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Vitamin D Screening and Supplementation

Christina Cahill
University of Vermont College of Medicine, Class of 2018
Family Medicine Clerkship March/April 2016
UVM Medical Center - South Burlington Family Medicine
Mentor: Whitney Calkins, MD
Problem

- Vitamin D helps protect against osteoporosis (by promoting calcium absorption), moderates cell growth, aids in neuromuscular and immune function and reduces inflammation.
- No national primary care professional organization currently recommends screening for vitamin D deficiency.
- There is insufficient data to assess the balance of benefits and harms of screening for vitamin D deficiency according to The American Academy of Family Physicians.
- In 2007, 85% of people in central Vermont were vitamin D deficient.
- There is confusion over what constitutes vitamin D deficiency.
- There is mixed evidence and recommendations for testing vitamin D levels, supplementation efficacy such as reduction of fractures, cardiovascular disease, cancer and mortality.
- There is no current standard laboratory test for vitamin D.
Public Health Cost

- Sales of vitamin D have reached $550 million in 2010 compared to $40 million in 2001.
- Pending insurance, 25(OH)D testing can range from free to $300.
- 25(OH)D lab orders increased 6 fold between 2004 and 2008 in the United States.
- Medicare spent $224 million on 25(OH)D testing for seniors in 2011.
- $14 billion was spent on osteoporosis related fractures in 2012.
- Vitamin D supplements may be covered by insurance if patient is severely defiant. The cost is dose dependent and ranges from approximately $5 to $30 per 100 capsules.
Community Perspective

- Interview with Kimberly Evans, MS, RD a clinical dietitian for the University of Vermont and co-owner of Whole Health Nutrition
  “...50% of our patients are deficient in Vitamin D. We generally test all of our patients. Most critical are obese patients, anyone presenting with depression, eating disorders, athletes, Hashimoto’s or other autoimmune disease. Teens and folks who spend lots of time indoors or covered in sunblock we recommend testing as well.”

- Interview with [Unnamed Patient] at South Burlington Family Medicine
  “I was diagnosed with cancer a couple years ago. I decided to try an anti-inflammatory diet and saw a naturopath. My vitamin D levels were low and so I was put on supplements to try to decrease my inflammation. I think living in Vermont a lot of us are deficient and don’t even know it.”
Community Perspective and Support

- A survey was distributed to physicians at South Burlington Family Medicine.
- 87.5% (n=8) of physicians surveyed agree that they prescribe vitamin D for treatment only (not prevention).
- 75% (n=7) of physicians surveyed agree that more patients are asking about vitamin D.
- Reasons for ordering labs varied among providers. Responses included lack of sun in VT, vague symptoms needing a diagnosis and patients with malabsorption, osteoporosis, fatigue, dark skin or obesity.
- Physicians responded to the following questions:
Intervention and Methodology

- Intervention:
  Physicians at the South Burlington Family Medicine identified a lack of information available to their patients and families regarding vitamin D. As there are no recommendations for vitamin D screening, many physicians saw benefit in making an informative vitamin D flyer and revising the current patient handout. Both interventions focused on importance of vitamin D, sources, at-risk populations, signs of deficiency and toxicity.

- Method:
  Conduct a literature review on vitamin D including screening, guidelines, supplementation and at risk populations. Review patient educational materials available in office and interview providers. A concise, easy to read patient friendly flyer was developed. The previously available patient handout was revised and updated.
Results

- The physicians at South Burlington Family Medicine were enthusiastic to have an informative flyer and revised vitamin D handout that could be easily read by patients and family members.
- A flyer with current recommendations and information was provided to South Burlington Family Medicine.
- A revised vitamin D handout was given to providers.
- Electronic copies of both the flyer and handout are available to staff for future use.
- Providers showed interest in completing the survey and were surprised by the variability in responses.
Results

UTM Medical Centre Plastic Surgery - Learning About Vitamin D

Why is vitamin D important?

Your body needs vitamin D to absorb calcium. Calcium keeps your bones, muscles, and heart healthy and strong. If you do not get enough vitamin D throughout your life, you have an increased chance of developing osteoporosis. This makes your bones more bendable. In children, this may not grow properly or calcify any further. This is called rickets.

Vitamin D can also boost your immune system, reduce inflammation, and may prevent cardiovascular events.

Vitamin D and calcium are added to many foods. Your body can also make vitamin D from sun exposure.

How much vitamin D do I need?

<table>
<thead>
<tr>
<th>Age</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–3 months</td>
<td>400 IU</td>
</tr>
<tr>
<td>4–11 years</td>
<td>600 IU</td>
</tr>
<tr>
<td>12 years and older</td>
<td>800 IU</td>
</tr>
</tbody>
</table>

International Units (IU)

What can I find vitamin D in my diet?

