Hyperglycemia first detected in pregnancy in Cape Town – the need for intervention has never been greater

Tawanda Chivese, Shane A Norris, Naomi Levitt

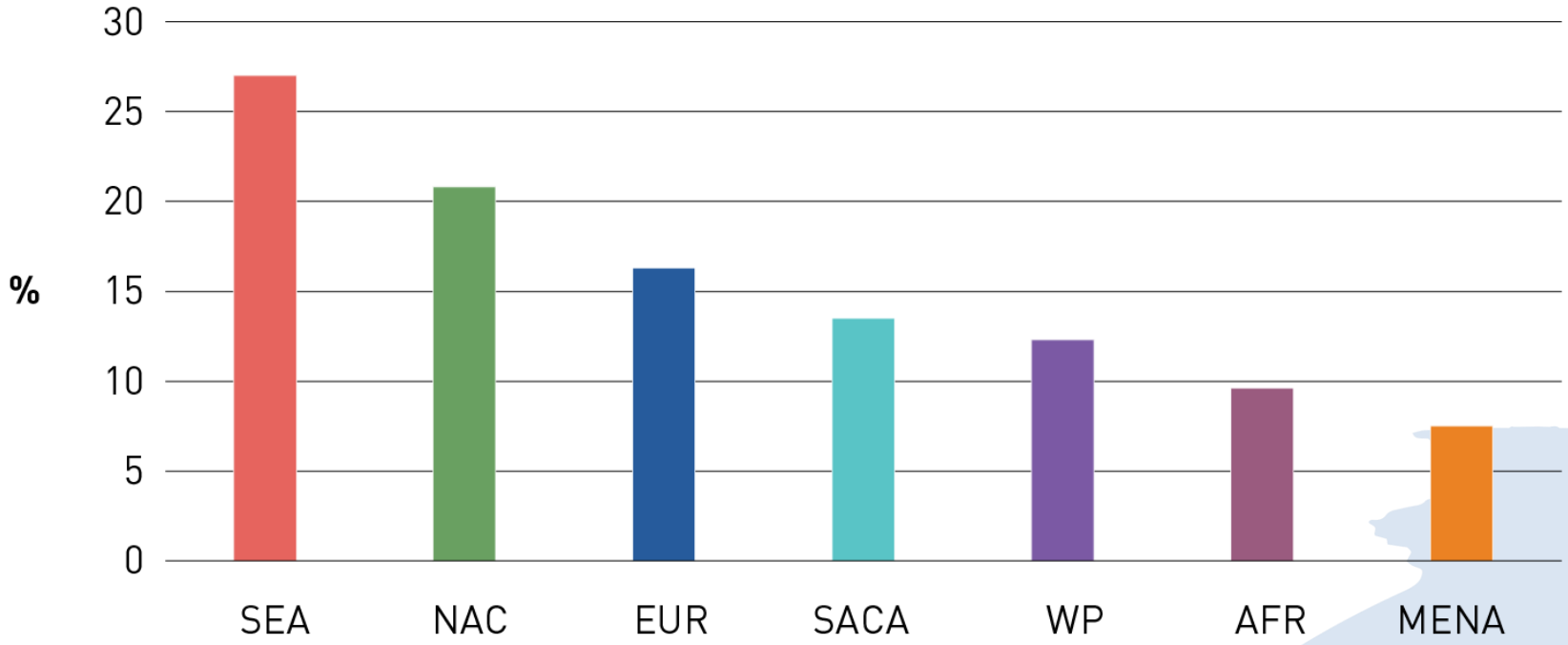
Chronic Disease Initiative for Africa

So, what is hyperglycaemia first detected in pregnancy

- Raised blood glucose detected in women without diabetes, for the first time during pregnancy
- 2 categories
  - Gestational diabetes (blood glucose < T2D diagnostic thresholds outside pregnancy)
  - DM in pregnancy (blood glucose within T2D diagnostic thresholds outside pregnancy
- HFDP increases risk of later T2D --- 7 times
- Increases risk of early CVD
- Increases risk of early metabolic disease in the offspring

HYPERGLYCAEMIA IN PREGNANCY

Prevalence of hyperglycaemia in pregnancy in women (20-49 years) by IDF Region (%), 2019*



*Age-adjusted comparative prevalence

International Diabetes Federation

Atlas, IDF Diabetes. "9th." (2019): 1-3.

