The Effect of Probiotics for Preventing Acute Upper Respiratory Tract Infections

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More information about the Cochrane Summary of Findings tables is available at http://www.thecochranelibrary.com/view/0/SummaryFindings.html.

As part of its efforts to disseminate the results of Cochrane reviews to a wider audience, the Cochrane Complementary and Alternative Medicine (CAM) Field develops Summary of Findings (SoF) tables and then uses those tables as a basis for its plain-language summaries. Each SoF table presents the most important outcomes for the review as well as the effect of the intervention and the quality of the evidence for each outcome. The process of developing the SoF table involves deciding which outcomes to present for which time points and evaluating the strength and quality of the evidence for the outcomes.

In this article, we present a Cochrane review about the effects of the use of probiotics for preventing acute upper respiratory tract infections. We contacted the authors of the Cochrane review to request clarification on points that we did not understand and to have them review the SoF table.

WHAT ARE ACUTE UPPER RESPIRATORY TRACT INFECTIONS, AND WHY PRESCRIBE PROBIOTICS?

Upper respiratory tract infections (URTIs) are illnesses caused by an acute infection of the upper respiratory tract (ie, the nose, sinuses, pharynx, or larynx). Acute URTIs include the common cold, acute sinusitis, acute pharyngitis, acute laryngotracheobronchitis (croup), acute epiglottitis (supraglottitis), acute rhino sinusitis and acute otitis media. Acute URTIs are a major cause of morbidity, especially in children and the elderly. They are caused by a large variety of viruses and bacteria. Common symptoms include cough, fever, headache, sore throat, runny nose, and sneezing. Usually, the symptoms subside after a few days.

To reduce fever and ease pain and headaches, paracetamol (acetaminophen), ibuprofen, or aspirin is often recommended. Antibiotics are prescribed if the illness becomes chronic and complications develop. However, misuse of antibiotics in acute URTIs caused by viruses is common and may contribute to overuse of antibiotics and risk for development of antibiotic-resistant bacteria.

Probiotics are live microorganisms that might lead to health benefits when administered in adequate amounts. Lactic acid bacteria and bifidobacteria are the most common types of probiotics. They are commonly consumed in fermented foods, such as yogurt and soy yogurt, or as dietary supplements. The underlying mechanisms of how probiotics may improve health are unclear, but improved local immunity (by maintaining gut wall integrity) and systemic immunity (by enhancing nonspecific and specific arms of the immune system) are possible explanations.

This review was carried out to assess the effectiveness and safety of probiotics (any specified strain or dose) compared with placebo in the prevention of acute URTI in people at risk of acute URTI.

WHAT DOES THE RESEARCH SAY?

Not all research provides the same quality of evidence. The higher the quality, the more certain we are about what the research says about an effect. The words *will* (high-quality evidence), *probably* (moderate-quality evidence), and *may* (low-quality evidence) describe how certain we are about the effect (Table).

The 10 studies that the Cochrane authors reviewed showed that for people at risk of acute URTI, compared with a placebo, probiotics

- may reduce the number of participants who experienced URTI episodes (at least 1 event),
- have an uncertain effect on the mean duration of an episode of URTI because the quality of evidence is very low,
- may reduce the number of participants who used antibiotics, and
- may make little or no difference to adverse events.

None of the studies measured the effect of probiotics on older people.

In general, side effects are poorly documented and it is difficult to provide precise information. In these studies, participants experienced minor side effects. The main side effects were gastrointestinal symptoms such as vomiting, flatulence, and increased irritability. However, pooled analysis showed no statistical difference between the probiotics group and the placebo group (low-quality evidence).

WHERE DOES THIS INFORMATION COME FROM?

The Cochrane Collaboration is an independent global network of volunteers dedicated to summarizing research about healthcare.

This information is taken from this Cochrane Review: Hao Q, Lu Z, Dong BR, Huang CQ, Wu T. Probiotics for preventing acute upper respiratory tract infections. Cochrane Database Syst Rev. 2011 Sep 7;(9):CD006895.

Table Summary of Findings: Probiotics Compared to Placebo for Preventing Acute Upper Respiratory Tract Infections

Patient or population: Children and adults of all ages
Settings: Day-care centers, hospital, or unclear
Intervention: Probiotics
Comparison: Placebo

Outcomes	Illustrative Comparative Risks[a] (95% CI)		Relative Effect (95% CI)	No. of Participants (No. of studies)	Quality of the Evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Placebo	Probiotics				
Number of participants who experienced URTI episodes, at least 1 event Follow-up: 3-12 mo	30 per 100	20 per 100 (13-28)	OR 0.58 (0.36-0.92)	1836 (6)	⊕⊕⊖⊖ low[b,c,d]	
The number of participants who used antibiotics Follow-up: 3-12 mo	10 per 100	6 per 100 (4-9)	RR 0.67 (0.45-0.98)	1104 (3)	⊕⊕⊖⊖ low[b,e]	
The mean duration of an episode of URTI Follow-up: 3-8.5 mo	The mean duration of an episode of URTI ranged across control groups from 6.3 to 8.9 (unit not specified)	The mean duration of an episode of URTI in the intervention groups was 0.29 lower (3.73 lower-3.13 higher)		620 (2)	⊕⊖⊖⊖ very low[b,f,g]	
Adverse events	2 per 100	2 per 100 (1-5)	OR 0.92 (0.37-2.28)	959 (2)	⊕⊕⊖⊖ low[h,i]	

[a] The corresponding risk (and its 95% confidence interval) is based on the assumed risk in the comparison group (ie, the median control group risk across studies) and the relative effect of the intervention (and its 95% CI).

Abbreviations: CI, confidence interval; OR, odds ratio; RR, risk ratio; URTI, upper respiratory tract infection.

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

[b] Unclear risk of bias in the included studies.
[c] High statistical heterogeneity (ie, I-square = 69%).
[d] The included studies had heterogeneous populations (ie, infants, children, marathon runners, and healthy volunteers).
[e] All participants in all 3 studies were children, which limits the generalizability of findings to adults.
[f] High statistical heterogeneity (ie, I-square = 92%) and high clinical heterogeneity (ie, 1 of the 2 studies includes only marathon runners, and the other study includes the general population). The study with marathon runners is in favor of placebo (although nonsignificant results) (MD 1.60; 95% CI –0.34 to 3.54) and the study with the general population is in favor of probiotics (MD –1.90; 95% CI –2.04 to –1.76).
[g] Very wide confidence interval.
[h] Unclear risk of bias in the smaller of the 2 studies; however, the larger of the 2 studies had a low risk of bias. Chose not to downgrade.
[i] Few events, wide CI.

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