Integrating qualitative research with trials in systematic reviews

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**Notes**
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An example review from public health shows how integration is possible and some potential benefits

The value of including data from different types of studies in systematic reviews of health interventions is increasingly recognised. A recent editorial accepted that qualitative research should be included in systematic reviews, but pointed to a "daunting array of theoretical and practical problems." This article presents an approach to combining qualitative and quantitative research in a systematic review. We describe how we used this approach in a systematic review of interventions to promote healthy eating among children, full details of which are available.

The review framework

The review question was: "What is known about the barriers to, and facilitators of, healthy eating among children aged 4-10 years?" The specific focus of the review was fruit and vegetable intake. We searched for two types of research: controlled trials (randomised or non-randomised) that examined interventions to promote healthy eating and studies that examined children's perspectives and understandings (views studies), often by using qualitative research methods—such as in-depth interviews and focus groups.

Quality assessment

We maintained the key principles of avoiding bias and maximising transparency and accountability when conducting a systematic review. Both types of study went through a stage of quality assessment with two reviewers working independently and then meeting to discuss their findings. We used different tools for the different types of studies, building on recent developmental work and established consensus on quality assessment for both experimental studies and qualitative research. The studies were assessed in terms of reporting quality, internal validity or reliability, and, for qualitative studies, the extent to which the findings were rooted in children's perspectives.

Fig 1 Stages of the review

We used conventional systematic review methods: sensitive searching, systematic screening, and independent quality assessment. These methods found 33 trials and eight qualitative studies that met our prespecified inclusion criteria.

We assessed studies for quality and reliability according to standards for their specific study types; they were then synthesised individually by using methods appropriate to the study. We conducted a meta-analysis with the data extracted from trials, used qualitative methods to synthesise the textual data extracted from the qualitative studies, and then integrated the findings from the qualitative synthesis with those from the meta-analysis. This gave us one review with three syntheses (fig 1).

But will she eat her greens?
We judged 21 of the 33 trials to be sufficiently reliable to enter the meta-analysis. Five of the eight qualitative studies met nine or more of the 12 quality criteria. The remaining three met six or fewer criteria. We conducted a sensitivity analysis and found that the results of these three studies did not contradict those from studies of a higher quality. The synthesis would have come to the same conclusions with or without their inclusion. In future, we have decided to exclude poorer quality studies from the synthesis and are conducting methodological work to assess the impact this has on the findings of the review.

**Synthesis 1: meta-analysis of data from trials**

In the first synthesis we carried out a traditional meta-analysis and pooled the effect sizes on six outcomes. We explored heterogeneity by carrying out subgroup analyses on a limited range of categories that we had specified in advance. Combining the results of the trials using a random effects model we found that, on average, the interventions described in the trials were able to increase children’s fruit and vegetable consumption by about half a portion a day.

There was great variability between the studies. For example, one intervention was able to increase consumption by nearly two portions a day, while most of the others did not achieve one portion. Since all but two of the studies were evaluating different interventions, the summary statistic seems to conceal more than it reveals. We were unable to explain the statistical heterogeneity using prespecified categories covering study quality, study design, setting, and type of intervention.

**Synthesis 2: synthesis of qualitative studies**

The data for the second synthesis were in text form. In order to synthesise these, we copied the authors’ findings verbatim into NVivo software and then followed guidelines for the thematic analysis of textual data collected in primary research. The aim of the analysis was to infer barriers to, and facilitators of, healthy eating and ideas for effective interventions from children’s views. We examined the findings of each study in turn and assigned codes to describe relevant sentences or paragraphs—for example, one code was “children prefer fruit to vegetables.” We then looked for similarities and differences between the codes to organise these into a hierarchical tree structure centred on children’s understandings of healthy eating and the factors, in their views, that influence the food they eat.

In the next stage of the synthesis, three reviewers independently examined the descriptive themes and their associated data in the light of the review question to infer barriers, facilitators, and implied recommendations for developing interventions. The reviewers then met to discuss their findings and to develop a set of more abstract analytical themes.

As an example, one of the themes was that children do not see their personal health as their responsibility but that of their parents. Children do not regard purchasing fruit for health reasons as a legitimate use of their pocket money. Again, that is the job of parents.

**Criteria for assessing quality**

- **Quantitative studies (controlled trials)**
  - Provision of data on outcomes before and after the intervention
  - Provision of data on all outcomes measured
- **Qualitative studies**
  - Quality of reporting (5 items)
  - Sufficiency of strategies for establishing reliability or validity (4 items)
  - Extent to which study findings were rooted in children’s perspectives (3 items)

Example of the synthesis matrix:

<table>
<thead>
<tr>
<th>Recommendation for intervention from children’s views</th>
<th>Trials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not promote fruit and vegetables in the same way</td>
<td>Good quality</td>
</tr>
<tr>
<td>Reduce health emphasis in messages to promote fruit and vegetables, particularly those which concern future health</td>
<td>5</td>
</tr>
</tbody>
</table>
Integration of the two types of studies can identify ways to improve interventions and their implementation challenges the notion that subgroup analyses should always be specified before the review. The inductive approach used in the thematic analysis of data from the qualitative studies meant that our categories for subgroup analysis could not be defined in advance. Secondly, the use of children’s views to structure the final synthesis challenges traditional notions of who experts are and what constitutes expert opinion. Thirdly, the method is dependent on the judgment of reviewers when evaluating the extent to which an intervention meets a recommendation from the qualitative synthesis. Decisions also have to be made when the findings of the two syntheses conflict or when different parts of the matrix suggest contrary approaches.

The technique presented here breaks new ground in review methodology, offering an alternative to Bayesian methods for combining different types of studies in systematic reviews. Conceptually, the method allows the integration of quantitative estimates of benefit and harm with qualitative understanding from people’s lives. The insights gained from the synthesis of qualitative studies allows exploration of statistical heterogeneity in ways that it would be difficult to imagine in advance. More work is needed to develop the method and test its relevance to different areas of health care and health promotion research.

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