

Paper Urging Monitoring Of Vitamin D | CPD Blog

JoLynne Lyon

10/12/2017



Many Utahns are deficient, with potential consequences for mothers and children

In light of chronic and sometimes serious health conditions that stem from vitamin D deficiency in prenatal development, and noting that a majority of Utahns are not getting enough of the vitamin, the Center for Persons with Disabilities has issued a statement urging physicians of pregnant mothers to test for deficiency and correct low levels. The statement cites numerous studies that show Vitamin D--which is eventually converted by the body into an active hormone--does much more than help strengthen bones. What's more, prenatal vitamins typically contain much less than is suggested by the [Endocrine Society](#), the world's largest organization in the field of medicine concerned with endocrine glands and hormones. "Recent research indicates that low vitamin D levels during pregnancy are associated with various negative health outcomes," state Thayne L. Sweeten, Ph.D.; Anthony R. Torres, M.D.; Dennis Odell, M.D.; and Matthew Wappett, Ph.D and director of the Center for Persons with Disabilities. The four authors cite studies linking adequate levels of vitamin D with reduced risk of the immunological aspects of asthma in newborns, as well as a lowered risk of preeclampsia and preterm birth in mothers. Autism may also be linked to a deficiency of the vitamin. "Over the last

ten years, at least 15 studies have reported lower than normal blood levels of vitamin D in individuals with autism," the statement reads. "Related studies show that mothers who give birth to children with autism are more likely to be deficient in vitamin D. ... "It is unknown what role, if any, this deficiency plays in the onset of autism; however, given the wide spread deficiency of this vitamin, we recommend that serum 25-hydroxyvitamin D levels be measured prior to and during pregnancy in all mothers, especially those who have previously given birth to a child with an autism spectrum disorder." The statement follows in its entirety.

Vitamin D supplementation in pregnancy

Position paper from The Center for Persons with Disabilities
Utah State University

Thayne L. Sweeten, Ph.D.
Anthony R. Torres, M.D.
Dennis Odell, M.D.
Matthew Wappett, Ph.D.

Vitamin D deficiency has reached epidemic proportions in the United States. In the Intermountain Healthcare population covering Utah and parts of Idaho, the deficiency affects over 60% of individuals (Anderson, 2010). Vitamin D plays important roles throughout the body and vitamin D deficiency is associated with many disease states including: bone health (rickets), hypertension, renal disease, diabetes mellitus, coronary heart disease, pregnancy issues and autoimmune diseases (Kriegel, 2011; Wang, 2017). Although vitamin D is important throughout life, adequate amounts are especially vital during pregnancy and in a newborn child (Thorne-Lyman, 2012).

The American College of Obstetricians and Gynecologists notes that vitamin D deficiency is common during pregnancy especially in high risk groups like vegetarians, women living in northern latitudes, those using sun protection, and individuals with darker skin pigmentation. The Food and Nutrition Board in the Health and Medicine Division of the National Academies of Sciences, Engineering, and Medicine established in 2010 that 600 international units (IU) of vitamin D per day are adequate during pregnancy and lactation (Food and Nutrition Board, 2010). The Endocrine Society suggests that pregnant and lactating women may require at least 1500-2000 IU/day of the vitamin (Holick, 2011).

Most prenatal vitamin contain only 400 IU of vitamin D. While this amount may be sufficient to prevent bone problems, it does little to correct the low vitamin D blood levels that are common among pregnant women (Hollis, 2011). Recent research indicates that low vitamin D levels during pregnancy are associated with various negative health outcomes. These negative outcomes are mitigated by maintaining adequate blood levels of vitamin D, obtained by taking 4000 – 5000 IU daily. For instance, a study published in the Journal of Allergy and Clinical Immunology (Hornsby, 2017) suggests that 4400 IU/day vitamin D taken in the later stages of pregnancy helps correct the immunological aspects of asthma in newborns. Other studies show that the risk of preeclampsia and preterm birth are significantly reduce when pregnant mothers maintain adequate vitamin D blood levels of 30 ng/ml and 40 ng/ml respectively (Mirzakhani, 2016; McDonnell, 2017).

