

Does Pre-pregnancy Maternal Obesity Influence Length of Gestation and Birth Weight (BW)?: A Multi-variate Analysis



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BACKGROUND

- ▼ Obesity is defined as a condition of abnormal or excessive fat accumulation or adipose tissue to the extent that health may be impaired.

WHO 1998

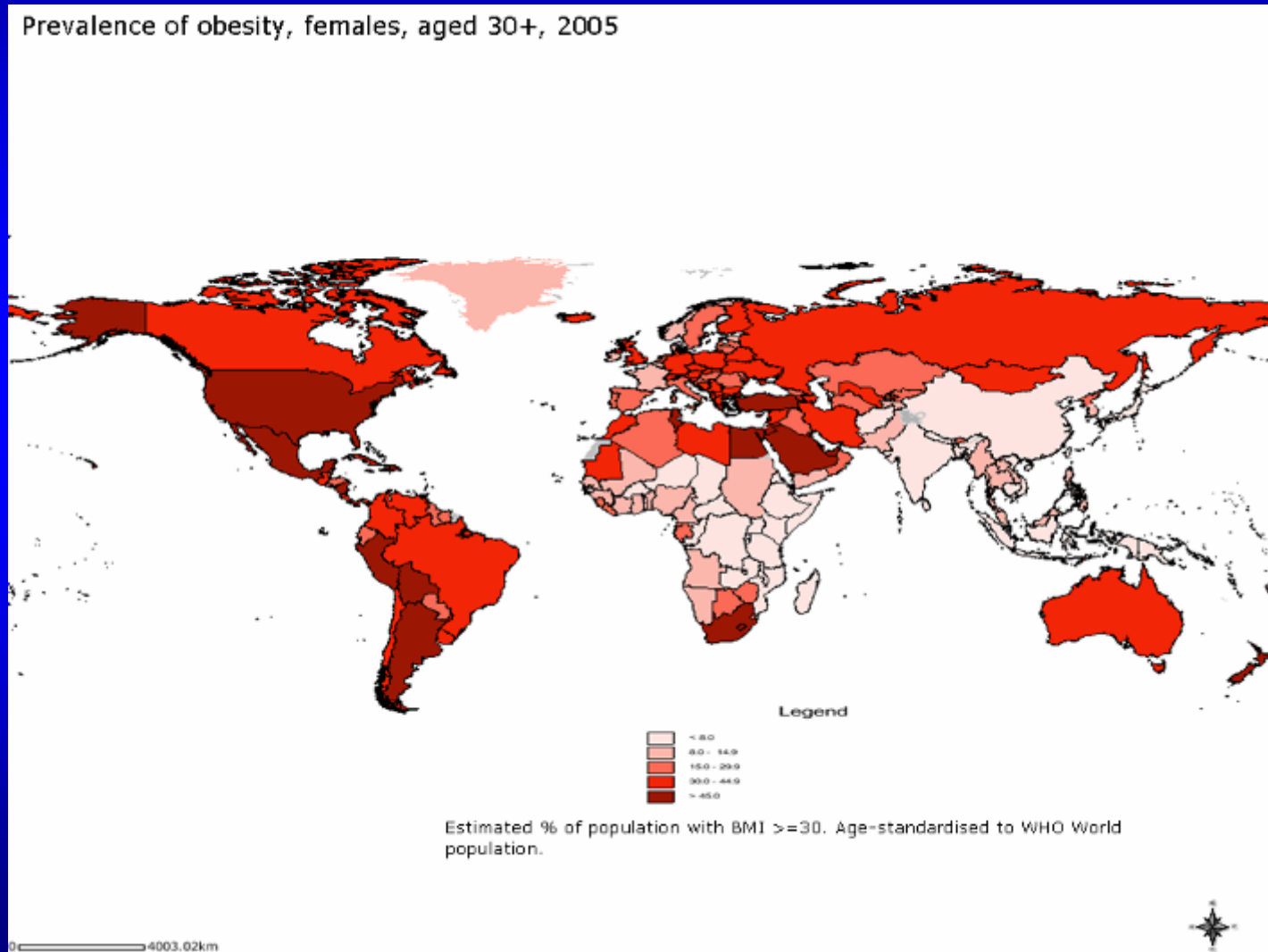
- ▼ Obesity is the new epidemic of the 21st century.
- ▼ It is complex disorder associated with genetic predisposition, as well as dys- and malnutrition, and sedentary life style.
- ▼ Higher prevalence amongst urban than rural populations.
- ▼ The cost of obesity and its associated health consequences is estimated in the U.S. to be between \$27 and \$48 billion.

