Licking needle pain

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Should GPs offer lollies to children as an analgesic during vaccinations?

CLINICAL SCENARIO

OLIVIA, a healthy four-year-old girl, saw me recently with her parents for immunisations. These were performed without incident, apart from Olivia having a cry.

Afterwards, I reflected that although I knew that sweet solutions have an analgesic effect for babies, I wasn't sure about older children, and it wasn't my usual practice. Should I introduce this? What is the evidence?

CLINICAL QUESTION

What is the effect of using an oral sweet substance on pain caused by immunisations in children?

THE RESEARCH EVIDENCE

Step 1: The Cochrane Library

The Cochrane Library has a relevant systematic review published in 2015 (search conducted October 2014) on sweet-tasting solutions for reducing needle-related procedural pain for children aged from 12 months to 16 years.[1] I had a quick look to see whether there were other up-to-date reviews.

Step 2: TripDatabase

I conducted a search using the TripDatabase PICO search tool (Participant: "children", Intervention: "sweet", Comparator: "placebo", Outcomes: "pain").

The Cochrane systematic review was identified as the top result. There were recent studies and systematic reviews for neonates and babies, but not for older children. Let's look at this systematic review in detail.[1]

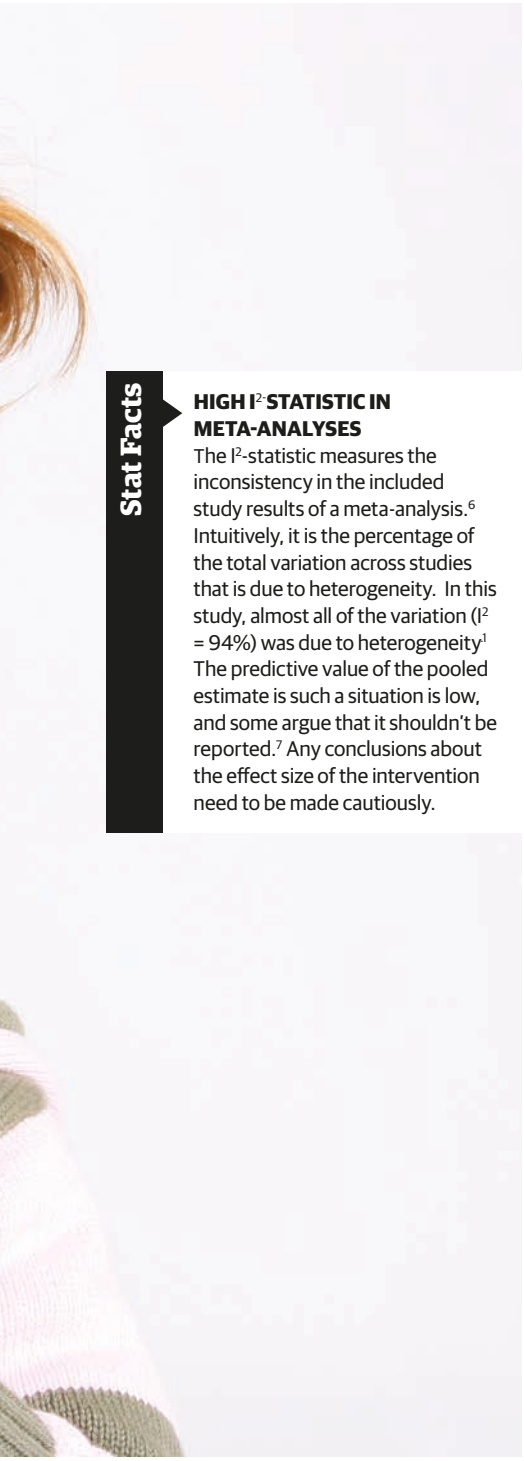
CRITICAL APPRAISAL

I will use the systematic reviews critical appraisal sheet from the Centre for Evidence-Based Medicine.[2]

PICO

What PICO question does the systematic review ask?

In children aged 1-16 undergoing needle-



Stat Facts

HIGH I^2-STATISTIC IN META-ANALYSES

The I^2-statistic measures the inconsistency in the included study results of a meta-analysis.[6] Intuitively, it is the percentage of the total variation across studies that is due to heterogeneity. In this study, almost all of the variation (I^2 = 94%) was due to heterogeneity[1] The predictive value of the pooled estimate is such a situation is low, and some argue that it shouldn't be reported.[7] Any conclusions about the effect size of the intervention need to be made cautiously.

related procedures (Participants), what is the effect of an orally administered sweet substance (such as sucrose, glucose, fructose or non-sucrose sweetener), delivered by any means, with or without additional physical and/or comfort measures, distraction methods, psychological interventions or pharmacological strategies (Intervention), compared with non-sweet substances (including water, formula, breast milk, other) (Comparator) on pain intensity (Outcome)?

Is it clearly stated?
Yes.

Is it unlikely that important studies were missed?
Yes. The search strategy was rigorously described, as typical for Cochrane systematic reviews. Multiple databases were searched, along with specific paediatric and pain journals, and conference proceedings.

Were the criteria used to select articles for inclusion appropriate?
Yes. The authors included only randomised trials (RCTs) or quasi-RCTs of the relevant participant group and interventions.

Were the included studies sufficiently valid for the question asked?
Possibly not. Seven published studies and one unpublished study were included in the review.

The authors formally assessed the risk of bias of the included studies using the standard methods of the Cochrane Collaboration. The method to assess risk was extensively described in this paper (pp. 8-10).[1]

About half of all included studies were judged at unclear risk of bias for most of the risk domains. Furthermore, all but one study was rated at high risk of bias with regard to small sample sizes.

Were the results similar between studies?
No. There was very high between-study heterogeneity (see Stat Facts) comparing sucrose versus control for preschool-aged children on cry duration (I^2 = 94%) and composite pain score (I^2 = 86%).

What were the results?
Sucrose or sweet taste (lollipop) compared with control in pre-school children compared with the control intervention:

- Cry duration: -15 seconds (95% CI -54 to 24), p = 0.45
- Composite pain scores: SMD -0.26 (95% CI -1.27 to 0.75), p = 0.61

DISCUSSION AND CONCLUSION

The included studies in this systematic review were small and conflicting. This is represented by the high heterogeneity, and the broad confidence intervals, in the pooled estimates.

Caution should be used in making any empirical conclusions from the data.

The use of oral sweet solutions in reducing immunisation pain is more robust for neonates and babies under 12 months.[3]

However, it may be unwise to generalise these data to older children.

Although a spoonful of sugar is unlikely to be harmful, the precautionary approach is to avoid assuming that sweets used in this context have a meaningful analgesic effect.

Even for babies, breastfeeding may be more effective than a sweet solution in reducing vaccination pain[4] and hence the preferred strategy where possible.

For children of Olivia's age, there is better evidence supporting the use of distraction as a technique to reduce pain and distress from needle procedures.[5]

Although this is not a mutually exclusive intervention to using an oral sweet, using distraction should arguably be prioritised as an evidence-based approach.

Moving forward, I will not be introducing oral sweets for four-year-old immunisations.

Rather, I'll work with the parents to include more explicit distraction at the time of the needle.

References:

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7. Melsen et al; The effects of clinical and statistical heterogeneity on the predictive values of results from meta-analyses. Clin Microbiol Infect 2014; Feb;20(2):123-9