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Abstract

Introduction:

Methods:

Results:

difference between the two groups were included. For example, for iron-zinc factorial trials, results were included for comparisons of zinc only vs. placebo and zinc plus iron vs. iron only. In case of cluster randomized trials, cluster adjusted values were used.

Data were analyzed in two ways. In first analysis, we pooled the studies to get a weighted mean difference also called effect size. This value, also known as Cohen's effect size, is useful in meta-analyses because it eliminates the problems of units of measurement (e.g. change in height in cm or HAZ scores) and duration, which may vary across studies [11,12]. These effect sizes were calculated for individual studies by dividing the difference between the mean change in treatment and control groups by the pooled standard deviation. Random effect models were used for the primary analysis [13]. We did a subgroup analysis for data sets where zinc was supplemented alone by excluding those data sets where it was given in combination with iron. This was based on results of some experimental studies that had shown that iron may decrease the absorption of zinc when supplemented together [14,15]. We hypothesized that the preventive effect of zinc for stunting would be more prominent if supplemented alone rather than in combination with iron.

In the second analysis, we pooled the studies reporting change in height in cms to get a net change in length in shows that zinc supplementation alone has more prominent effects on length gain than when supplemented in combination with iron. Due to this reason, we would base our recommendations for LiST model on the basis of results of zinc supplementation alone in the next section.

Recommendations for LiST model

Results of effect size (weighed mean difference) are interpreted as the percent of non-overlap of the intervention group's scores with those of the control group. An effect size (ES) of 0.0 indicates that the distribution of scores for the intervention group overlaps completely with the distribution of scores for the control group, and there is 0% non-overlap. An ES of 0.3 indicates a non-overlap of 21.3% in the two distributions. Effect size can be categorized as small (~0.2), medium (~0.5) or large (~0.8) [11]. This shows that results of pooled effect size can only be interpreted as percent of non-overlap of results of two groups and an absolute quantitative estimate cannot be generated in the form of units of measurement [69].

In order to translate the observed weighed mean effect size into practical recommendations, we reanalyzed the subset of 28 studies that presented results in terms of absolute height increments in centimeters. The pooled results from 32 data sets of these studies showed a net

supplementation in these studies was 7.03 months and the dose ranged from 1 mg/day to 20 mg/day. The weighed mean difference 'effect size' for these studies was 0.23 (95 % CI 0.11, 0.36). In order to give a recommendation with a specific dose/day and for a specific duration, we did a post hoc

Hong 1992
Bates 1993
Dirren 1994
Castillo-Durran 1995
Sempertegui 1996
Ninh 1996

of age [mean difference: 0.46cm (95 % CI 0.21, 0.71), random model]. The results for dose of 5 mg/day [mean difference 0.61 (95 % CI -0.28, 1.51), random model] and that of 3mg/day [mean difference 0.05 (95 % CI -0.25, 0.35) random model] were not statistically significant. There was a significant statistical difference among these subgroups (p=0.005). In the subset of studies where zinc was supplemented in a dose of 10 mg/day,

Hong 1992
Bates 1993
Dirren 1994
Castillo-Durran 1995
Ninh 1996
Ruz 1997
Rosado 1997 (Zn alone)
Kikafunda 1998
Lira 1998 (5 mg)
Gardner 1998Bates 1993

