

# Vitamin C as an Adjunctive Therapy in Cancer Treatment: Exploring Therapeutic Potential: Systematic Review

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## BACKGROUND

- High-dose intravenous vitamin C has been of interest as a potential adjunct in cancer therapy for decades.<sup>1</sup>
- Proposed mechanisms involve selective generation of reactive oxygen species (ROS), such as that damage tumor cells while sparing normal tissues.<sup>1</sup>
- Several randomized controlled studies suggest utility of vitamin C in cancer therapy.<sup>2,3</sup>

## OBJECTIVES

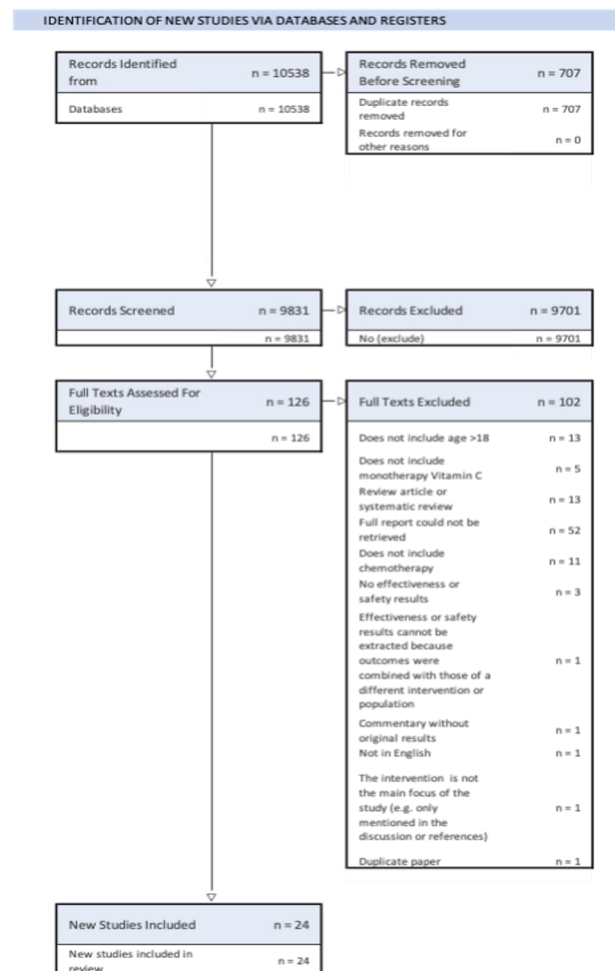
This systematic review aimed to:

- Evaluate clinical efficacy of vitamin C across cancer types.
- Examine synergistic effects of vitamin C with chemotherapy.
- Assess toxicities and adverse effects of vitamin C therapy.

## METHODS

- Conducted a systematic review in accordance to PRISMA 2020 guidelines.
- Performed a literature search across PubMed and EMBASE databases.
- After removal of duplicate journal articles, 9831 records underwent two levels of title and abstract screening, followed by a third round of full-text review to determine final eligibility.
- Articles were included if they met predefined inclusion criteria through independent review by 2-3 screeners followed by conflict review.
- Exclusion criteria included if the research did not include monotherapy vitamin C, adult human subjects (>18 years old), a review article, and/or chemotherapy.

Figure 1: PRISMA 2020 Flow Diagram



## RESULTS

- Included 21 studies published between 2007 - 2024 out of the 10,538 texts initially identified
- Eligible studies comprised of clinical trials, cohort studies, and retrospective analyses evaluating high-dose vitamin C as an adjunct in cancer treatment
- The studies included 1,100 patients diagnosed with the following malignancies: hematologic, colorectal, pancreatic, lung, and breast.
- Most studies assessed high-dose intravenous vitamin C (IVC) in combination with chemotherapy, at doses ranging from 1 g/kg to 125 g.
- While survival benefits were inconsistent, several studies reported enhanced tumor responses, particularly in non-small cell lung and rectal cancers, and improved quality of life metrics such as reduced fatigue and nausea ( $p < 0.05$ ). One rectal cancer study reported a 44.4% pathological complete response rate.
- Adverse events were minimal across studies.

## CONCLUSIONS

- High-dose vitamin C demonstrates favorable safety profile and may enhance treatment tolerability and quality of life when combined with chemotherapy.
- Although survival benefits remain inconclusive, current evidence supports further investigation through large-scale clinical trials to determine the broader applicability.

## REFERENCES

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