

Effect of Vitamin D and Calcium Supplementation on Cancer Incidence in Older Women

BACKGROUND:

- About 40% of the population will have a cancer diagnosis during their life.
- Evidence suggests vitamin D status may increase the risk of cancer.

OBJECTIVE:

- The study's objective was to determine if dietary supplementation with vitamin D3 and calcium reduces the risk of cancer among older women.

METHODS

- **Design:** Placebo-controlled, population-based, parallel, randomized, double-blind study
- **Duration:** 4 years
- **Inclusion criteria:** Must be a woman, 55+ years of age, 4 years past last menses, healthy, independently living, living in one of 31 selected rural counties in Nebraska, and must be able to travel to the Fremont Area Medical Center (FAMC) for study visits
- **Exclusion criteria:** History of cancer except for superficial basal or squamous cell carcinoma of the skin or other malignancies treated curatively more than 10 years ago, history of chronic kidney disease, or participation in the previous population-based calcium and vitamin D study
- **# patients enrolled:** 2303 patients total; 1156 in vitamin D and calcium treatment group; 1147 in placebo group
- **Drug regimens/dosages:** Treatment group: 2000 IU vitamin D3 daily and 1500 mg calcium carbonate daily (500mg tablet three times daily); Placebo: identical placebos given
- **Outcome measures:**
Primary outcome measure: The first diagnosis of any type of cancer (excluding non-melanoma skin cancers)
Secondary outcome measures: Incidence of specific cancers including breast, lung, colon, lymphoma, leukemia, and myeloma. Other secondary outcomes included hypertension, cardiovascular disease, osteoarthritis, colonic adenomas, diabetes, upper respiratory tract infections, and falls.
- **Power:** <94.4% for primary outcomes. Power was not sufficient for any secondary outcomes.
- **Data handling method:** Intent-to-treat

RESULTS

- 2064 (89.6%) patients completed the study (89% of the calcium and vitamin D group; 90.2% of the placebo group).
- **Primary outcome measure:** 45 cancers (3.89%) were diagnosed in the vitamin D and calcium group; 64 cancers (5.58%) were diagnosed in the placebo group (difference, 1.69%; 95% CI -0.06%-3.46%; p=0.06)
- **Secondary outcome measures:** Breast cancer: 19 diagnosed in vitamin D and calcium group; 24 diagnosed in placebo group (difference in proportion: 0.005; 95%

CI -0.007-0.016; p=0.435). Other cancers were too few to statistically analyze. Other secondary outcomes were not reported.

- **Author's conclusion:** The authors concluded that among healthy post-menopausal older women with a mean baseline serum 25-hydroxyvitamin D level of 32.8ng/mL, supplementation with vitamin D3 and calcium compared with placebo did not result in a significantly lower risk of all-type cancer at 4 years. The also said further research is necessary to assess the possible role of vitamin D in cancer prevention.

STRENGTHS

- Appropriate study design and statistical tests were used
- Addressed a needed research question
- Study was conducted for a sufficient period of time to see some outcomes

LIMITATIONS

- Small geographical area used to sample patients
- Non-diverse study population (99.5% non-Hispanic white race)
- Lack of screening patients for cancer before the study began
- Compliance was only tested by weighing the bottles at each appointment

CONCLUSION

- This study was designed well for the most part and provided some useful information on whether or not vitamin D and calcium reduce cancer risk. The results did not appear to be statistically or clinically significant, and therefore vitamin D3 and calcium should not be considered as a prevention method for cancer at this time.
- Even though this treatment does not appear to be useful in preventing cancer based on this study, further research is still needed. If these drugs were to eventually be proven to prevent cancer in other studies, then they would be much cheaper than the cost of treating cancer.
- Further studies should be designed in a way to widen the search to include a more diverse range of participants, including men and women, different races, different ages, and different geographical locations. The studies should also be conducted for a longer period of time (i.e. 10 years) to be able to observe more outcomes.

Reference: Lappe, J., Watson, P., Travers-Gustafson, D, et al. Effect of vitamin D and calcium supplementation on cancer incidence in older women: a randomized clinical trial. *JAMA*. 2017;317(12):1234-1243. doi: 10.1001/jama.2017.2115

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