medians and interquartile ranges and categorical variables as n (%); NA-not applicable

Table S2. Diabetes care cascade by study site

	Soweto				Agincourt				Dikgale				Nanoro				Navrongo				Nairobi			
	T	M	W	p	T	M	W	p	T	M	W	p	T	M	W	p	T	M	W	p	T	M	W	p
Sample size	2,027	1,025	1,002		1,465	573	892		1,168	356	812		2,084	1,045	1,039		2,014	923	1,091		1,942	886	1,056	
Diabetes present (n)	191	72	119		92	40	52		105	28	77		71	50	21		23	11	12		131	37	94	
Crude diabetes prevalence (%)	9.4 (8.2 - 11)	7.0 (5.5 - 8.8)	12 (9.9 - 14)		6.3 (5.1 - 7.6)	7.0 (5.0 - 9.4)	5.8 (4.4 - 7.6)		9.0 (7.4 - 11)	7.9 (5.3 - 11)	9.5 (7.6 - 12)		3.4 (2.7 - 4.3)	4.8 (3.6 - 6.3)	2.0 (1.3 - 3.1)		1.1 (0.7 - 1.7)	1.2 (0.6 - 2.1)	1.1 (0.6 - 1.9)		6.8 (5.7 - 8.0)	4.2 (3.0 - 5.7)	8.9 (7.3 - 11)	
Age-adjusted diabetes prevalence (%)	9.0 (7.8 - 10)	6.3 (4.9 - 7.9)	12 (9.7 - 14)	<0.01	5.3 (4.1 - 6.4)	5.7 (4.0 - 8.1)	5.0 (3.6 - 6.8)	0.56	7.4 (6.0 - 8.9)	7.2 (4.6 - 11)	7.5 (5.8 - 9.6)	0.86	3.3 (2.5 - 4.0)	4.7 (3.5 - 6.3)	1.8 (1.1 - 2.8)	<0.01	1.3 (0.7 - 1.9)	1.3 (0.6 - 2.4)	1.3 (0.6 - 2.5)	>0.99	6.7 (5.6 - 7.8)	4.1 (2.9 - 5.7)	9.1 (7.3 - 11)	<0.01
Aware of having diabetes (n)	120	51	69		55	22	33		61	16	45		18	16	2		15	8	7		59	17	42	
Aware of having diabetes (%)	63 (56 - 70)	71 (59 - 81)	58 (49 - 67)	0.08	60 (49 - 70)	55 (39 - 71)	64 (50 - 76)	0.41	58 (48 - 68)	57 (37 - 76)	58 (47 - 70)	0.90	25 (16 - 37)	32 (20 - 47)	9.5 (1.2 - 30)	0.05	65 (43 - 84)	73 (39 - 94)	58 (28 - 85)	0.47	45 (36 - 54)	46 (30 - 63)	45 (34 - 55)	0.90
Reporting treatment for diabetes (n)	NA	NA	NA		41	18	23		54	11	43		4	3	1		7	4	3		46	14	32	
Reporting treatment for diabetes (%)	NA	NA	NA		75 (61 - 85)	82 (60 - 95)	70 (51 - 84)	0.31	89 (78 - 95)	69 (41 - 89)	96 (85 - 100)	<0.01	22 (6.4 - 48)	19 (4 - 46)	50 (1.3 - 99)	0.32	47 (21 - 73)	50 (16 - 84)	43 (9.9 - 82)	0.78	78 (65 - 88)	82 (57 - 96)	76 (61 - 88)	0.60
Diabetes controlled (n)	NA	NA	NA		13	5	8		25	4	21		2	1	1		4	3	1		14	6	8	
Diabetes controlled (%)	NA	NA	NA		32 (18 - 48)	28 (9.7 - 54)	35 (16 - 57)	0.63	46 (33 - 60)	36 (11 - 69)	49 (33 - 65)	0.46	50 (6.8 - 93)	33 (0.8 - 91)	100 (-)	0.68	57 (18 - 90)	75 (19 - 99)	33 (0.8 - 91)	0.27	30 (18 - 46)	43 (18 - 71)	25 (12 - 43)	0.23

