Impact of BMI Classifications and Obesity Definitions on Perinatal Outcomes Among Asian American Pregnant Patients

Kandace Fung BA[1,2], Apekshya Nepal BS[2], Kennedi Randolph BS[2], Heidi Kim BA[2], Nazow Tarakai BA[2], Jiayue Chen MPH[3], Lorna Kwan BS, MPH[3], Christina S. Han MD[4]

[1]Charles R. Drew University of Medicine and Science; [2]David Geffen School of Medicine at University of California, Los Angeles (UCLA); [3]Department of Urology, David Geffen School of Medicine at University of California, Los Angeles (UCLA); 4Department of Obstetrics and Gynecology, David Geffen School of Medicine at University of California, Los Angeles (UCLA)

Background:

- Asian Americans (AsA) are disproportionately affected by type 2 diabetes and have increased cardiovascular risk factors
- WHO has set different cut-offs for obesity for AsA populations
  - International standard (IS-BMI): BMI ≥30 kg/m²
  - Asian populations (AS-BMI): BMI ≥27.5 kg/m²
- This specific BMI threshold has not been widely applied in practice

Objective:

- To evaluate how applying the AS-BMI versus IS-BMI thresholds affects pregnancy and neonatal outcomes in AsA and non-AsA patients

Study Design:

- Retrospective case-control; Delivered at 2 academic centers (7/2022-12/2023)
- Inclusion: 16-49 years; AsA or NHW race; Singleton; Early pregnancy BMI recorded
- Exclusion: Aneuploidy, pregestational diabetes, multiple gestations, bariatric surgery, cystic fibrosis, or chronic systemic steroid use
- Comparisons made between:
  - AsA groups with IS-BMI and AS-BMI
  - AsA with IS-BMI : non-ASA with IS-BMI
  - AsA with AS-BMI : non-ASA with IS-BMI
- T-test, Kruskal-Wallis, and Chi-squared as appropriate

Results: N=1882 deliveries

AsA (42.6%) vs non-AsA (57.4%)

- English as primary language (95.6% vs 99.3%; p<.0001)
- Early pregnancy BMI (22.4 (20.2, 25.8) vs 23.1 (21.2, 26.2); p<0.0001)
- No differences in age, insurance, employment status

Table 1: Evaluating AsA populations by IS-BMI vs AS-BMI

- Both criteria showed that those who were above cutoff had:
  - Higher early pregnancy BMI (p<0.0001)
  - Lower total weight gain (p<0.0001)
  - Less likely to meet IOM standard (p<0.0001; p=0.0004)
  - Higher GDM prevalence (p=0.0010; p<0.0001)

IS-BMI: BMI above cut-off had:	AS-BMI: BMI above cut-off had:
• More neonatal hypoglycemia (17.6% vs 7.5%; p<0.01)	• More induction (42.6% vs 40.5%; p=0.0037) • Higher birth weight (3290 vs 3175; p=0.0099) • More macrosomia (7.4% vs 2.8%; p=0.0104)

Table 2: Evaluating Non-AsA IS-BMI outcomes to AsA by IS-BMI and AS-BMI

Using IS-BMI	Using Race-appropriate BMI
AsA vs. non-AsA	**AsA-AS-BMI vs. non-AsA-IS-BMI**
• No difference in pregnancy and neonatal outcomes	• Met IOM standard (22% vs 0%; p<0.0001) • gHTN (8.3% vs 18%; p=0.0303) • Induction (42.6% vs 64.8%; p=0.0054)

Standard BMI thresholds may underestimate obesity-related pregnancy risk in Asian-American patients

Questions?
Take a picture of this QR code to access the poster and additional data, or email at kfung@mednet.ucla.edu

Conclusion:

- **AS-BMI threshold identified a broader at-risk population**
- Compared to obese non-AsA, both AsA cohorts, regardless of BMI standard, did not have significant differences in mode of delivery, lacerations, or birth weight compared to non-AsA cohort
- **Further investigation needed into risk stratifying and clinical guidance for Asian American populations**