- ▼ Obesity affects children, adolescents and adult populations
- ▼ It is associated with cardiovascular, metabolic disease (diabetes) and various forms of cancer.
- ▼ By 2025 60% of deaths world wide will be caused by cardiovascular disease and cancer.
- ▼ A greater number of women are becoming obese than men.

Worldwide Obesity in Women

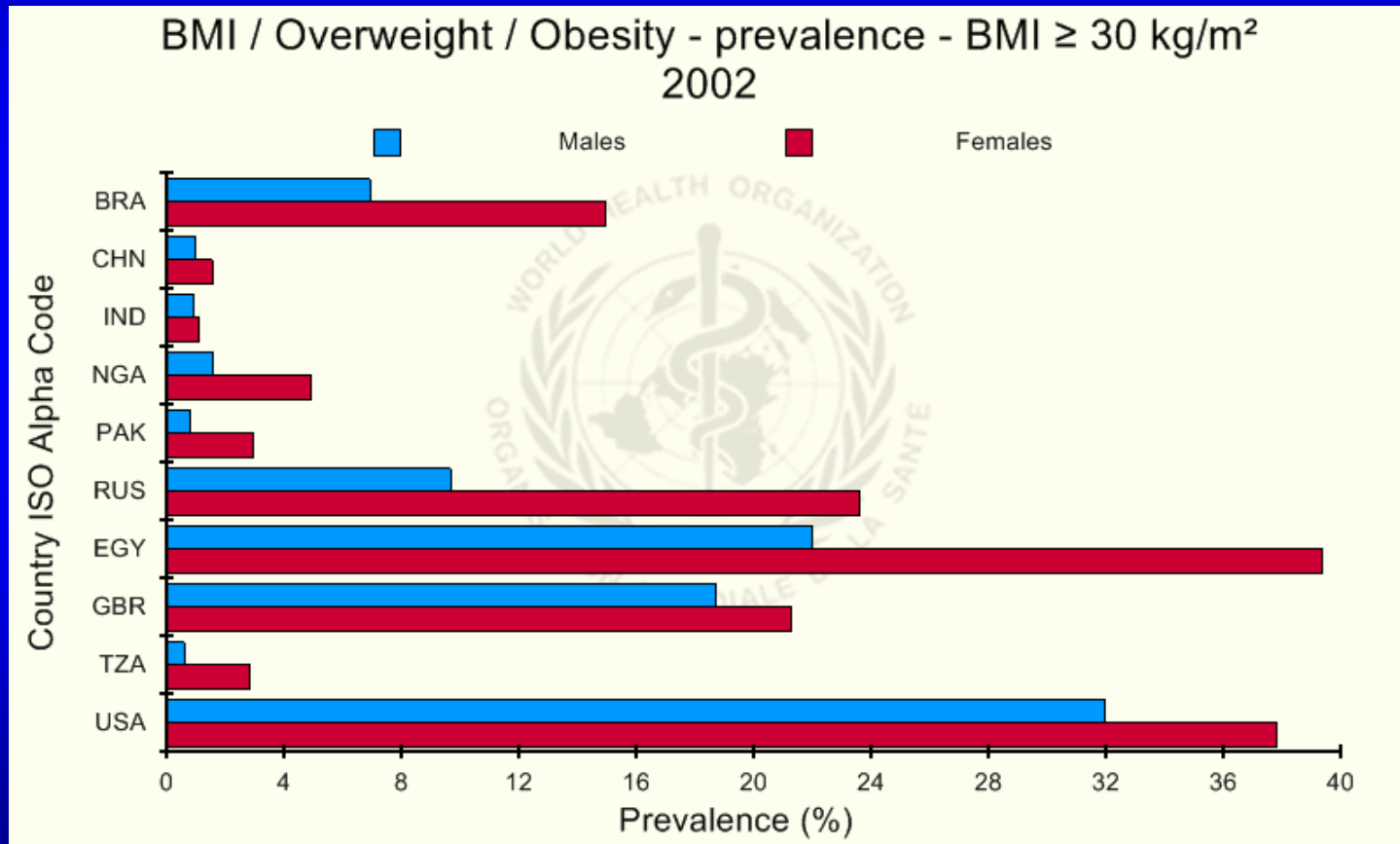
WHO 2005

Prevalence of obesity, females, aged 30+, 2005



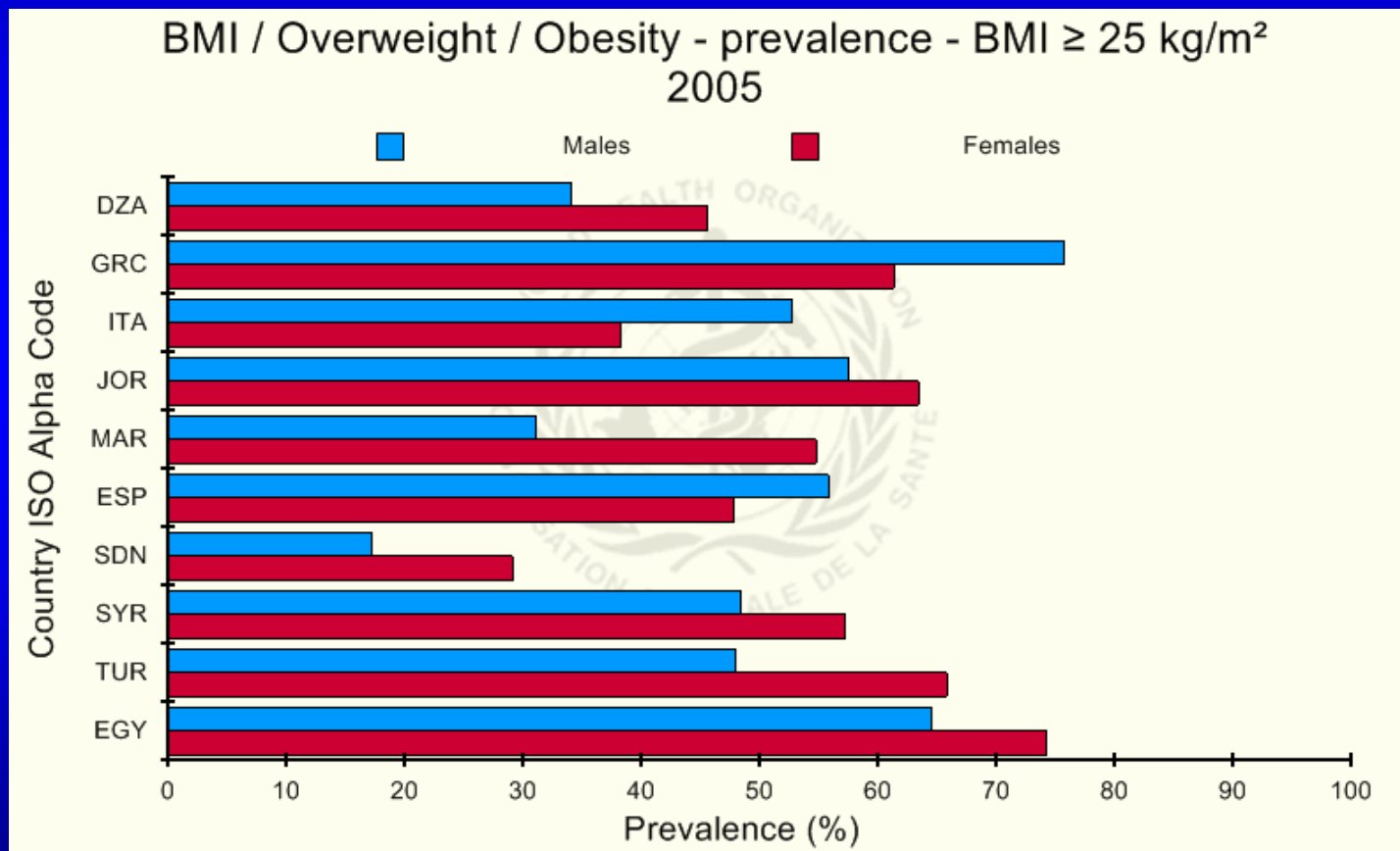
Obesity for 2002

Egypt versus Global



Obesity 2005

