THE “DISCIPLINED SUBJECTIVITY” OF META-ANALYSIS

A critique of the 2005 Cochrane review of randomized controlled trials comparing home-like versus hospital settings for birth \(^1\) has focused debate on methodologic challenges of meta-analysis. Criticism centered on criteria used to assess studies for inclusion and quality of the underlying studies, particularly whether they defined and controlled the treatment in each arm sufficiently to ensure trials offered valid comparisons between two discrete conditions.\(^2\)

Meta-analyses can increase the statistical power and precision of estimates of effect by pooling data from studies that explore the same research question using comparable parameters. It is useful for clarifying results of multiple, similar small or conflicting studies. Pooling data does not, however, correct problems of quality in the contributing studies; it merely concentrates their unreliable conclusions.

Judging which studies may be included in a meta-analysis is complicated and entails many decisions. Some focus on the quality of trials; others consider study design and format of the data. These decisions are made to satisfy the statistical assumptions of meta-analysis; nonetheless, they involve subjective judgments, may impact review conclusions, and are often not described explicitly.

Voils et al.\(^3\) detail the methodologic considerations they faced when deciding which trials to include in a planned meta-analysis. To illustrate the “disciplined subjectivity” of meta-analysis and its impact on the resulting review, they describe the process of culling data from 29 trials for pooled analysis. After ensuring the statistical compatibility of study designs, methods to control or adjust for confounding, operationalization of variables, and metrics used to express the data, the authors report they had to exclude 73% to 87% of all observations, leaving very little of the original data to synthesize.

In response to the critique of their Cochrane review on birth setting, Hodnett and Downe\(^4\) quote the Cochrane Handbook, noting that “much more research is needed to determine which criteria for validity assessment are important influences on study results.”


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EVIDENCE-BASED REVIEWS FROM OTHER SOURCES


Meta-analyses of observational studies assessed the effect of maternal obesity on risk for gestational diabetes mellitus (GDM), stillbirth, and cesarean delivery. All found heightened risk that rose as women’s weight categories increased. Because not all studies reported adjusted odds or adjusted for the same factors, crude odds ratios were used in the primary meta-analyses; however, separate meta-analysis of available adjusted odds ratios yielded similar results. Overweight, obese, and severely obese women from 20 trials were two, four, and eight times more likely to develop GDM, respectively, compared to women of normal weight at the start of pregnancy. The odds of stillbirth were 1.47 and 2.07 for overweight and obese women from nine trials compared to those of normal weight. The odds of cesarean delivery were 1.46, 2.05, and 2.89, respectively, for overweight, obese, and severely obese women from 33 trials compared to normal weight women. Overweight and obese women without co-morbidities had 1.41 and 1.75 times higher odds of cesarean, respectively. Meta-regression suggested that the relationship between obesity and outcomes did not vary by study characteristics.

Comment: These studies clarify the magnitude of pregnancy risk related to excess weight. With 27% of US women overweight and 31% obese, pre-pregnancy weight loss could improve outcomes significantly.


A meta-analysis of three randomized controlled trials comprising 11,259 subjects evaluated effects of a 20-minute continuous cardiotocography (CTG) assessment on hospital admission compared to intermittent auscultation of the fetal heart rate throughout labor without an initial period of continuous electronic monitoring. Outcomes compared were 5-minute Apgar scores and rates of cesarean and instrumental birth. The pooled relative risk of cesarean section was 20% higher, and that of instrumental delivery was 10% higher, in association with admission CTG compared to intermittent auscultation while there was no significant difference in 5-minute Apgar scores between the two groups.

Comment: A CTG admission strip is routinely used to evaluate fetal well being for many women entering the hospital in labor. This review did not find a benefit for neonates and suggested increased risk of surgical or instrumental delivery associated with admission CTG compared to intermittent auscultation while there was no significant difference in 5-minute Apgar scores between the two groups.


The authors conducted a systematic review and meta-analysis of randomized controlled trials comparing outcomes for women with borderline or low-grade cervical cytology who received immediate referral for colposcopy
to those managed with surveillance for up to 24 months. Compliance with return visits was also analyzed. Because of study heterogeneity, pooled analysis of all three trials was not possible for all outcomes. The incidence of human papillomavirus (HPV) and mild cervical dysplasia (CIN1) on biopsy was significantly higher in the immediate colposcopy group compared to the surveillance group at 24 months. There was no significant difference in incidence of moderate (CIN2) or worse dysplasia between these groups. However, by 24 months, the rate of adherence to a return appointment had decreased significantly for those in the surveillance group. The cytologic status is unknown for women lost to follow-up and introduces the possibility of biased estimates.

Comment: Many minor cervical cytological abnormalities resolve spontaneously with time, especially in young women. However, some may progress to or mask invasive disease. At face value, the results of this meta-analysis favor surveillance; however, the risk to women lost to follow-up is uncertain. A risk–benefit analysis is needed to ascertain whether this risk exceeds those associated with potential over treatment of minor abnormalities.

RECENT EVIDENCE-BASED REVIEWS

- Friedenson B. The BRCA1/2 pathway prevents hematologic cancers in addition to breast and ovarian cancers. BMC Cancer 2007;7:152. Available without charge from: www.biomedcentral.com/1471-2407/7/152

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