Type 2 diabetes in women

- 1 of 14 African women of childbearing age
- Women dual roles
  - Unpaid care givers for family members with diabetes and NCDs
  - Directly affected by diabetes
- Women have higher mortality compared to men
- Transgenerational transmission of metabolic risk if a woman becomes pregnant
- **Thus …. WHO advocates a gender based approach to NCD prevention**

Chivese T, et al BMJ Open 2019;9:e024345.

The PRO2D study – Objectives

- To estimate the progression to T2D and determinant within 6 years after HFDP
- To estimate prevalence of CVD risk factors
- To estimate the prevalence of overweight at birth and at preschool age in the offspring

PRO2D study – Methods

- Data on all women with HFDP managed at GDM collected during August 2010- September 2011
- Data included
  - maternal blood glucose at HFDP diagnosis
  - Post prandial blood glucose during second and third trimester
  - Gestational age, treatments, mode of delivery, birthweight and
  - other clinical data
- The same women and their offspring from the pregnancy recalled during 2016-2017

PRO2D study – Methods (Measurements)

- Data collected – mothers
  - Fasting OGTT blood glucose
  - HbA1c
  - Lipid profile
  - Anthropometry
  - Blood pressure
  - Questionnaire
- Offspring weight and height

PRO2D study – Methods (Outcomes)

- Maternal
  - T2D
  - Dyslipidaemia
  - Raised blood pressure

- Offspring
  - LGA at birth
  - Overweight and obesity at preschool age

PRO2D study –selected characteritics during HFDP

	Overall, N = 443	DIP, N = 165	GDM, N = 278
Maternal age at booking (mean(SD))	30.5 (6.2)	31.2(6.0)	30.0 (6.2)
Maternal BMI at booking (kg/m2, mean(SD))	34.5 (8.6)	35.1 (8.3)	34.2 (8.7)
Fasting glucose at HFDP (mmol/L, median(IQR))	5.8 (5.2-6.6)	7.20 [6.2, 8.5]	5.6 [5.0, 5.9]
OGTT 2- hour glucose at HFDP (median(IQR))	9.1 (8.3-10.6)	11.9 [11.1, 13.4]	8.6 [8.1, 9.4]
Postprandial glucose during pregnancy	5.7 (5.1-6.3)	5.9 (5.2-6.6)	5.6 (5.1- 6.2)
On metformin (n(%))	141 (31.9)	70 (42.4)	71 (25.6)
On insulin (n(%))	111 (25.1)	88 (53.3)	23 (8.3)
Mode of delivery (caesarian section, n(%))	231 (52.4)	96 (58.2)	135 (48.9)
Gestational age at delivery (weeks, median	38 [38-39]	38.0 [37.0,	38.0 [38.0,