Vitamin D is known for its role in strengthening and regulating immune responses, and deficiencies are common in a variety of autoimmune diseases. Our research group at Utah State University has studied the immune system in individuals with autism for decades and has noted similarities between autism and autoimmune diseases (Torres, 2016; Sweeten, 2016). Over the last ten years, at least 15 studies have reported lower than normal blood levels of vitamin D in individuals with autism (Wang, 2016; Cannell, 2017). Related studies show that mothers who give birth to children with autism are more likely to be deficient in vitamin D (Chen, 2016; Vinkhuyzen, 2017).

It is unknown what role, if any, this deficiency plays in the onset of autism; however, given the wide spread deficiency of this vitamin, we recommend that serum 25-hydroxyvitamin D [25(OH)D] levels be measured prior to and during pregnancy in all mothers, especially those who have previously given birth to a child with an autism spectrum disorder. Deficiencies should be corrected by bringing levels into the normal range, under the care of a health care provider. Vitamin D deficiency is easily treated.

References

- Anderson, J. L., May, H. T., Horne, B. D., Bair, T. L., Hall, N. L., Carlquist, J. F., . . . Muhlestein, J. B. (2010). Relation of Vitamin D Deficiency to Cardiovascular Risk Factors, Disease Status, and Incident Events in a General Healthcare Population. *The American Journal of Cardiology*, 106(7), 963-968. doi:10.1016/j.amjcard.2010.05.027
<http://www.sciencedirect.com/science/article/pii/S0002914910011318>
- Cannell, J. J. (2017). Vitamin D and autism, what's new? *Reviews in Endocrine and Metabolic Disorders*, 18(2), 183-193. doi:10.1007/s11154-017-9409-0
<https://link.springer.com/article/10.1007/s11154-017-9409-0>
- Chen, J., Xin, K., Wei, J., Zhang, K., & Xiao, H. (2016). Lower maternal serum 25(OH) D in first trimester associated with higher autism risk in Chinese offspring. *Journal of Psychosomatic Research*, 89, 98-101. doi:10.1016/j.jpsychores.2016.08.013
<http://www.sciencedirect.com/science/article/pii/S0022399916303804>
- Food and Nutrition Board. (2010). *Dietary Reference Intakes for Vitamin D and Calcium*. Washington, D.C.: National Academy Press. <http://www.nationalacademies.org/hmd/~media/Files/Report%20Files/2010/Dietary-Reference-Intakes-for-Calcium-and-Vitamin-D/Vitamin%20D%20and%20Calcium%202010%20Report%20Brief.pdf>
- Holick, M. F., Binkley, N. C., Bischoff-Ferrari, H. A., Gordon, C. M., Hanley, D. A., Heaney, R. P., . . . Weaver, C. M. (2011). Evaluation, Treatment, and Prevention of Vitamin D Deficiency: an Endocrine Society Clinical Practice Guideline. *The Journal of Clinical Endocrinology & Metabolism*, 96(7), 1911-1930. doi:10.1210/jc.2011-0385
<https://academic.oup.com/jcem/article-lookup/doi/10.1210/jc.2011-0385>
- Hollis, B. W., Johnson, D., Hulseley, T. C., Ebeling, M., & Wagner, C. L. (2011). Erratum: Vitamin D supplementation during pregnancy: Double-blind, randomized clinical trial of safety and effectiveness. *Journal of Bone and Mineral Research*, 26(12), 2341-2357. doi:10.1002/jbmr.537
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3183324/>
- Hornsby, E., Pfeffer, P. E., Laranjo, N., Cruikshank, W., Tuzova, M., Litonjua, A. A., . . . Hawrylowicz, C. (2017). Vitamin D supplementation during pregnancy: Effect on the neonatal immune system in a randomized controlled trial. *Journal of Allergy and Clinical Immunology*. Advance online publication. doi:10.1016/j.jaci.2017.02.039
[http://www.jacionline.org/article/S0091-6749\(17\)30575-4/fulltext](http://www.jacionline.org/article/S0091-6749(17)30575-4/fulltext)
- Kriegel, M. A., Manson, J. E., & Costenbader, K. H. (2011). Does Vitamin D Affect Risk of Developing Autoimmune Disease?: A Systematic Review. *Seminars in Arthritis and Rheumatism*, 40(6), 512-531. doi:10.1016/j.semarthrit.2010.07.009
<http://www.sciencedirect.com/science/article/pii/S0049017210001484>
- Mcdonnell, S. L., Baggerly, K. A., Baggerly, C. A., Aliano, J. L., French, C. B., Baggerly, L. L., . . . Wagner, C. L. (2017). Maternal 25(OH)D concentrations #40 ng/mL associated with 60% lower preterm birth risk among general obstetrical patients at an urban medical center. *Plos One*, 12(7), E0180483. doi:10.1371/journal.pone.0180483
<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0180483>
- Mirzakhani, H., Litonjua, A. A., Mcelrath, T. F., O'Connor, G., Lee-Parritz, A., Iverson, R., . . . Weiss, S. T. (2016). Early pregnancy vitamin D status and risk of preeclampsia. *Journal of Clinical Investigation*, 126(12), 4702-4715. doi:10.1172/jci89031
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5127689/>
- Sweeten, T.L., & McDougale, C.J. (2016). Immunological aspects of autism. In C.J. McDougale (Ed.), *Primer on Autism Spectrum Disorder*. Oxford, England: Oxford University Press. <http://dx.doi.org/10.1093/med/9780199349722.001.0001>

