

Why is preterm birth stubbornly higher in African-Americans?

Opinion

In the US, 70% of perinatal mortalities are in premature infants.¹ CDC (Center of Disease Control and Prevention) reported that in 2012, 1 of every 9 babies was born premature in the United States.² According to the March of Dimes 2014 Premature Birth Report Card: Hispanic 11.6%, White 10.3%, and Black 16.5%.³ Additionally, although most black women give birth at term, on average, black women are about 60% more likely to have a premature baby compared to white women (CDC 2012). The reasons for the difference between black and white/Hispanic women remain unknown and are an area of intense research.² Limited understanding and lack of reliable biomarkers contribute to the difficulty in early identification of at risk individuals then the implementation of effective preventive strategy and treatment protocol of preterm birth (PTB). Higher incidence of PTB among African-Americans has been attributed to social determinants of health.¹ Recent CDC report suggests that social determinants of health for Hispanics are similar to those of African-Americans⁴ but PTB is persistently higher in African-Americans compared to Caucasians or Hispanics.¹ The question is why? Since, the most common conditions that are associated with PTB are infection and inflammation, pathways regulating these processes may provide therapeutic targets and improve prevention strategies.⁵ As vitamin D is important in regulation of immune responses, we hypothesize that insufficiency (serum level 21-29ng/ml) or deficiency (serum level ≤ 20 ng/ml) of vitamin D, enhance susceptibility to infection and/or pro-inflammatory milieu, and increase risk of PTB.⁶ It was reported earlier that Hypovitaminosis D and PTB are more prevalent among African Americans (AAs) than their Caucasian (Cau) counterparts.⁷ Vitamin D (vit D) deficiency in AA is attributed to reduced UV light penetration through skin due to higher melanin pigmentation and consequent decrease in the cutaneous vit D synthesis. Racial differences could also be attributable to varying dietary intake of vit D.^{8,9} Indeed, we have recently reported that vitamin D deficiency is associated with an increased risk of PTB in African-Americans and Caucasians.¹⁰ Additionally, we have demonstrated that vitamin D elicits anti-inflammatory response, and decreases expression of contractile factors in human uterine smooth muscle cells.¹¹ Furthermore, specific vitamin D receptor polymorphism has been associated with increased risk of spontaneous idiopathic preterm birth.¹² As vitamin D deficiency is epidemic among African-Americans, we believe the stubbornly high PTB rate in African-Americans is, at least partially, a consequence of low Vitamin D levels. Importantly, Endocrine Society recommends not only screening of all pregnant women for vitamin D deficiency but also treating vitamin D deficiency once diagnosed.¹³ The extent to which health care providers adhere to this particular recommendation however is unclear. Among obstetrical societies, ACOG has issued brief committee opinion in July 2011 stating that there is insufficient evidence to recommend vitamin D supplementation for prevention of preterm birth.¹⁴ However, in light of accumulating compelling recent literature.^{11,13} Since issuance of that committee opinion, we would encourage reconsideration of evaluating and possibly adapting the

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Endocrine Society policy (which is co-sponsored by The Institute of Medicine), which could likely have positive impact and may help reduced the persistently high PTB rate and associated high infant mortality rate in this population. This is a simple, inexpensive, yet potentially important step that can be applied now, while we all, as a nation, are attempting to address chronic social challenges to improve health for all.

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Conflicts of interest

The authors declare that there is no conflict of interest.

References

1. Goldenberg RL, Rouse DJ. Prevention of premature birth. *N Engl J Med.* 1998;339(5):313-320.
2. Preterm Birth. Division of reproductive health, National center for chronic disease prevention and health promotion, USA. 2014.
3. March of Dimes. Premature Birth annual report card: the march of dimes is leading the prematurity campaign to reduce the nation's preterm birth rate to 9.6 percent or less by 2020, US. 2014.
4. Brennan Ramirez LK, Baker EA, Metzler MRN. A resource to help communities address social determinants of health, department of health and human services, centers for disease control and prevention Atlanta, US. 2008.
5. Lamont RF, Sawant SR. Infection in the prediction and antibiotics in the prevention of spontaneous preterm labour and preterm birth. *Minerva Ginecol.* 2005;57(4):423-433.
6. Thota C1, Farmer T, Garfield RE, et al. Vitamin D elicits anti-inflammatory response, inhibits contractile-associated proteins, and modulates toll-like receptors in human myometrial cells. *Reprod Sci.* 2013;20(4):463-475.

7. Nesby-O'Dell S, Scanlon KS, Cogswell ME, et al. Hypovitaminosis D prevalence and determinants among African American and white women of reproductive age: third National Health and Nutrition Examination Survey, 1988-1994. *Am J Clin Nutr.* 2002;76(1):187-192.
8. Clemens TL, Adams JS, Henderson SL, et al. Increased skin pigment reduces the capacity of skin to synthesize vitamin D3. *Lancet.* 1982;1(8263):74-76.
9. Specker BL, Tsang RC, Hollis BW. Effect of race and diet on human-milk vitamin D and 25-hydroxyvitamin D. *Am J Dis Child.* 1985;139(11):1134-1137.
10. Thota C, Menon R, Fortunato SJ, et al. 1, 25-Dihydroxyvitamin D deficiency is associated with preterm birth in African American and Caucasian women. *Reprod Sci.* 2014;21(2):244-250.
11. Thota C, Laknaur A, Farmer T, et al. Vitamin D regulates contractile profile in human uterine myometrial cells via NF- κ B. *Am J Obstet Gynecol.* 2014;210(4):347.e1-347.e10.
12. Manzon L, Altarescu G, Tevet A, et al. Vitamin D receptor polymorphism FokI is associated with spontaneous idiopathic preterm birth in an Israeli population. *Eur J Obstet Gynecol Reprod Biol.* 2014;177:84-88.
13. Holick MF, Binkley NC, Bischoff-Ferrari HA, et al. Evaluation, treatment, and prevention of vitamin D deficiency: an Endocrine Society clinical practice guideline. *J Clin Endocrinol Metab.* 2011;96(7):1911-1930.
14. American College of Obstetricians and Gynecologists. Vitamin D: screening and supplementation during pregnancy. committee opinion No. 495. *Obstet Gynecol.* 2011;118:197-198.