

Status of Vitamin D in Children with Pediatric Acute-Onset Neuropsychiatric Syndrome (PANS)

G. Delgado, R.C. Kaufmann, D.D. Siri.

Illinois Math and Science Academy / Midwest Allergy Sinus Asthma / SWIA Clinical Research, Normal, IL.

RATIONALE

- Numerous studies have indicated an association between vitamin D deficiency and the immune dysregulation and the pathogenesis of autoimmunity.
- An increased prevalence of vitamin D deficiency has been demonstrated in several pediatric autoimmune diseases, including autoimmune thyroid disease and Type-1 diabetes mellitus.
- Identification of children with Vitamin D deficiency may lead to the opportunity to influence the risk factors lead to the development of autoimmune diseases by vitamin D supplementation.

OBJECTIVE

- This study was undertaken to determine the prevalence of vitamin D deficiency in children with PANS/PANDAS, an autoimmune disorder characterized by abrupt-onset neuropsychiatric symptoms, often associated with infections such as Group A Streptococcus.

METHODS

- A chart review was performed retrospectively from a single PANS/PANDAS treatment center. Data from patients who presented to the specialty clinic for evaluation of PANS/PANDAS was collected. Additional information collected included 25-hydroxy vitamin D levels, age, gender, race, and age of diagnosis.
- Vitamin D status was stratified into three groups; deficiency (0 to < 20 ng/ml), insufficiency (20 to < 30 ng/ml), and sufficiency (30-100 ng/ml) (1). Patients were also stratified into two age groups; child (< 12 years old) and adolescent (12-17 years old).

RESULTS

- 91/129 patients with the diagnosis of PANS/PANDAS were able to be evaluated.

| | Deficient | Insufficient | Sufficient | Total (n=91) |
|-----------------------|-----------------|-------------------|-------------------|--------------|
| Child (<12 yo) | 6 (8%) | 18 (24%) | 51 (68%) | 75 |
| Adolescent (12-17 yo) | 1 (6.3%) | 4 (25%) | 11 (68.8%) | 16 |
| Male | 4 (8.3%) | 12 (25%) | 32 (66.7%) | 48 |
| Female | 3 (7%) | 10 (23.3%) | 30 (69.8%) | 43 |
| Total | 7 (7.7%) | 22 (24.2%) | 62 (68.1%) | 91 |

Table 1. Prevalence of vitamin D status by age and gender.

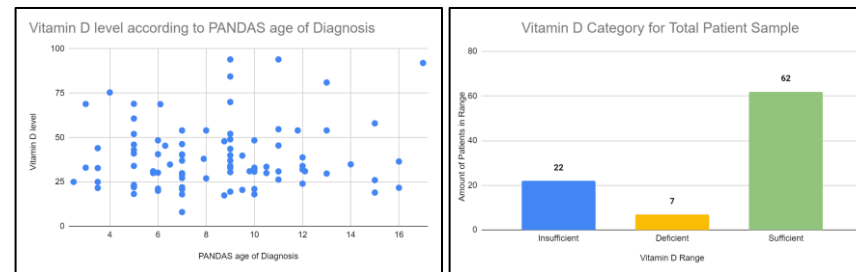


Figure 1. Age at PANS/ PANDAS diagnosis vs. 25-hydroxy vitamin D.

Figure 2. Vitamin D status of PANS/PANDAS pediatric population.

| | PANS/PANDAS Cohort | US Child Cohort |
|-------------------------|--------------------|-----------------|
| Vitamin D Deficiency | 7.7% | 9% |
| Vitamin D Insufficiency | 24.2% | 61% |

Odds Ratio: 0.843505 **95% CI (-2.91 to 4.59)**

Table 2. Prevalence of vitamin D status is shown in the PANS/PANDAS cohort compared with the prevalence in a recently studied in a general US pediatric population. (Kumar 2009 *Pediatrics*). The Odds Ratio comparing the two cohorts is noted, indicating a lower rate of vitamin D deficiency or insufficiency in the PANS/PANDAS cohort studied, versus the general US pediatric population.

CONCLUSIONS/DISCUSSION

- Results indicate that our patient population of children with PANS/PANDAS had a lower risk of vitamin D deficiency and insufficiency status than those of the general US pediatric population regardless of their age or gender.
- The results are inconsistent with the high prevalence of vitamin D deficiency/insufficiency status reported in children with other autoimmune diseases.
- Various factors that contribute to this negative study:
 - 97.7% of our patients are white (non-Hispanic). Children in our cohort were disproportionately skewed toward white race and a higher socioeconomic status than participants in the general US pediatric comparator study. Children with skin-of-color and lower socioeconomic status have a higher risk factor for vitamin D deficiency/insufficiency.
 - A higher rate of vitamin supplementation may have been present in our PANS/PANDAS cohort, due to earlier and more frequent medical evaluation and intervention, diagnostic delays and challenges contributing to higher nutritional interventions, and/or parental choice.
- More studies are needed to evaluate a larger, more diverse population of children with PANS/PANDAS and vitamin D status at earlier time points, prior to supplementation.
- Although our cohort population is small and from a single center, results also suggest that PANS/PANDAS may be underdiagnosed in children with skin-of-color and in those with lower socioeconomic status.

REFERENCES

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