T: total, M:men, W:women; prevalences are given as estimates and 95% confidence intervals. p value for men vs women and calculated using chi-squared or Fisher's exact test. NA-not applicable as these data were not collected

Table S3. Factors associated with odds of having diabetes across three sub-Saharan African sites with high HIV prevalence (Agincourt, Dikgale & Nairobi)¹

	Odds ratio	95% confidence interval	p value
Age	1.1	1.0-1.1	<0.01
Sex			
Women	reference		
Men	0.8	0.5-1.2	0.21
Marital status			
Currently married or cohabitating	reference		
Never married or cohabitating	1.2	0.8-1.8	0.37
Previously married	1.0	0.8-1.4	0.91
Educational attainment			
No formal education	reference		
Primary education	1.5	1.0-2.2	0.07
Secondary education	1.2	0.8-1.9	0.44
Tertiary education	1.2	0.6-2.6	0.60
Employment status			
Unemployed	reference		
Employed	1.2	0.9-1.6	0.19
Smoking status			
No history of smoking	reference		
Current smoker	0.6	0.4-1.1	0.08
History of hypertension			
No	reference		
Yes	2.0	1.5-2.6	<0.01
HIV status			
Negative	reference		
Positive	0.5	0.4-0.8	<0.01
Family history of diabetes			
No	reference		
Yes	3.6	2.8-4.7	<0.01
Physical activity categories			
Absent	reference		
Insufficient	1.4	0.7-3.0	0.33
Sufficient	1.1	0.6-2.0	0.73
Hip circumference	1.0	1.0-1.0	<0.01
Visceral fat	1.2	1.1-1.2	<0.01
Subcutaneous fat	1.3	1.1-1.4	<0.01

¹3929 participants were included in the analysis

Table S4. Factors associated with odds of having diabetes across two sub-Saharan African sites with low HIV prevalence (Navrongo & Nanoro)¹

	Odds ratio	95% confidence interval	p value
Age	1.0	1.0-1.1	0.18
Sex			
Women	reference		
Men	1.9	1.1-3.3	0.03
Marital status			
Currently married or cohabitating	reference		
Never married or cohabitating	1.8	0.2-14.2	0.58
Previously married	1.2	0.6-2.3	0.68
Educational attainment			
No formal education	reference		
Primary education	0.5	0.2-1.2	0.12
Secondary education	0.9	0.4-2.5	0.91
Tertiary education	3.7	1.0-13.9	0.05
Employment status			
Unemployed	reference		
Employed	1.8	0.8-3.9	0.13
Smoking status			
No history of smoking	reference		
Current smoker	0.9	0.3-2.6	0.79
History of hypertension			
No	reference		
Yes	1.2	0.7-2.1	0.50
HIV status			
Negative	reference		
Positive	1.7	0.2-13.5	0.63
Family history of diabetes			
No	reference		
Yes	10.4	4.3-25.4	<0.01
Physical activity categories			
Absent	reference		
Insufficient	0.5	0.1-1.7	0.23
Sufficient	0.5	0.3-0.8	0.01
Hip circumference	1.0	1.0-1.1	0.02
Visceral fat	1.2	1.0-1.4	0.14
Subcutaneous fat	1.1	0.7-1.9	0.72

¹3496 participants were included in the analysis

Table S5. Factors associated with awareness in high HIV prevalence sites (Agincourt, Dikgale, Nairobi & Soweto)¹

	Odds Ratio	95% confidence interval	p value
Age	1.0	1.0-1.1	0.09
Sex			
Women	reference		
Men	1.0	0.6-1.6	0.85
Marital status			
Currently married or cohabitating	reference		
Never married or cohabitating	1.0	0.5-2.1	0.93
Previously married	0.9	0.5-1.4	0.60
Educational attainment			
No formal education	reference		
Primary education	1.1	0.5-2.3	0.86
Secondary education	1.4	0.7-3.2	0.37
Tertiary education	1.2	0.4-3.9	0.79
Employment status			
Unemployed	reference		
Employed	0.8	0.5-1.2	0.20
History of hypertension			
No	reference		
Yes	1.9	1.2-2.9	0.01
HIV status			
Negative	reference		
Positive	2.1	1.1-4.0	0.03
Body mass index	1.0	0.9-1.0	0.17

¹397 participants were included in the analysis