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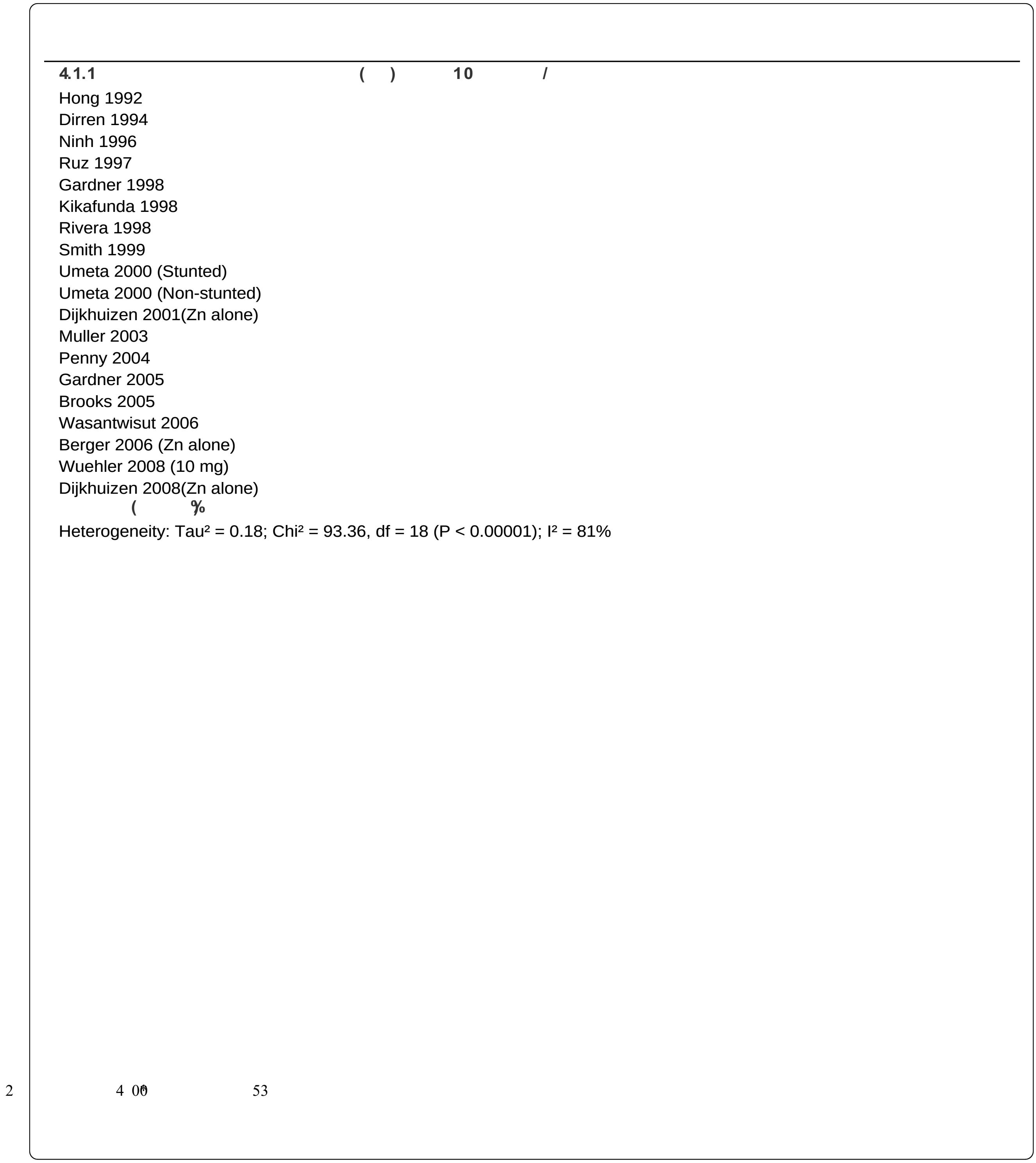
duration of supplementation was 6 months in all the studies except in three studies [35,37,39]. In two of these studies the supplementation continued for a year [35,39] while in one study it was for 5 months [37]. In the study by Brooks et al. [56] the supplementation also continued until a year, however disaggregated data was available for 6 months duration. We pooled results of those studies where zinc was supplemented in a dose of 10 mg/day for duration of 24 weeks by excluding the three above mentioned studies [35,37,39]. Combined results from these studies showed a net gain in length of 0.37 cm (±0.25) in zinc supplemented group compared to placebo (Figure 6). Table 2 summarizes the quality assessment and pooled estimate for this outcome. The qualitative assessment of the available evidence for the effect of zinc supplementation (10 mg/day for 24 weeks) on linear growth was that of 'moderate' level. This qualitative grading for collective evidence is



based on the parameters such as volume and consistency of the evidence, the size of the effect and the strength of the statistical evidence for an association between the intervention and outcome [10].

On the basis of qualitative grading of collective evidence and specificity of intervention in terms of dose and duration, we have recommended this estimate for input to LiST model. This can be described as follows; “preventive zinc supplementation in a dose of 10 mg/day for 24 weeks in children < 5 years of age leads to a net gain of 0.37cm in zinc supplemented group compared to control in developing countries”.

Discussion

Effect of zinc supplementation on linear growth has been evaluated previously [3-5]. The first and most widely known meta-analysis evaluating the effect of zinc

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