



COLUMBIA UNIVERSITY MEDICAL
CENTER

Comparison of Apgar score, skin-to-skin initiation time and resuscitative interventions in Black vs. non-Black neonates

Charlotte Thompson BA, Sandy Kim MD, James Conwell DO,
Jean R Guglielminotti MD PhD, Ruth Landau MD



Background & Hypothesis

- **Black neonates have “falsely” lower Apgar scores due to darker skin pigmentation**
 - Scores do not correlate with cord blood gas values¹⁻³
 - Scores do not correlate with pulse oximetry values^{4,5}
 - Population datasets show darker racial and ethnic groups are less likely to have high Apgar scores than white counterparts^{6,7}
- **We hypothesized that Black neonates have a lower Appearance score and thus lower Apgar scores leading to:**
 - Delayed skin-to-skin initiation
 - More resuscitative interventions

1. Marx et al, Correlation of biochemical data with Apgar scores at birth and at one minute. *Br J Anaesth* 1977

2. Yama et Marx Race and Apgar scores. *Anaesthesia*, 1991

3. Edwards et al Associations between provider-assigned Apgar score and neonatal race. *Am J Obstet Gynecol* 2023

4. Chauhan, Correlation of pulse oximetry and Apgar scoring in the normal newborns. *J Clin Neonatol*, 2013

5. Dawson et al Assessing the tongue colour of newly born infants may help to predict the need for supplemental oxygen in the delivery room. *Acta Paediatr*

6. Doyle et al Race/ethnicity, Apgar, and infant mortality. *Population Research and Policy Review* 2013

7. Grunebaum et al Hidden in plain sight in the delivery room - the Apgar score is biased. *J Perinat Med* 2023

Study Design & Methods

- An observational cross-sectional study of neonates born via cesarean delivery between 11/2023 and 11/2025 at two centers
- Exposure of neonate race
- **Primary outcome was Apgar score at 1 min (Appearance score)**
- Secondary outcomes are skin-to-skin initiation time and resuscitative interventions
 - Resuscitative interventions included O2 blowby, positive pressure ventilation, intubation, NICU admission

Results

Table 1. Neonatal outcomes by race and Apgar score

	Black (n=91)	White (n=165)	Hispanic (n=548)	P value
Appearance score = 0 at 1 min	56 (61.5%)	80 (48.5%)	218 (39.7%)	0.0002
Apgar score at 1 minute				
≤7, n=110	18 (19.8%)	28 (17%)	64 (11.7%)	0.001
8, n=306	43 (47.2%)	69 (41.8%)	194 (35.4%)	
9, n=388	30 (33%)	68 (41.2%)	290 (52.9%)	
Clinical outcomes				
Skin-to-skin time (min), n= 469	87.2 ± 33.6 (n=48)	76.9 ± 25.3 (n=102)	74.1 ± 30.6 (n=319)	0.02
Resuscitative interventions (yes), n=805	29 (31.9%)	54 (32.7%)	122 (22%)	0.007
Apgar scores at 1 minute and skin-to-skin times and resuscitative interventions				
Apgar score	Skin-to-skin time (min)	P value	Interventions	P value
Appearance score = 0 at 1 min	81.1 ± 29.7 (n=238)	< 0.001	175 (41.8%) (n=319)	< 0.001
Appearance score = 1 at 1 min	72.2 (28.0%)		65 (12.7%) (n=511)	
≤7, n=57	83.3 ± 29.5	< 0.001	111 (81.6%)	0.002
8, n=216	80.7 ± 29.4		101 (28.1%)	
9, n=282	71.2 ± 27.9		28 (6.4%)	

Conclusion & Discussion

- Lower Apgar scores are associated with delayed skin-to-skin times and more interventions
- **Black neonates have significantly later skin-to-skin initiation times and lower Apgar scoring, due to lower Appearance scores, than Hispanic neonates.**
- There was no difference in resuscitation interventions in Black vs. non-Black neonates
- This could be due to differences of interpretations of Apgar scores based on neonate race, or if resuscitation efforts are based on clinical indications rather than Apgar scores.
- Future studies evaluating modified Apgar score without appearance component and its effect on downstream outcomes such as skin-to-skin initiation times and resuscitative interventions is warranted.