Thorne-Lyman, A., & Fawzi, W. W. (2012). Vitamin D During Pregnancy and Maternal, Neonatal and Infant Health Outcomes: A Systematic Review and Meta-analysis. *Paediatric and Perinatal Epidemiology*, 26, 75-90. doi:10.1111/j.1365-3016.2012.01283.x

<http://onlinelibrary.wiley.com/doi/10.1111/j.1365-3016.2012.01283.x/abstract>

Torres, A. R., Sweeten, T. L., Johnson, R. C., Odell, D., Westover, J. B., Bray-Ward, P., . . . Benson, M. (2016). Common Genetic Variants Found in HLA and KIR Immune Genes in Autism Spectrum Disorder. *Frontiers in Neuroscience*, 10, 463. doi:10.3389/fnins.2016.00463

<http://doi.org/10.3389/fnins.2016.00463>

Vinkhuyzen, A. A., Eyles, D. W., Burne, T. H., Blanken, L. M., Kruithof, C. J., Verhulst, F., . . . Mcgrath, J. J. (2017). Gestational vitamin D deficiency and autism spectrum disorder. *British Journal of Psychiatry Open*, 3(2), 85-90. doi:10.1192/bjpo.bp.116.004077

<http://bjpo.rcpsych.org/content/3/2/85>

Wang, H., Chen, W., Li, D., Yin, X., Olsen, N., & Zheng, S. (2017). Vitamin D and Chronic Diseases. *Aging and Disease*, 8(3), 346-353. doi:10.14336/AD.2016.1021

<http://www.aginganddisease.org/EN/10.14336/AD.2016.1021>

Wang, T., Shan, L., Du, L., Feng, J., Xu, Z., Staal, W. G., & Jia, F. (2015). Serum concentration of 25-hydroxyvitamin D in autism spectrum disorder: a systematic review and meta-analysis. *European Child & Adolescent Psychiatry*, 25(4), 341-350. doi:10.1007/s00787-015-0786-1

<https://link.springer.com/article/10.1007/s00787-015-0786-1>