Mediterranean



- ▼ Obesity affects both industrialized and developing economies.
- ▼ Recent studies in Egypt demonstrate a greater prevalence of obesity in the urban poor than among the economically affluent
- ▼ This has been attributed to less access to fruits and vegetables, and higher fat and sugar content in the diet, living in more crowded conditions subject to severe stress.

- The number of women starting their pregnancy with overweight and obesity is increasing.**
- Obesity represents a significant reproductive risk due to its association with hypertension, diabetes and other nutritional morbidities.**
- Obesity during pregnancy may also be associated macrosomia and prematurity**

OBJECTIVES

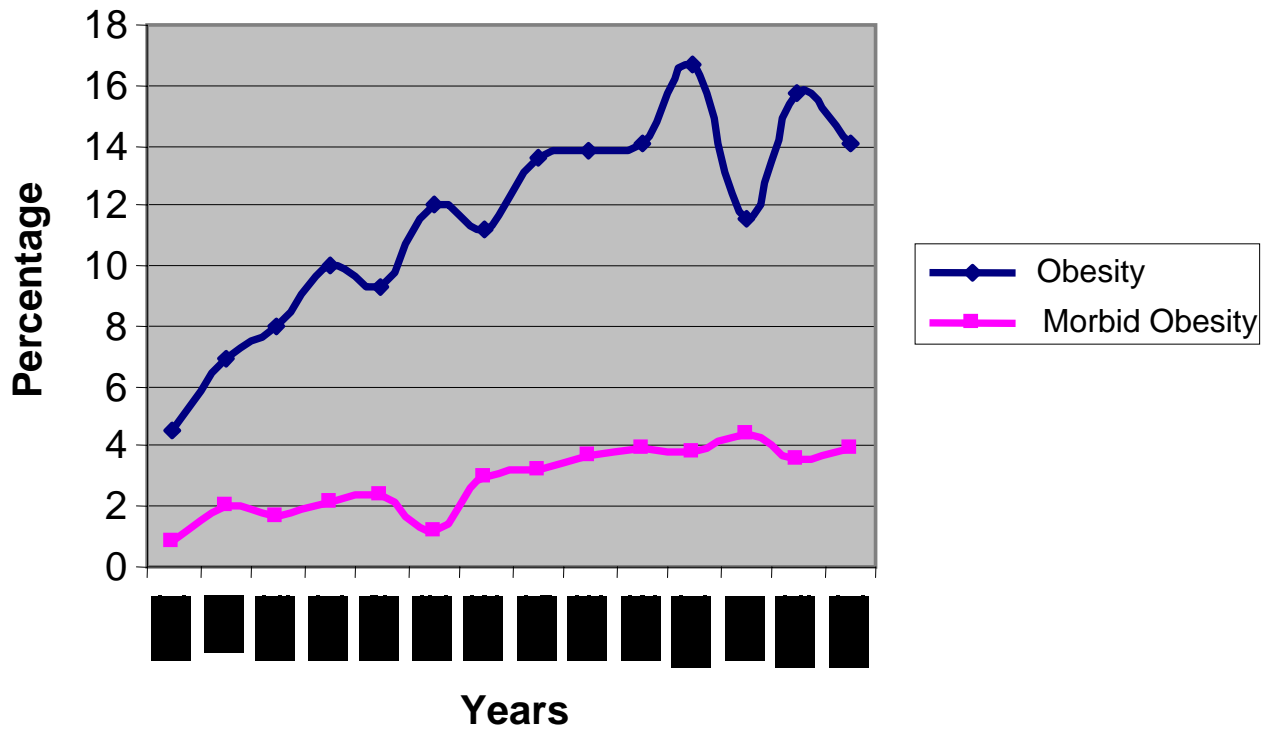
- **Examine effect of obesity (O) and morbid obesity (MO) on birth weight and gestational age in 14,183 mothers with singleton deliveries at George Washington University Hospital between 1992-2003.**
- **Determine whether effects on pregnancy outcomes in (O) and (MO) mothers is influenced by racial affiliation.**

