The accuracy of maternal anthropometry measurements as predictor for spontaneous preterm birth: a systematic review


CRD summary
This well-conducted review assessed the accuracy of antenatal maternal anthropometric measurements for the prediction of pre-term birth. The authors' conclusions, that pre-pregnancy body mass index, pregnancy weight gain and maternal height are poor predictors for pre-term birth, are reliable.

Authors' objectives
To assess the accuracy of antenatal maternal anthropometric measurements for the prediction of spontaneous pre-term birth.

Searching
MEDLINE (1966 to June 2002), EMBASE (1980 to June 2002), Pascal (1973 to June 2002) and BIOSIS Previews (1969 to June 2002), the Cochrane Database of Systematic Reviews (Issue 2, 2002), the Cochrane CENTRAL Register (Issue 2, 2002), DARE, MEDION (1974 to December 2000), the National Research Register (Issue 4, 2002), SciSearch (1974 to June 2002) and Conference Papers Index (1973 to June 2002) were searched. A reference to the full searches was supplied (see Other Publications of Related Interest). Reference lists of known reviews and primary studies were screened to identify additional relevant studies. No language restrictions were applied.

Study selection
Study designs of evaluations included in the review
Observational studies were eligible for inclusion. The included studies were prospective and retrospective cohort studies and retrospective case-control studies.

Specific interventions included in the review
Studies that assessed antenatal anthropometric measurement (height, pre-pregnancy weight and pregnancy weight gain) were eligible for inclusion. The included studies assessed pre-pregnancy body mass index (BMI), antenatal height measurement, and adequacy of maternal weight gain during pregnancy. Women with BMI less than 19 (underweight), 25 to 30 (overweight) or more than 30 (obese) were considered abnormal; a BMI of 19 to 24 was considered the norm.

Reference standard test against which the new test was compared
Studies that used gestation at spontaneous birth as the reference standard were eligible for inclusion. The included studies defined pre-term birth as reported at <30, <32, <35 or <37 weeks' gestation.

Participants included in the review
Studies of asymptomatic or symptomatic pregnant women were eligible for inclusion.

Outcomes assessed in the review
The studies had to report sufficient data to construct a 2x2 table of test performance to be included in the review. Positive and negative likelihood ratios (LRs) were the primary outcome measure presented.

How were decisions on the relevance of primary studies made?
Two reviewers screen the electronic searches independently and full manuscripts of all citations thought likely to meet the inclusion criteria were obtained. Two independent reviewers made the final inclusion decisions on assessment of these manuscripts. Any disagreements were resolved through consensus or discussion with a third reviewer.
Assessment of study quality
The studies were considered to be of high quality if they used a prospective design, consecutive enrolment, adequate test description and blinding of the test results. Two reviewers independently assessed the methodological quality of the included studies.

Data extraction
Two reviewers independently extracted the data from the included studies. If accuracy data were not extractable, the authors contacted study authors to seek assistance. Accuracy data were used to construct 2x2 tables and these data were used to calculate LRs and their 95% confidence interval (CI).

Methods of synthesis
How were the studies combined?
The data were synthesised separately for asymptomatic and symptomatic women, stratified according to test thresholds. In the absence of heterogeneity, summary LRs were calculated (method of pooling not reported).

How were differences between studies investigated?
Heterogeneity was assessed statistically (chi-squared test) and graphically to aid the decision regarding pooling.

Results of the review
Eight studies of asymptomatic women (n=124,647) were included. Four studies used a prospective cohort design (n=54,281), three used a retrospective cohort design (n=69,676), and one was a case-control study (n=690). No relevant studies of symptomatic women were identified.

None of the studies fulfilled all four quality criteria of an ideal study. Blinding of maternal anthropometric results and consecutive enrolment into the study were lacking in all but one of the included studies.

Accuracy of maternal pre-pregnancy BMI in predicting birth at <37 weeks' gestation (n=5).
Pre-pregnancy BMI was a poor predictor of pre-term birth. The positive LRs ranged from 0.96 to 1.75 and the negative LRs from 0.84 to 1.01.

Accuracy of maternal BMI in predicting birth at <32 weeks' gestation (n=2).
Pre-pregnancy BMI was also a poor predictor of pre-term birth at <32 weeks' gestation. The positive LRs ranged from 1.01 to 2.00 and the negative LRs from 0.83 to 1.00.

Accuracy of adequacy of pregnancy weight gain in predicting birth at <37 weeks' gestation (n=4).
Weight gain throughout pregnancy was a poor predictor of pre-term birth. The summary positive LR was 1.69 (95% CI: 1.48, 1.92) and the summary negative LR was 0.81 (95% CI: 0.77, 0.86).

Accuracy of maternal height in predicting pre-term birth (n=2).
These studies used thresholds of below the 25% quartile of the population or less than 152 cm in height, but neither was an accurate predictor of spontaneous pre-term birth. The positive LRs were 1.79 and 1.26, while the negative LRs were 0.75 and 0.96.

Authors' conclusions
Routine antenatal maternal anthropometric measurements are not useful in predicting the risk of pre-term birth before 37 weeks' gestation.
CRD commentary
This was a well-conducted and clearly reported review. The objective was clear and supported by well-defined inclusion criteria. An extensive literature search was conducted, although this might have benefited from further attempts to locate unpublished studies. Details of the review methodology were reported; these included appropriate attempts to minimise bias in the review process. Study quality was assessed and the results tabulated and discussed in the synthesis of the results. The authors did not provide details of the methods used to pool the results, therefore it was not possible to determine whether the methods used were appropriate. However, given the very poor LRs, this would not have affected the conclusions of this review. In addition, it is questionable whether there was any benefit of pooling the results. The authors’ conclusions are supported by the data presented.

Implications of the review for practice and research
Practice: The authors stated that routine antenatal maternal anthropometric measurements are not useful in predicting the risk of pre-term birth.

Research: The authors stated that further studies should address the use of anthropometric measurements in combination with other tests, but need to use a more clinically appropriate reference standard of pre-term birth (e.g. birth before 32 to 34 weeks’ gestation) and improve on the quality of their design.

Funding
WellBeing charity (UK), grant number K2/00.

Bibliographic details

PubMedID
15734079

DOI
10.1016/j.ejogrb.2004.07.041

Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Anthropometry /methods; Body Height; Body Mass Index; Body Weight; Female; Humans; Mothers; Predictive Value of Tests; Pregnancy; Pregnancy Outcome; Premature Birth /etiology; Risk Factors; Weight Gain

AccessionNumber
12005009558

Date bibliographic record published
30/11/2006

Date abstract record published
30/11/2006
Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.