Table 1: Phenotypic comparisons of study participants by BMI in AsA individuals

Phenotypic Comparisons	WHO International Standard (BMI ≥30 kg/m²)		p-value*	WHO Asian Standard (BMI ≥27.5 kg/m²)		p-value**
	BMI <30 kg/m² (n=750)	BMI ≥30 kg/m² (n=51)		BMI <27.5 kg/m² (n=680)	BMI ≥27.5 kg/m² (n=121)	
Earliest pregnancy BMI	22.1 (20.1, 25.0)	32.8 (31.3, 35.4)	**<.0001**[1]	21.7 (20.0, 24.2)	29.7 (28.4, 32.4)	**<.0001**[1]
Total Weight Increase (kg)	12.2 (9.7, 15.0)	8.7 (5.0, 12.2)	**<.0001**[1]	12.3 (9.8, 15.2)	10.2 (6.4, 13.8)	**<.0001**[1]
Met IOM Standard	273 (38.9%)	0 (0.0%)	**<.0001**[2]	247 (39.0%)	26 (22.0%)	**0.0004**[2]
GDM Prevalence	69 (9.2%)	12 (23.5%)	**0.0010**[2]	56 (8.2%)	25 (20.7%)	**<.0001**[2]
Type of GDM						
A1GDM	53 (94.6%)	6 (100.0%)	0.5611[2]	44 (97.8%)	15 (88.2%)	0.1183[2]
A2GDM	3 (5.4%)	0 (0.0%)		1 (2.2%)	2 (11.8%)	
GA at Delivery	39.0 (38.0, 39.0)	38.5 (37.0, 39.0)	0.0515[1]	39.0 (38.0, 39.0)	39.0 (38.0, 39.0)	0.4076[1]
Preterm Delivery	52 (6.9%)	4 (7.8%)	0.8053[2]	46 (6.8%)	10 (8.3%)	0.1272[2]
Induction	229 (40.3%)	13 (50.0%)	0.3258[2]	213 (40.5%)	29 (42.6%)	**0.0037**[2]
Mode of Delivery						
C-section	151 (26.6%)	11 (42.3%)	07842[2]	138 (26.2%)	24 (35.3%)	0.1145[2]
Vaginal Delivery	417 (73.4%)	15 (57.7%)		388 (73.8%)	44 (64.7%)	
Lacerations (OASIS)	28 (3.7%)	2 (3.9%)	0.9454[2]	28 (4.1%)	2 (1.7%)	0.1883[2]
EBL (mL)	200.0 (150.0, 350.0)	200.0 (150.0, 350.0)	0.5304[1]	200.0 (150.0, 350.0)	200.0 (150.0, 400.0)	0.7311[1]
Birth Weight (g)	3189.9 (2899.9, 3487.1)	3285.1 (2945.0, 3515.4)	0.3546[1]	3175.2 (2890.8, 3480.0)	3290.0 (2990.1, 3530.1)	**0.0099**[1]
Macrosomia	25 (3.3%)	3 (5.9%)	0.3375[2]	19 (2.8%)	9 (7.4%)	**0.0104**[2]
Shoulder Dystocia	1 (0.2%)	0 (0.0%)	0.8304[2]	1 (0.2%)	0 (0.0%)	0.7190[2]
Neonatal Hypoglycemia	56 (7.5%)	9 (17.6%)	**0.0100**[2]	54 (7.9%)	11 (9.1%)	0.6696[2]

[1]Kruskal-Wallis p-value; [2]Chi-Square p-value; *comparing AsA individuals using WHO international standard; ** comparing AsA WHO Asian Standard ; Data presented as n (%) or median (interquartile range)
Abbreviations: AsA – Asian American, GDM – gestational diabetes mellitus, A1GDM – diet-managed GDM, A2GDM – medication-managed GDM, GA – gestational age, OASIS - Obstetric Anal Sphincter Injury; EBL – estimated blood loss; SGA – small for gestational age

Table 2: Phenotypic comparisons of study participants by different BMI cut-offs in non-AsA and AsA individuals

Phenotypic Comparisons	Non-AsA BMI ≥30 kg/m² (n=100)	AsA BMI ≥30 kg/m² (n=51)	AsA BMI ≥27.5 kg/m² (n=121)	p-value*	p-value**
Early Pregnancy BMI	34.4 (31.7, 39.6)	32.8 (31.3, 35.4)	29.7 (28.4, 32.4)	**0.0331**[1]	**<.0001**[1]
Total Weight Increase (kg)	11.3 (5.4, 14.7)	8.7 (5.0, 12.2)	10.2 (6.4, 13.8)	0.0914[1]	0.4060[1]
Met IOM Standard	0 (0.0%)	0 (0.0%)	26 (22.0%)	N/A	**<.0001**[2]
GDM	12 (12.0%)	12 (23.5%)	25 (20.7%)	0.0669[2]	0.0861[2]
Gestational HTN	18 (18.0%)	4 (7.8%)	10 (8.3%)	0.0943[2]	**0.0303**[2]
Preeclampsia without Severe Features	3 (3.0%)	1 (2.0%)	5 (4.1%)	0.7069[2]	0.6538[2]
Preeclampsia with Severe Features	2 (2.0%)	1 (2.0%)	2 (1.7%)	0.9870[2]	0.8472[2]
GA at Delivery	39.0 (38.0, 39.0)	38.5 (37.0, 39.0)	39.0 (38.0, 39.0)	0.0946[1]	0.9319[1]
Induction	59 (64.8%)	13 (50.0%)	29 (42.6%)	0.1703[2]	**0.0054**[2]
Mode of Delivery					
C-section	28 (30.8%)	11 (42.3%)	24 (35.3%)	0.2710[2]	0.5474[2]
Vaginal Delivery	63 (69.2%)	15 (57.7%)	44 (64.7%)		
Lacerations (OASIS)	3 (3.0%)	2 (3.9%)	2 (1.7%)	0.6977[2]	0.6144[2]
EBL	200.0 (150.0, 300.0)	200.0 (150.0, 350.0)	200.0 (150.0, 400.0)	0.7647[2]	0.5027[2]
Birth weight (g)	3330.0 (3060.1, 3620.0)	3285.1 (2945.0, 3515.4)	3290.0 (2990.1, 3530.1)	0.4336[1]	0.7278[1]

[1]Kruskal-Wallis p-value; [2]Chi-Square p-value; *comparing AsA individuals using WHO international standard; ** comparing AsA WHO Asian Standard ; Data presented as n (%) or median (interquartile range)
Abbreviations: AsA – Asian American, GDM – gestational diabetes mellitus, A1GDM – diet-managed GDM, A2GDM – medication-managed GDM, GA – gestational age, OASIS - Obstetric Anal Sphincter Injury; EBL – estimated blood loss; SGA – small for gestational age