DESIGN AND METHODS

- A retrospective analysis was conducted.
- Mothers were divided into three groups based on pre-pregnancy BMI, into non-obese (BMI <30), Obese (BMI 30-39) and morbidly obese (BMI \geq 40). Underweight mothers (BMI <19) were excluded from this study.
- Analysis was conducted on the entire group and after sub-classification by racial group in bi-variate & multivariate analyses.

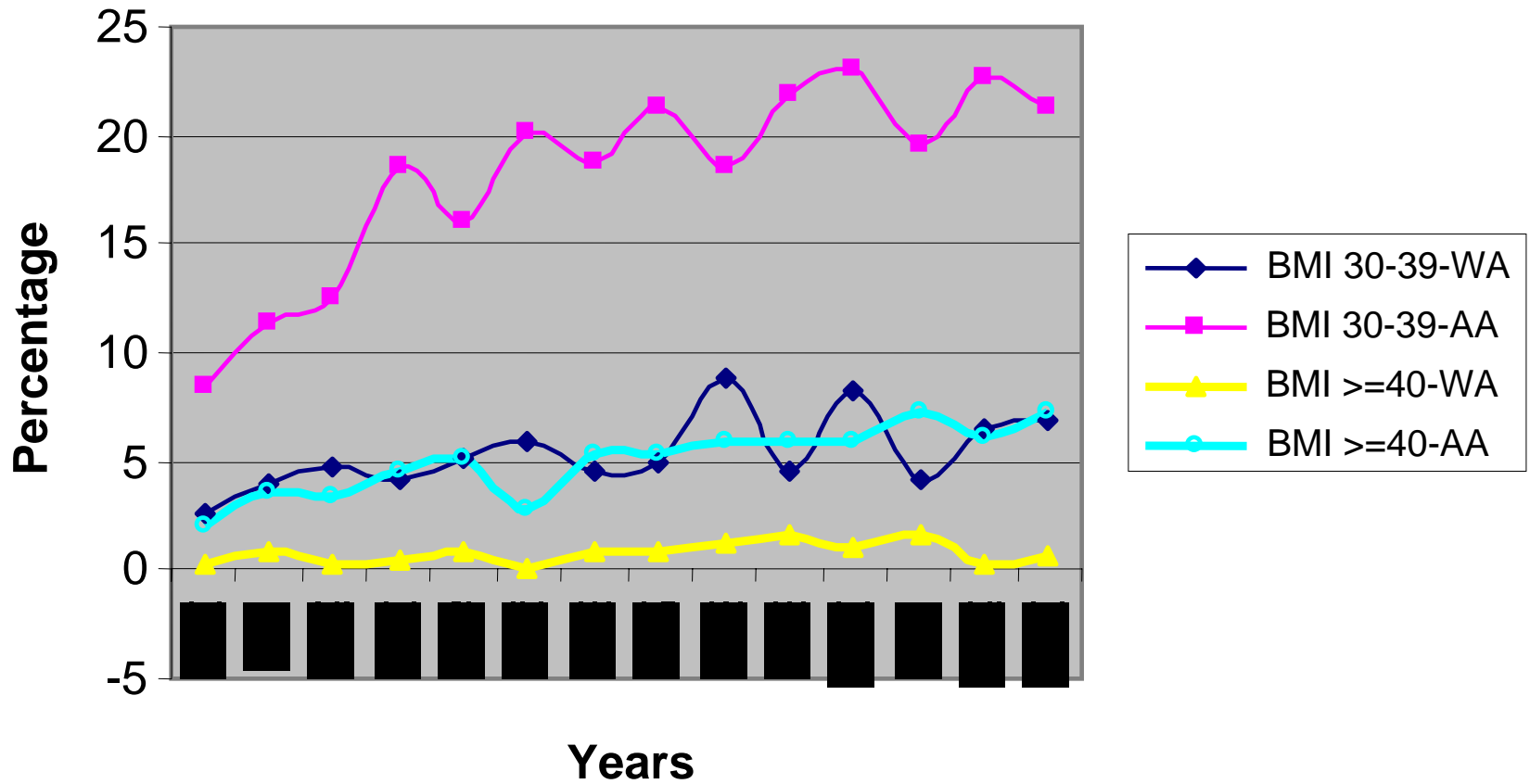
RESULTS

