

# Are *Blastocystis hominis* and *Cryptosporidium* spp. playing a positive role in colorectal cancer risk? A systematic review and meta-analysis

Taghipour Ali, Rayatdoost Esmail, Bairami Amir, Bahadory Saeed, Abdoli Amir

## Abstract

**Objective:** Intestinal protozoa *Blastocystis hominis* and *Cryptosporidium* spp. are two influential factors in intestinal complications and malignancies. In present study, we estimated the pooled prevalence and odds ratio (OR) of the two parasites in colorectal cancer (CRC) patients and their possible association with the deadly disease.

**Method:** Our systematic search was conducted for published researches between January 1, 2000 and April 30, 2022 by using four international databases include Scopus, PubMed, and Web of Science as well as Google scholar search engine. The random- and fixed-effects models were used to estimate the pooled prevalence, OR, and 95% confidence interval (CI) by comprehensive meta-analysis (V2.2, Bio stat) software. Inclusion and exclusion criteria were applied.

**Results:** Thirteen papers (seven case-control and six cross-sectional studies) for *B. hominis*/CRC and six papers (two case-control and four cross-sectional studies) for *Cryptosporidium* spp./CRC were eligible to include in data synthesis. Pooled prevalence of *B. hominis* and *Cryptosporidium* spp. in CRC patients was calculated to be 26.8% (95% CI 19.4–35.7%) and 12.7% (95% CI 6.8–22.5%), respectively. Based on case-control studies, significant difference was found between case and controls in both protozoa (*B. hominis* OR 2.10; 95% CI 1.39–3.18% vs. *Cryptosporidium* spp. OR 5.06; 95% CI 1.8–13.6%). Considering the *Blastocystis* subtypes, ST1 (5/6; 83.33% studies) and ST3 (5/6; 83.33% studies) had the highest number of reports in CRC patients. Regarding the *Cryptosporidium* species, only *C. parvum* and *C. hominis* were reported.

**Conclusion:** Given the significant prevalence of both parasites in CRC patients and their statistically significant association, there is a need to pay more attention to these two intestinal parasites in under treatment patients.

**Keywords:** *Blastocystis hominis*, *Cryptosporidium* spp., Colorectal cancer, Meta-analysis