A Scoping Review of Clinical Trials Examining their Efficacy and Safety on the Use of Multivitamins

The researchers examined the efficacy and safety of multivitamin use in adults. The effects varied by supplement formulation, population, and duration of use.

In general, improvements in circulating folate, vitamin B6, and vitamin B12 were most consistent, whereas supplements containing iron, zinc, or iodine showed context-dependent benefits. Selected trials reported improvements in pregnancy-related outcomes and cognitive test performance, but benefits differed across populations and clinical endpoints.

About one-third of US adults take multivitamins, and use increases with age. However, differences in formulations and individual profiles make it difficult to weigh potential benefits against risks. Understanding how products vary by market, manufacturing period, and life stage could guide more targeted strategies to improve health.

Study

In the present review, researchers examined clinical trial evidence on the potential benefits and safety of broad-spectrum multivitamin supplementation across populations.

Databases such as Cochrane Library, Scopus, and PubMed were searched through September 9, 2026 for peer-reviewed studies published in English, primarily enrolling adults, with an exception for prenatal studies in low- and middle-income countries that included participants younger than 18. Two reviewers independently screened records, and one reviewer checked data extracted by the other, using Joanna Briggs Institute (JBI) methodology and resolving disagreements by consensus.

Each eligible single-arm, placebo- or active-controlled study included more than 10 individuals consuming multivitamins for at least two weeks. The included studies reported tablets and capsules that supplied at least 50% of the US National Academy of Medicine's life-stage-specific Recommended Dietary Allowance or Adequate Intake for 14 or more vitamins and minerals. They also had to contain at least two vitamins and two minerals, with no nutrient exceeding its applicable upper intake limit per daily serving.

Non-oral preparations, enteral nutrition, lipid-based formulations, fortified foods, and delivery forms such as syrups, powders, or sprinkles were excluded. The researchers did not assess risk

of bias or certainty of evidence and did not perform a meta-analysis. This limits conclusions about the magnitude and reliability of the reported benefits.

Findings

Of 5,263 records identified, 1,537 duplicates were removed. After title, abstract, and full-text screening, 153 articles were eligible; four more were identified through citation searching, bringing the total to 157. The review included 103 primary intervention reports and 54 related publications, some drawing on the same trial populations. Most studies were conducted in North America, Europe, and Asia.

Blood tests showed the most consistent increases in circulating vitamin B6, vitamin B12, and folate. Results for other vitamins varied depending on participants' baseline nutrient levels and the clinical setting. For example, surgery can affect nutrient absorption, while specialized products may deliver different amounts of individual nutrients.

Changes in mineral levels were less consistent, and responses to iron, zinc, and iodine supplementation varied by circumstance. Some studies also reported benefits for pregnancy-related outcomes and cognition, but results varied across study groups. Improved nutrient levels did not consistently translate into better clinical outcomes.

Multivitamin use was well tolerated during pregnancy, among older participants, and after surgical procedures. Some products caused mild digestive complaints, particularly those containing zinc or iron. The Physicians' Health Study II (PHS-II) reported modest increases in rash and nosebleeds, and the COcoa Supplement and Multivitamin Outcomes Study (COSMOS) reported increased gastrointestinal bleeding.

A cataract trial found adverse changes in some lens-opacity subtypes. Safety reporting varied between trials. Vitamin K may also interfere with anticoagulants such as warfarin, so people taking these medicines should consult a healthcare professional before using multivitamins.

Among participants in the COSMOS biospecimen substudy, total carotenoids, lutein, beta-carotene, and α-tocopherol levels increased. Findings from the Comprehensive Assessment of Long-term Effects of Reducing Intake of Energy (CALERIE) study suggested that anemia could persist during supplementation, but both randomized groups received multivitamins, preventing conclusions about their independent effects. Secondary analyses from the Maternal and Infant Nutrition Interventions, Matlab (MINIMat) and JiVitA-3 trials showed selective biochemical responses rather than complete resolution of deficiencies.

In the JiVitA-3 trial, multiple micronutrients reduced low birth weight and preterm births compared with iron and folic acid, but did not significantly reduce infant mortality through six months. The SUMMIT trial reported an 18% lower relative risk of early infant mortality. In a two-week clinical trial including women with preeclampsia, adding multivitamins to intravenous magnesium sulfate treatment improved proteinuria and selected maternal and neonatal outcomes, but the findings do not establish preeclampsia prevention or general health benefits in uncomplicated pregnancies.

In a 12-week trial among older adults, multivitamins did not improve the primary well-being outcome, though selected secondary measures favored supplementation for mood and stress. COSMOS-Web, COSMOS-Mind, and COSMOS-Clinic reported benefits for selected memory and

global cognition measures, but all were analyses of the same parent trial. PHS-II found no overall cognitive benefit, and dementia prevention remains unproven.

Some trials reported improved lipid profiles in women with obesity, but PHS-II and COSMOS did not establish overall cardiovascular preventive effects.

Some trials suggested possible pulmonary and liver-related benefits, but infection findings were inconsistent, and a COSMOS analysis found no significant overall reduction in COVID-19 incidence. PHS-II reported modest reductions in cataract and total cancer incidence, while COSMOS found no significant overall cancer reduction. COSMOS analyses also found modest slowing of certain epigenetic aging measures, but these findings did not establish reduced disease risk or longer survival.

Conclusion

The findings suggest that multivitamins may support nutritional health, but their effects vary by formulation, population, and baseline nutritional status. Their benefits may differ between adults with adequate diets and those facing food insecurity, increased nutritional needs, medication-related vulnerabilities, or malabsorption.

Future trials should determine whether cognitive benefits translate into better daily functioning or reduced cognitive impairment. The study needs clear clinical goals, validated outcomes, and consistent reporting of formulations, adherence, nutritional status, and adverse events. Including underrepresented populations and assessing real-world effectiveness could strengthen the evidence and inform more targeted guidance.

Source:

https://www.news-medical.net/news/20261029/Multivitamins-boost-key-vitamin-levels-but-do-they-improve-your-health.aspx