

Comparative Effects of Gut Microbiota Modifiers (Prebiotics, Probiotics, and Synbiotics) on Gastrointestinal Disorders in Adults with Colorectal Cancer: A Systematic Review with Exploratory Network Meta-Analysis

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Citation: Belloni, S., Magon, A., La Bella, V., Giacon, C., Arcidiacono, M. A., Conte, G., Caruso, R., & Arrigoni, C. (2026). Comparative effects of gut microbiota modifiers (prebiotics, probiotics, and synbiotics) on gastrointestinal disorders in adults with colorectal cancer: A systematic review with exploratory network meta-analysis. *International Journal of Health Supplements*, 1(Suppl. 2), 148–149. <https://doi.org/10.82051/ijhs-2026-Suppl2>

 Winner of the Early Bird Abstract Award

Introduction. Gastrointestinal (GI) disorders are prevalent consequences in patients with colorectal cancer (CRC) undergoing chemotherapy and are frequently associated with changes in gut microbiota composition, considerably affecting quality of life. Available evidence suggests that microbiota modifiers, including probiotics, prebiotics, and synbiotics, may alleviate these alterations. However, the comparative effectiveness of different formulations in reducing GI symptoms remains unclear. The aim of this systematic review with network meta-analysis was to compare the effects of different microbiota-modifying formulations on GI outcomes in patients with CRC.

Methods. A systematic review (CRD42025638296) with pairwise meta-analysis and exploratory network meta-analysis was conducted, including randomized controlled trials (RCTs) published up to

September 2025 and identified through six databases. Odds ratios (ORs) and 95% confidence intervals (CIs) were used as efficacy measures in pairwise meta-analyses. The network meta-analysis compared four interventions: multistrain probiotics, placebo, probiotics combined with prebiotics, and no intervention or standard care. The Surface Under the Cumulative Ranking (SUCRA) method was used to rank the effectiveness of the interventions for the diarrhoea outcome.

Results. Twelve RCTs involving 1,009 participants were included. Multistrain probiotics significantly reduced nausea and vomiting (OR = 0.30, 95% CI: 0.09–0.99, $p = 0.05$) and diarrhoea (OR = 0.48, 95% CI: 0.26–0.87, $p = 0.02$). No significant effect was observed for abdominal distension and bloating (OR = 0.52, 95% CI: 0.22–1.20, $p = 0.13$). The combination of probiotics and prebiotics did not significantly reduce the incidence of diarrhoea (OR = 0.36, 95% CI: 0.08–1.66, $p = 0.19$). Multistrain probiotics used as a standalone intervention appeared to be the most effective formulation for reducing diarrhoea, with a SUCRA value of 83.0%.

Discussion. Multistrain probiotics reduce the incidence of diarrhoea, nausea, and vomiting among patients with CRC undergoing chemotherapy and appear to be the most effective formulation for reducing diarrhoea when used alone. Further studies with larger sample sizes are needed to corroborate these findings. Nurses have a central role in the early identification of patients at risk and in facilitating timely nutritional interventions alongside pharmacological therapies.

Keywords: Colorectal Cancer, Probiotics, Gastrointestinal Disorders

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Funding: This research received no external funding. **Conflict of Interest:** The authors declare no conflict of interest.