Anthropometry and fat distribution in South African women by HIV status

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BACKGROUND

- Pregnancy and postpartum periods contribute to obesity burden in women
  - excessive gestational weight gain & retention
- Rising obesity in persons living with HIV (PLHIV) might worsen metabolic outcomes due to existing risk of metabolic diseases
- There is limited data on adiposity in postpartum PLHIV
- We examined anthropometry and fat distribution by HIV status in women enrolled in the **CA**rdio**M**etabolic complications in **P**regnancy (CAMP) study

CAMP Study Overview (2019-2022)

Pregnancy Enrolment: 24-28 weeks GA
N = 400
without HIV=200, with HIV=200

Pregnancy follow-up: 33-38 weeks GA
N = 292
without HIV=153, with HIV=139

- Pregnant women attending ANC at Gugulethu primary care clinic
- Eligibility (24-28w GA, ≥18 years, no diabetes/hypertension)
- Follow-up at T3 and 6-12m pp

Postpartum follow-up: 6-12 months

N = 214 (Anthropometry)
without HIV=101, with HIV=113

N = 65 (Fat distribution)
without HIV=13, with HIV=52

Excluded (N = 186)
Pregnancy loss = 2
Infant death = 2
Pregnant again = 3
Telephonic interview due to COVID lockdown (no weight measurement) = 7
Postpartum visit done after 12 months = 72
Lost to follow-up = 100

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HREC 505/2020 & 653/2020

Outcome measures

- **Anthropometry analysis** (study nurse)
  - *Measured*
    - Weight and height
    - Waist and hip circumferences
  - *Calculated*
    - Body mass index (BMI)
    - Waist-hip ratio
    - Total weight change = (postpartum weight) – (self-reported pre-pregnancy weight)
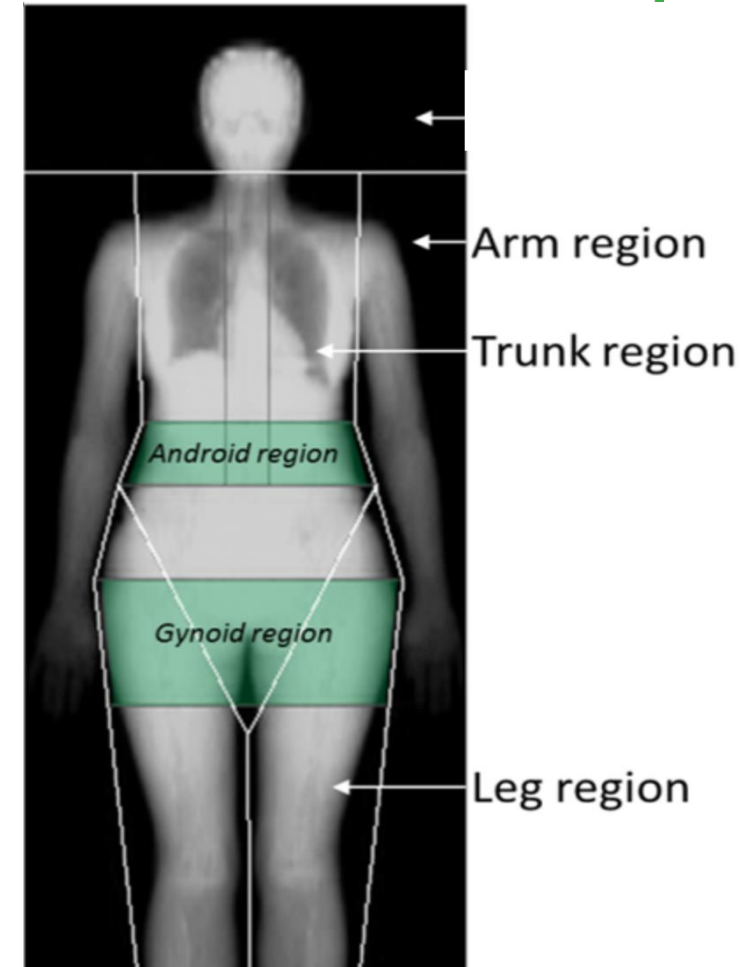   - Visceral adiposity index (adipose tissue dysfunction marker)

Outcome measures

- **Fat distribution analysis**
  - DEXA scan - radiographer

  - *Measured*
    - Fat mass (FM), fat-free mass (FFM), body fat %,
    - Subcutaneous (SAT) and visceral (VAT) adipose tissue FM
    - Trunk, arm, leg, android, gynoid FM

Arm region

Trunk region

Android region

Gynoid region

Leg region

Statistical Analysis

Aim: What is the association of HIV with anthropometry and fat distribution measures?