Maternal Pre-pregnancy BMI Over 14 Years



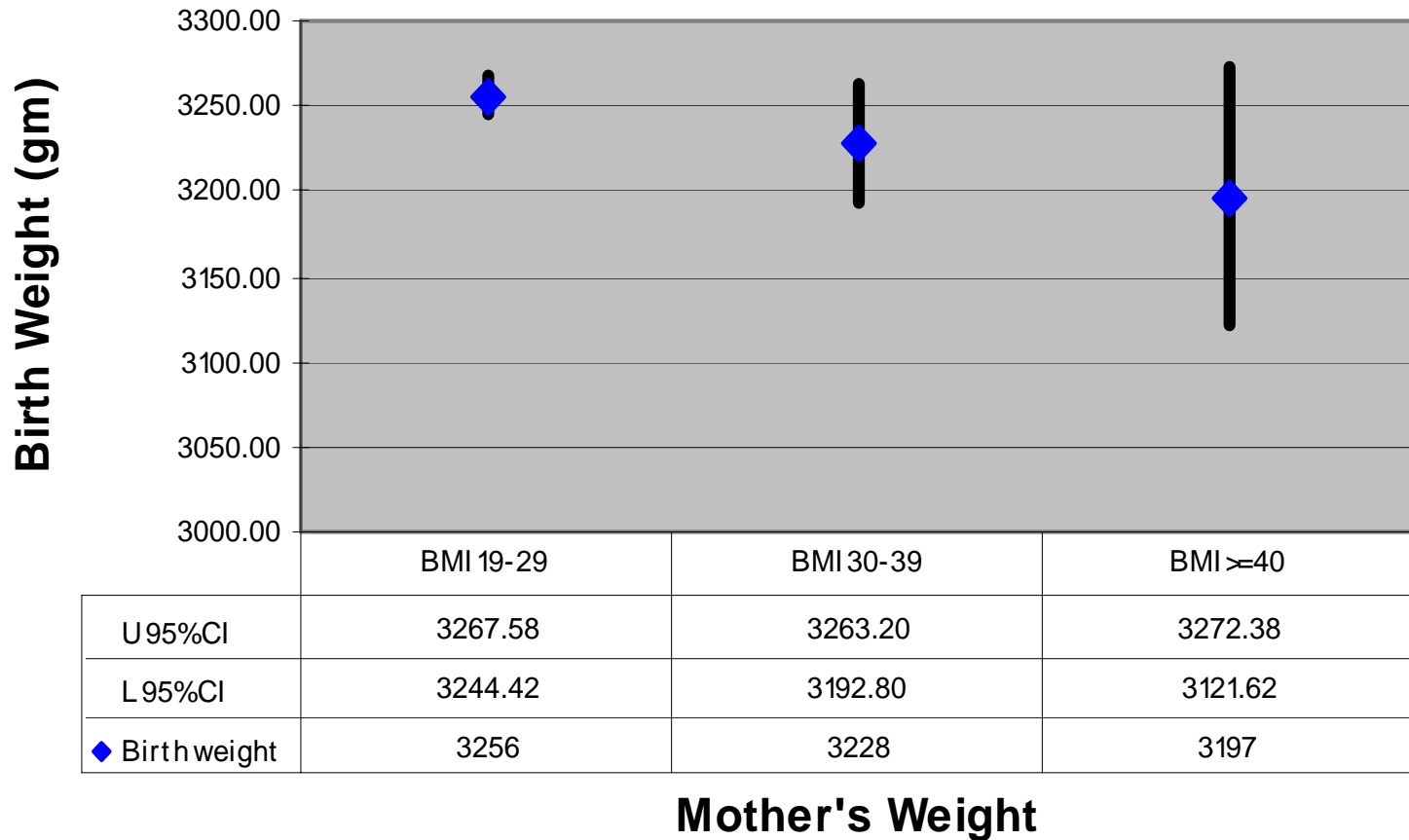
P<0.01

Maternal Pre-pregnancy BMI Over 14 Years by Race



P<0.01

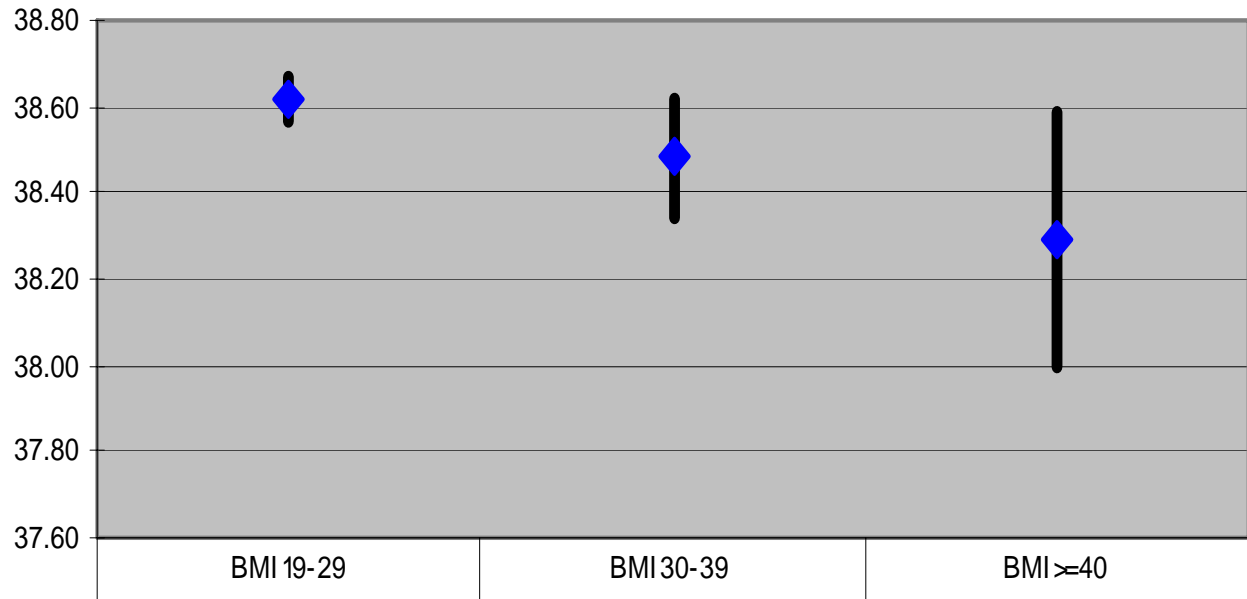
Birth Weight by Maternal Pre-pregnancy BMI



