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CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Vitamin D Supplementation for the Prevention of Tuberculosis Infection: Clinical Effectiveness and Guidelines

Service Line:	Rapid Response Service
Version:	1.0
Publication Date:	March 26, 2020
Report Length:	6 Pages

CADTH

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Cite As: *Vitamin D Supplementation for the Prevention of Tuberculosis Infection: Clinical Effectiveness and Guidelines.* Ottawa: CADTH; 2020 Mar. (CADTH rapid response report: summary of abstracts).

About CADTH: CADTH is an independent, not-for-profit organization responsible for providing Canada's health care decision-makers with objective evidence to help make informed decisions about the optimal use of drugs, medical devices, diagnostics, and procedures in our health care system.

Funding: CADTH receives funding from Canada's federal, provincial, and territorial governments, with the exception of Quebec.

Research Questions

1. What is the clinical effectiveness of vitamin D supplementation for the prevention of tuberculosis infection?
2. What are the evidence-based guidelines regarding the use of vitamin D supplementation for the prevention of tuberculosis infection?

Key Findings

One systematic review was identified regarding the clinical effectiveness of vitamin D supplementation for the prevention of tuberculosis infection. No evidence-based guidelines were identified regarding the use of vitamin D supplementation for the prevention of tuberculosis infection.

Methods

A limited literature search was conducted by an information specialist on key resources including PubMed, the Cochrane Library, the University of York Centre for Reviews and Dissemination (CRD) databases, the websites of Canadian and major international health technology agencies, as well as a focused internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were vitamin D and tuberculosis. No filters were applied to limit the retrieval by study type. The search was limited to English language documents published between Jan 1, 2015 and Mar 13, 2020. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Q1,2: People in areas of high tuberculosis incidence
Intervention	Q1,2: Vitamin D supplementation
Comparator	Q1: No vitamin D supplementation Q2: Not applicable
Outcomes	Q1: Clinical effectiveness Q2: Recommendations regarding the use of vitamin D supplementation
Study Designs	Health technology assessments, systematic reviews, randomized controlled trials, non-randomized studies and evidence-based guidelines

Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports and systematic reviews are presented first. These are followed by randomized controlled trials, non-randomized studies, and evidence-based guidelines.

One systematic review[1] was identified regarding the clinical effectiveness of vitamin D supplementation for the prevention of tuberculosis infection. No relevant health technology assessments, randomized controlled trials, or non-randomized studies were identified No evidence-based guidelines were identified regarding the use of vitamin D supplementation for the prevention of tuberculosis infection.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

One systematic review[1] was identified regarding the clinical effectiveness of vitamin D supplementation for the prevention of tuberculosis (TB) infection. The authors of the systematic review evaluated whether vitamin D prevented tuberculosis and other infectious diseases in children under the age of five.[1] Four randomized controlled trials met the inclusion criteria; however, none of these included studies specifically evaluated vitamin D supplementation for the prevention of TB.[1]

References Summarized

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

1. Yakoob MY, Salam RA, Khan FR, Bhutta ZA. Vitamin D supplementation for preventing infections in children under five years of age. *Cochrane Database Syst Rev*. 2016 11 09;11:CD008824.
PubMed: PM27826955

Randomized Controlled Trials

No literature identified.

Non-Randomized Studies

No literature identified.

Guidelines and Recommendations

No literature identified.

Appendix — Further Information

Systematic Reviews and Meta-Analyses

Risk Factors and Association of Vitamin D levels with Tuberculosis

2. Aibana O, Huang CC, Aboud S, et al. Vitamin D status and risk of incident tuberculosis disease: A nested case-control study, systematic review, and individual-participant data meta-analysis. *PLoS Med*. 2019 09;16(9):e1002907.
PubMed: PM31509529

3. Zisi D, Challa A, Makis A. The association between Vitamin D status and infectious diseases of the respiratory system in infancy and childhood. *Hormones*. 2019 Dec;18(4):353-363.
PubMed: PM31768940

4. Gou X, Pan L, Tang F, Gao H, Xiao D. The association between Vitamin D status and tuberculosis in children: A meta-analysis. *Medicine (Baltimore)*. 2018 Aug;97(35):e12179.
PubMed: PM30170465