1. Pregnancy to postpartum anthropometry analysis

2. Postpartum anthropometry analysis

3. Postpartum fat distribution analysis

- Linear (continuous) and Poisson (categorical) regressions, adjusted for age and pre-pregnancy BMI
- Used STATA (tables) and R Studio (figures)

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RESULTS
Baseline characteristics

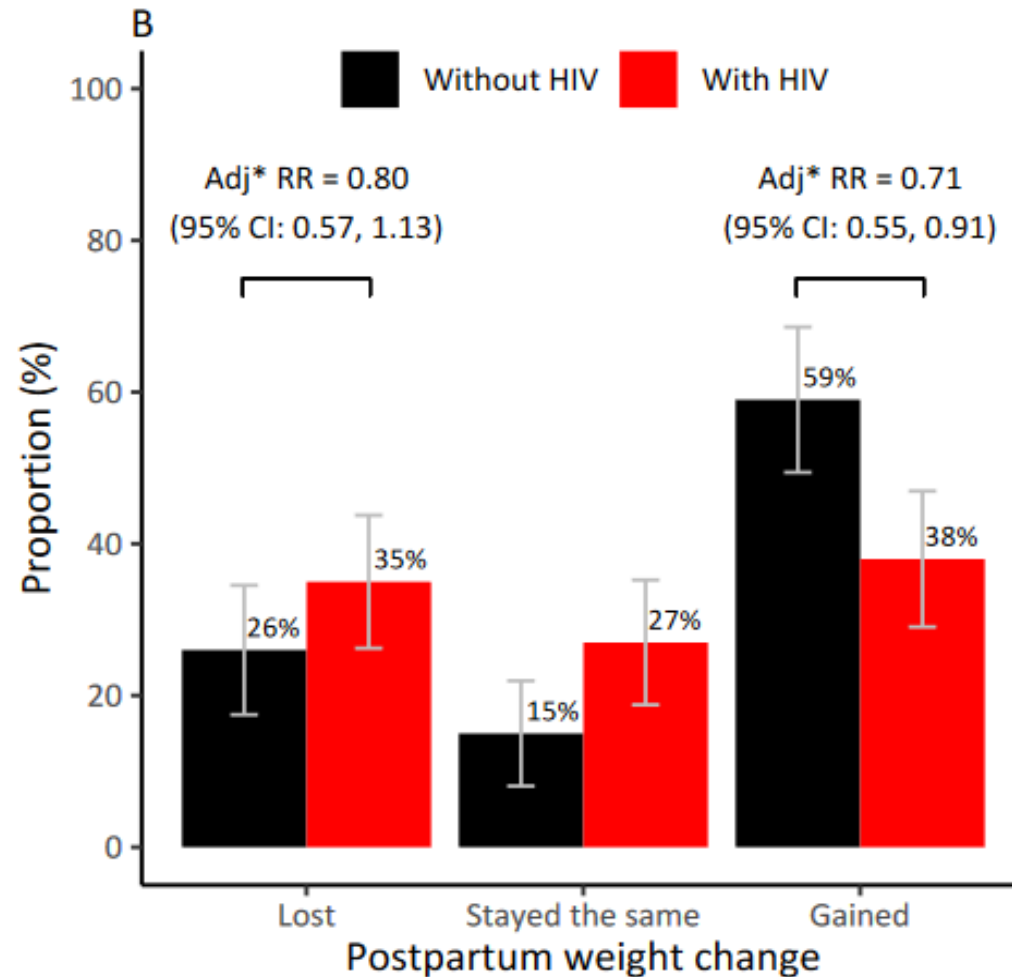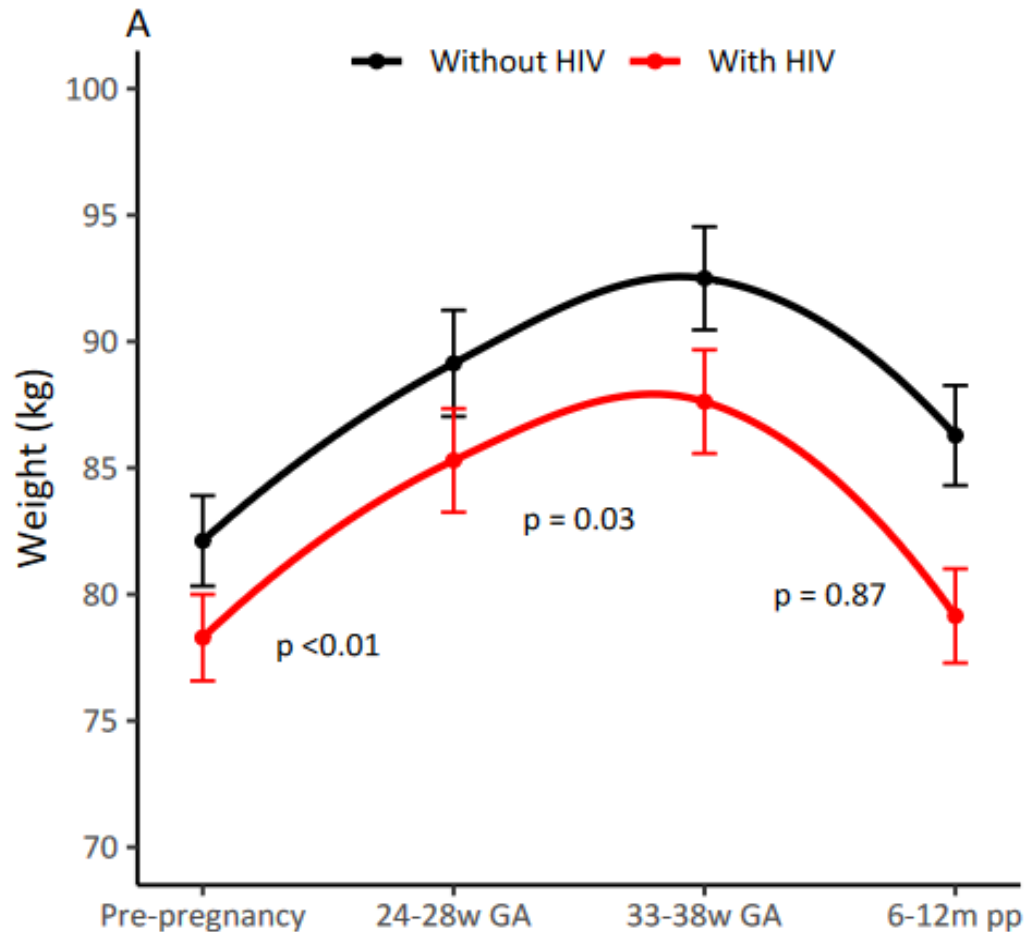|	Total N = 214	Without HIV N = 101	With HIV N = 113	p-value
Median (IQR)				
Age (years)	30 (26-34)	28 (23-31)	32 (28-35)	<0.01
Gestational age (weeks)	25 (24-27)	25 (24-27)	26 (24-27)	0.52
Pre-pregnancy BMI (kg/m^2)	31 (26-36)	32 (28-37)	30 (26-35)	0.11
CD4 count (cells/µL)	454 (334-604)	---	454 (334-604)	---
Viral Load (copies/mL)	15 (15-304)	---	15 (15-304)	---
N (%)				
Pre-pregnancy BMI (kg/m^2)				0.29
Underweight (<18.5)	0 (0)	0 (0)	0 (0)	
Normal (18.5-24.9)	39 (18)	19 (19)	20 (18)	
Overweight (25-29.9)	55 (26)	21 (21)	34 (30)	
Obese (≥30)	120 (56)	61 (60)	59 (52)	