P=0.06

Gestational Age by Maternal Pre-pregnancy BMI

Gestational Age (weeks)



	BMI 19-29	BMI 30-39	BMI ≥40
U 95%CI	38.67	38.62	38.58
L 95%CI	38.57	38.34	38.00
◆ Gestational age	38.62	38.48	38.29

Mother's Weight

P<0.01

Risk Associations with O and MO in Pregnant Mothers

	Not Obese N=12,061	“O” N=1,707	“MO” n-=415	P value
Mat. Age	31.48	30.37	30.04	NS
Multigrav.	11.6%	20.15%	22.4%	0.001
Race AA	40.9%	75.2%	86.2%	0.001
C-Section	25.8%	38.7%	49.9%	0.001
Anemia	18.6%	32.4%	42.1%	0.001
Hypertension	5.1%	13.9%	20.7%	0.001
Diabetes	3.8%	9.8%	16.9%	0.001
Smoking	1.5%	2.9%	20.3%	0.001
Prematurity	14.5%	16.7%	20.3%	0.01
Birth Weight	3256 gm	3228 gm	3197 gm	0.06

Regression Model for Preterm Birth in Caucasian Mothers

Risk Variable	OR	95% CI
“MO”	0.46	0.19 - 1.14
“O”	1.06	0.78 - 1.46
Multi-grav.	1.77	1.33 – 2.42
Anemia	2.41	1.93 – 3.05
Hypertension	2.22	1.67 – 2.98
Diabetes	1.69	1.22 – 2.32
Mat Age	0.97	0.96 – 0.99

Regression Model for Preterm Birth in African American Mothers

Risk Variable	OR	95% CI
“MO”	0.57	0.42 – 0.77
“O”	0.57	0.47 – 0.68
Multi-grav.	1.9	1.5 – 2.4
Anemia	1.4	1.2 – 1.6
Hypertension	2.3	1.9 – 2.8
Diabetes	1.6	1.2 – 2.1
Mat Age	0.99	0.98 – 1.0

Regression Model for Birthweight in Caucasian Mothers

Risk Variable	Parameter Est.	P value
“MO”	152 \pm 60	0.01
“O”	74 \pm 22	0.0009
Male Gender	135 \pm 10	0.0001
Anemia	-1 \pm 19	0.9
Hypertension	-115 \pm 25	0.0001
Diabetes	122 \pm 26	0.0001
Mat Age	3.2 \pm 1	0.004
Smoking	- 156 \pm 54	0.004

Regression Model for Birthweight in African American Mothers

Risk Variable	Parameter Est.	P value
“MO”	77 ± 27	0.004
“O”	46 ± 15	0.002
Male Gender	97 ± 12	0.0001
Anemia	1.3 ± 13	0.9
Hypertension	-116 ± 21	0.0001
Diabetes	120 ± 25	0.0001
Mat Age	4 ± 1	0.0001
Smoking	$- 220 \pm 37$	0.0001

CONCLUSIONS

- **Obesity and morbid obesity is significantly increasing in pregnant women over the past decade.**
- **In bivariate analysis it appears that obesity and morbid obesity are associated with a trend towards lower birthweight and a significant decrease in gestational age.**
- **In multivariate analysis this trend is reversed for birthweight in Caucasian and African American mothers.**

CONCLUSIONS

- In multivariate analysis for the risk of prematurity there was no association between O and MO with prematurity in Caucasian mothers.
- In African American mothers O and MO are associated with a protective effect against prematurity.
- O and MO seem to exert their negative effects on gestational age and birthweight through associated risk factors that include hypertension, diabetes and anemia.