<table>
<thead>
<tr>
<th>Food</th>
<th>IU per serving</th>
<th>% DV**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cod liver oil, 1 tablespoon</td>
<td>2560</td>
<td>100</td>
</tr>
<tr>
<td>Salmon, canned, 3 ounces</td>
<td>500</td>
<td>20</td>
</tr>
<tr>
<td>Tuna fish, canned in water, 3 ounces</td>
<td>125</td>
<td>5</td>
</tr>
<tr>
<td>Orange juice fortified with vitamin D, 1 cup (check product label, as amount of added vitamin D varies)</td>
<td>125</td>
<td>5</td>
</tr>
<tr>
<td>Milk, fortified, reduced fat, multiple vitamin D fortified, 1 cup</td>
<td>25</td>
<td>1</td>
</tr>
<tr>
<td>Yogurt, fortified with 20% of the DV for vitamin D, 0.5 cup</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>Margarine, fortified, 1 tablespoon</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Barley, canned, 2 servings</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Kelso, egg, boiled, 2 servings</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Eggs, large (vitamin D is found in yolk)</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Ready-to-eat cereal, fortified with 15% of the DV for vitamin D, 0.5–1 cup (check product label, as amount of added vitamin D varies)</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>Cheese, brick, 1 ounce</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

* IU = International Units
** % DV = Daily Value

What makes me or my child at risk of deficiency?

Some people do not make vitamin D as well or suffer from the sun and may require vitamin D supplements.

Things that may reduce how much vitamin D your body makes include:

- Dark skin
- Age older than 65 years
- Obesity
- Low sun exposure
- Digestive problems, such as Crohn’s disease, cystic fibrosis or other disease
- Liver and kidney disease

What are signs of deficiency?

Signs of vitamin D deficiency include fatigue, muscle pain, weakness, and pain in your bones. Blood tests for vitamin D can check your vitamin D level. However, there is no standard normal range used by all laboratories. The Institute of Medicine recommends a blood level of 20 ng/mL of vitamin D for healthy bones.

Are there risks from too much vitamin D?

You should not consume more than 4000 IU daily. Side effects of high vitamin D are related to increased calcium in the blood. Symptoms may include nausea, vomiting, constipation, or weakness. Excessive bone growth, kidney stones or an overactive bone disorder may also occur.

Vitamin D may interact with other medications. Tell your doctor about all of the medications you take, including over-the-counter drugs, herbs, and pills.

Please contact your doctor with any questions or concerns.

What is vitamin D?

Vitamin D helps absorb calcium and keep your bones, muscles, and heart strong.

May prevent diabetes and heart disease.

How do I get vitamin D?

Our body makes vitamin D from sun exposure 3 to 30 minutes twice a week.

Salmon, tuna and mackerel (best)

Cheese, egg yolks and beef liver

Fortified foods and drinks

Supplements

VITMAIN D

What are signs of deficiency?

Muscle cramps, weakness, fatigue, classic pain, headaches and depression may be signs of low vitamin D levels.

What are signs of too much?

Nausea, constipation, confusion, abdominal heartburn and even kidney stones from high calcium.

Supplements

Am I at risk for deficiency?

If you have dark skin, are older than 65, have digestive problems (such as Crohn’s and Celiac disease), or are obese, or have liver or kidney disease, you may be at risk.

Several medications interfere with vitamin D’s production or use. Questions or concerns?

Please ask your provider.
Evaluation of Effectiveness and Limitations

- The flyer will fill a gap in patient education and improve physician-patient discussions regarding vitamin D because of an increase in awareness and knowledge.
- Accessing vitamin D deficiency is difficult because it may be treated over the counter.
- This project was completed in early Spring. Winter is when most physicians and patients are concerned about vitamin D deficiency.
- A chart review should have been performed comparing vitamin D tests and supplementation prevalence before and after the flyer and handout were available to evaluate effectiveness of the interventions.
- The flyer will be competing with other patient materials in the office. There are numerous patient handouts for various conditions.
- Both interventions assume the patient is literate in English.
- The time restraint does not allow a follow-up period to evaluate effectiveness.
Recommendations for future interventions

- Increase number of survey responses and types of providers (internal medicine, pediatrics, specialists).
- Survey more patients for their prospective and perceived knowledge.
- Compare yearly vitamin D labs and supplementation rates in various geographic areas.
- Assess dietary recommendations of vitamin D based on age and co-morbidities.
- There are multiple clinical studies currently assessing the effectiveness of vitamin D.
References

- Matthew, J. Vitamin D Deficiency: Common, Damaging, and Simple to Remedy. Vermont Medical Society
- Vitamin D sales strong in 2010, supply costs rising. Nutrition Business Journal
Thank you for agreeing to be interviewed. This project is a requirement for the Family Medicine clerkship. It will be stored on the Dana Library ScholarWorks website. Your name will be attached to your interview and you may be cited directly or indirectly in subsequent unpublished or published work. The interviewer affirms that he/she has explained the nature and purpose of this project. The interviewee affirms that he/she has consented to this interview.

Yes ____ / No _____