RESULTS

1. Pregnancy to postpartum anthropometry analysis
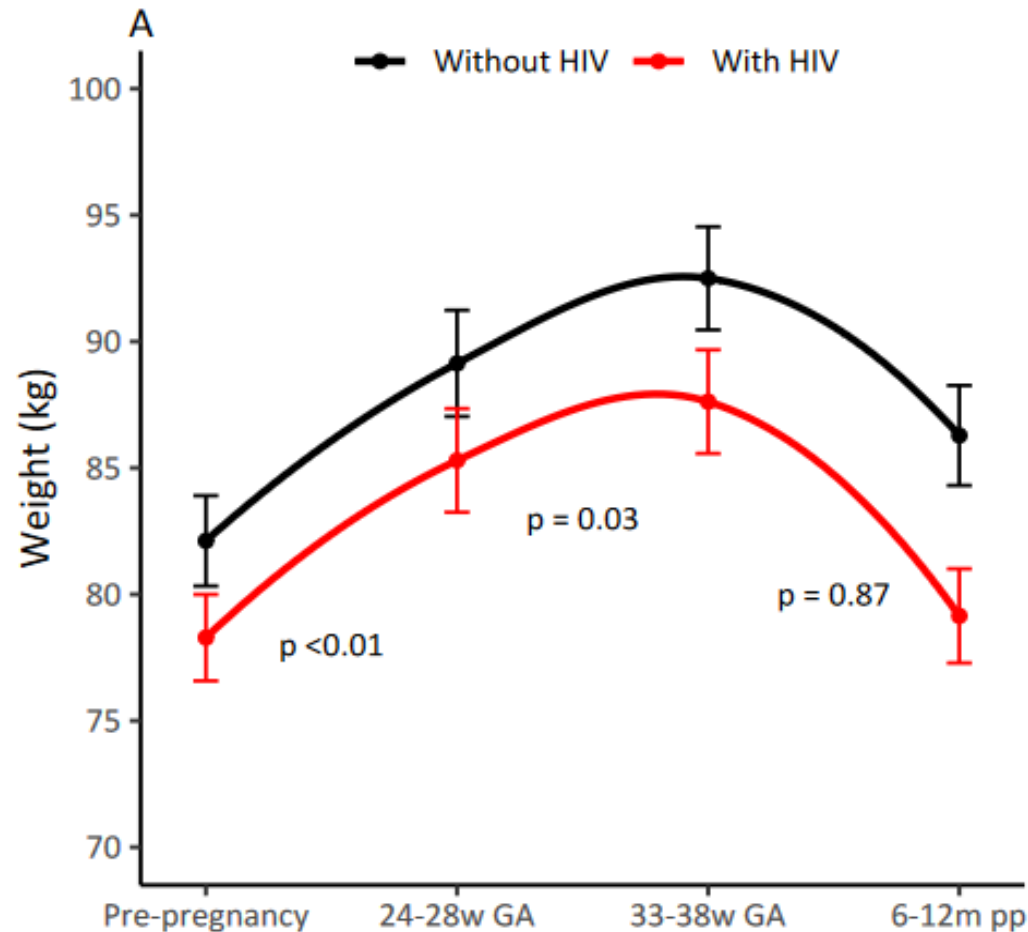
RESULTS

1. Pregnancy to postpartum anthropometry analysis

RESULTS

2. Postpartum anthropometry

	Without HIV N = 101	With HIV N = 113	With HIV (reference – without HIV)	
	Mean (± SD)		Mean difference (95% CI) *	p-value
Weight (kg)	86.3 (19.9)	79.1 (19.8)	-2.79 (-6.17, 0.60)	0.10
BMI (kg/m^2)	33.7 (7.4)	31.0 (7.0)	-1.22 (-2.21, -0.23)	0.02
Waist circumference (cm)	103.5 (16.3)	97.5 (13.6)	-3.65 (-6.66, -0.63)	0.01
Hip circumference (cm)	117.4 (14.5)	112.1 (13.8)	-2.96 (-5.82, -0.11)	0.04
Waist-hip ratio	0.88 (0.09)	0.87 (0.07)	-0.01 (-0.04, 0.01)	0.28
Visceral adiposity index	1.4 (0.8)	1.3 (0.8)	0.04 (-0.19, 0.27)	0.73
	N (%)		Risk ratio (95% CI) *	p-value
BMI (kg/m^2)				
Underweight (<18.5)	1 (1)	1 (1)	0.95 (0.09, 9.56)	0.96
Normal (18.5-24.9)	13 (13)	26 (23)	1.00 (ref)	----
Overweight (25-29.9)	23 (23)	26 (23)	0.89 (0.63, 1.26)	0.50
Obese (≥30)	64 (63)	60 (53)	0.93 (0.79, 1.09)	0.36

*Adjusted for age and pre-pregnancy BMI

RESULTS

3. Postpartum fat distribution

	Without HIV N = 13	With HIV N = 52	With HIV (reference – without HIV)	p-value
	Mean (± SD)		Mean difference (95% CI) *	
Fat mass (kg)	45.9 (14.6)	34.2 (13.3)	-4.25 (-9.81, 1.31)	0.13
Fat-free mass (kg)	45.6 (6.5)	39.8 (6.9)	-1.98 (-5.19, 1.23)	0.22
Body fat (%)	49.1 (5.9)	45.3 (6.4)	0.65 (-3.67, 2.37)	0.66
Trunk FM (kg)	21.3 (7.6)	15.6 (6.6)	-2.04 (-4.73, 0.64)	0.13
Arm FM (kg)	5.7 (2.6)	4.3 (2.3)	-0.37 (-1.66, 0.92)	0.56
Leg FM (kg)	17.9 (6.1)	13.9 (5.1)	-0.68 (-2.88, 1.51)	0.53
Android FM (kg)	3.7 (1.5)	2.7 (1.3)	-0.24 (-0.75, 0.28)	0.36
Gynoid FM (kg)	7.9 (2.4)	6.2 (2.2)	-0.34 (-1.29, 0.61)	0.47
Visceral AT (cm^2)	166.7 (64.7)	117.4 (54.0)	-22.98 (-45.27, -0.69)	0.04
Subcutaneous AT (cm^2)	551.9 (168.4)	442.2 (158.3)	-14.26 (-80.53, 52.01)	0.66

*Adjusted for age and pre-pregnancy BMI. FM - fat mass, AT - adipose tissue

Discussion and Conclusion

- WLHIV gained weight slower in pregnancy and had lower pp anthropometry and fat distribution than those without HIV

- However, pp weight gain and obesity rates were high among WLHIV

- Longer follow-up needed to understand long-term implications on metabolic disease outcomes in WLHIV

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