Review: probiotics reduced diarrhoea at 3 days in children and adults with proven or presumed infectious diarrhoea


Are probiotics effective for proven or presumed infectious diarrhoea in children and adults?

 METHODS

Data sources: Cochrane Infectious Diseases Group trials register (December 2002), Cochrane Controlled Trials Register (Issue 4, 2002), Medline (1966–2002), and EMBASE/Excerpta Medica (1988–2002); existing reviews; reference lists of retrieved trials; experts and relevant organisations; and 5 manufacturers of probiotics.

Study selection and assessment: published and unpublished randomised controlled trials (RCTs) in any language that compared specific probiotics with placebo or no probiotic in adults and children with acute diarrhoea (<14 d) that was proven or presumed to be caused by an infectious agent. Two independent reviewers assessed the methodological quality of individual studies in terms of generation of allocation sequence, allocation concealment, blinding, and loss to follow up.

Outcomes: diarrhoea lasting ≥3 or ≥4 days, duration of diarrhoea, and stool frequency.

 MAIN RESULTS

23 studies (n = 1917, 76% children) met the selection criteria. Probiotics included lactis acid bacilli (21 studies) and the yeast Saccharomyces boulardii (2 studies). Comparison groups included matching placebo (20 studies), standard treatment without placebo (2 studies), and milk formula (1 study).

Meta-analysis showed that patients who received probiotics were less likely to have diarrhoea lasting ≥3 days or ≥4 days than patients who received placebo or no probiotics (table). Mean duration of diarrhoea was reduced in patients who received probiotics, as was stool frequency at day 2 and day 3 of the intervention (table).

 CONCLUSION

In children and adults with proven or presumed infectious diarrhoea, probiotics reduced diarrhoea lasting ≥3 days or ≥4 days and reduced the mean duration of diarrhoea by 30 hours.

For correspondence: Dr S J Allen, Swansea Clinical School, University of Wales Swansea, Swansea, UK. s.j.allen@swansea.ac.uk

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Commentary

The findings of the comprehensive systematic review by Allen et al on probiotics for treating acute infectious diarrhoea are consistent with those of 2 previous reviews. Allen et al have built on these reviews by including unpublished RCTs (to minimise publication bias), non-blinded studies, and more detailed quality assessment. The reviewed studies included participants of all ages from developed and developing countries, some of whom might have received antibiotics before recruitment. The expansion of the inclusion criteria promotes greater clinical generalisability. The findings also are consistent with a review by D’Souza et al who found that probiotics prevented antibiotic associated diarrhoea. Allen et al identified significant heterogeneity among individual trial results for some outcomes (diarrhoea at ≥3 d or ≥4 d and mean duration of diarrhoea) and appropriately used a random effects model to combine study findings. Despite the use of sensitivity analysis to identify sources of heterogeneity, the small number of studies limited the ability to assess whether other factors may have accounted for the heterogeneity between studies (eg, probiotic used and identified diarrhoeal pathogens). The statistically significant heterogeneity between studies indicates that the summary analyses should be interpreted with caution.

Cost effectiveness was not addressed in this review, and many of the included studies did not report adverse events. When adverse events were reported, they tended to be minor (eg, vomiting) and were not considered to be attributable to the probiotic.

The findings of Allen et al support the use of probiotics for acute infectious diarrhoea in children and adults. More studies of specific probiotic regimens in well defined groups of children or adults are needed to inform evidence-based treatment guidelines.

Faith Donald, RN (EC), MS (CHN)

School of Nursing, Ryerson University Toronto, Ontario, Canada


### Table

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Number of studies (n)</th>
<th>Weighted event rates</th>
<th>Weighted mean difference (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diarrhoea for ≥3 days†</td>
<td>15 (1341)</td>
<td>Probiotics 40% Control 17%</td>
<td>RRR (95% CI) NNT (CI)</td>
</tr>
<tr>
<td>Diarrhoea for ≥4 days†</td>
<td>13 (1228)</td>
<td>Probiotics 17% Control 45%</td>
<td>34% (23 to 45) 5 (4 to 8)</td>
</tr>
<tr>
<td>Mean duration of diarrhoea (h)†</td>
<td>12 (970)</td>
<td>Probiotics −30.48 (−42.46 to −18.51)</td>
<td></td>
</tr>
<tr>
<td>Mean stool frequency (day 2)†</td>
<td>5 (417)</td>
<td>Probiotics −1.51 (−1.85 to −1.17)</td>
<td></td>
</tr>
<tr>
<td>Mean stool frequency (day 3)†</td>
<td>4 (447)</td>
<td>Probiotics −1.31 (−1.56 to −1.07)</td>
<td></td>
</tr>
</tbody>
</table>

*Abbreviations defined in glossary; RRR, NNT, and CI calculated from data in article. †Based on a random effects model (significant heterogeneity among trials). ‡Based on a fixed effects model.
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