PRO2D Findings – Progression to T2D

N at follow-up - 220

GDM - 150

DIP – 70 T2DM

T2DM in GDM – 31%

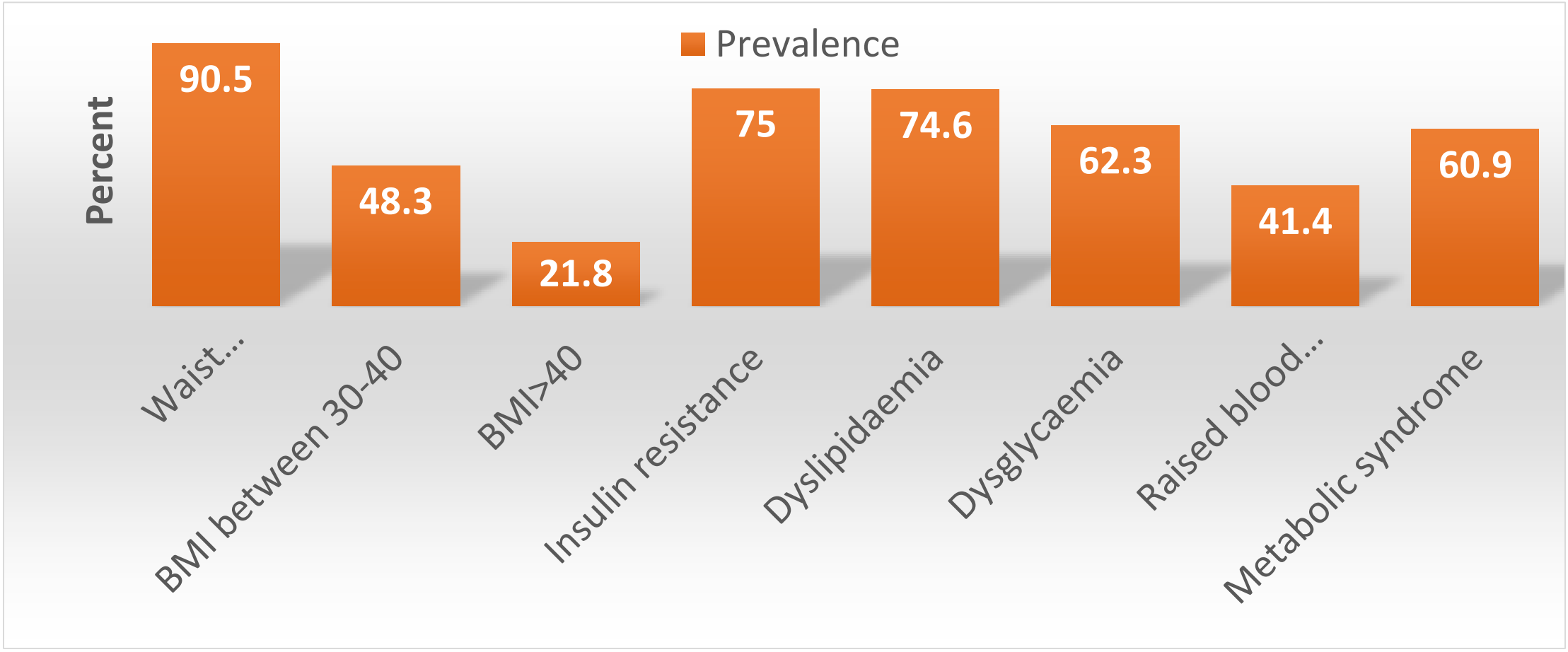
T2DM in DIP -83%

IFG/IGT in GDM – 20%

IFG/IGT in DIP -9%

Chivese T, Norris SA, Levitt NS. Progression to type 2 diabetes mellitus and associated risk factors after hyperglycemia first detected in pregnancy: A cross-sectional study in Cape Town, South Africa. PLoS medicine. 2019 Sep;16(9).

PRO2D Findings – Prevalence of CVD risk factors



Chivese T, Norris SA, Levitt NS. High prevalence of cardiovascular risk factors and insulin resistance 6 years after hyperglycemia first detected in pregnancy in Cape Town, South Africa. BMJ Open Diabetes Research and Care. 2019 Nov 1;7(1).

PRO2D conclusions

- Relatively young women of mean age 37 years at follow up
- Half of women with HFDP (48%) progressed to T2D within 6 years in Cape Town
  - High disease burden, individual treatment burden and high risk of CVD
- High prevalence of Dysglycaemia (>60%), dyslipidaemia (75%) and insulin resistance (75%)
  - Increased risk of early CVD events
- High prevalence of LGA and overweight and obesity at preschool age
  - Children who are overweight or obese – high risk of adulthood obesity
- Maternal glucose control influences weight outcomes during childhood
  - Evidence of transmission of cardiometabolic risk to offspring
  - Need for tighter control

Conclusions and recommendations

- Great need for
  - interventions to prevent HFDP
  - better screening
  - improved and perhaps more frequent follow up
  - post-partum interventions in women with HFDP
  - Interventions for early prevention of childhood overweight and obesity