5. Huang SJ, Wang XH, Liu ZD, et al. Vitamin D deficiency and the risk of tuberculosis: a meta-analysis. *Drug Des Devel Ther*. 2017;11:91-102.
PubMed: PM28096657

Non-Specific to Tuberculosis

6. Nouri-Vaskeh M, Sadeghifard S, Saleh P, Farhadi J, Amraii M, Ansarin K. Vitamin D Deficiency among Patients with Tuberculosis: a Cross-Sectional Study in Iranian-Azari Population. *Tanaffos*. 2019 Jan;18(1):11-17.
PubMed: PM31423135

7. Shah I, Tolani D, Bansal N, Shetty NS. Vitamin D Status in Children with Tuberculosis. *Indian J Pediatr*. 2019 12;86(12):1146.
PubMed: PM31338705

8. Wang CY, Hu YL, Wang YH, Chen CH, Lai CC, Huang KL. Association between Vitamin D and latent tuberculosis infection in the United States: NHANES, 2011-2012. *Infect*. 2019;12:2251-2257.
PubMed: PM31413602

9. Buonsenso D, Sali M, Pata D, et al. Vitamin D Levels in Active TB, Latent TB, Non-TB Pneumonia and Healthy Children: A Prospective Observational Study. *Fetal Pediat Pathol*. 2018 Oct;37(5):337-347.
PubMed: PM30260729

10. Balcells ME, Garcia P, Tiznado C, et al. Association of Vitamin D deficiency, season of the year, and latent tuberculosis infection among household contacts. *PLoS ONE*. 2017;12(4):e0175400.
PubMed: PM28403225

Non-Randomized Studies

No Comparator

11. Larcombe L, Mookherjee N, Slater J, et al. Vitamin D, serum 25(OH)D, LL-37 and polymorphisms in a Canadian First Nation population with endemic tuberculosis. *Int J Circumpolar Health*. 2015;74:28952.
PubMed: PM26294193

Review Articles

12. Ayelign B, Workneh M, Molla MD, Dessie G. Role Of Vitamin-D Supplementation In TB/HIV Co-Infected Patients. *Infect*. 2020;13:111-118.
PubMed: PM32021325

13. Rashedi J, Rashedi J, et al. Vitamin D and Tuberculosis Patients. *EC Pulmonology and Respiratory Medicine* 2018 7.7: 466-476.
https://www.ecronicon.com/ecprm/pdf/ECPRM-07-00230.pdf

14. Abubakar I, Kloprogge F. End of the Road for Adjunctive Vitamin D Therapy for Pulmonary Tuberculosis? *Am J Respir Crit Care Med*. 2017 09 01;196(5):544-545.
PubMed: PM28759259

15. Facchini L, Venturini E, Galli L, de Martino M, Chiappini E. Vitamin D and tuberculosis: a review on a hot topic. *J Chemother*. 2015 Jun;27(3):128-138.
PubMed: PM26058744

16. Turnbull ER, Drobniewski F. Vitamin D supplementation: a comprehensive review on supplementation for tuberculosis prophylaxis. *Expert Rev Respir Med*. 2015 Jun;9(3):269-275.
PubMed: PM25959993

Additional References

17. Junaid K, Rehman A. Impact of vitamin D on infectious disease-tuberculosis-a review. *Clinical Nutrition Experimental* 2019 25; 1-10.
https://www.clinicalnutritionexperimental.com/article/S2352-9393(19)30017-X/pdf
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18. Brighenti S, Bergman P, Martineau AR. Vitamin D and tuberculosis: where next? *J Intern Med*. 2018 May 27;27:27.
PubMed: PM29804293

19. Kim EH, Bae JM. Vitamin D supplementation as a control program against latent tuberculosis infection in Korean high school students. *Epidemiol Health*. 2018;40:e2018035.
PubMed: PM30056639

20. Syal K, Chakraborty S, Bhattacharyya R, Banerjee D. Combined inhalation and oral supplementation of Vitamin A and Vitamin D: a possible prevention and therapy for tuberculosis. *Med Hypotheses*. 2015 Mar;84(3):199-203.
PubMed: PM25617043