

Accuracy of simple clinical and epidemiological definitions of childhood obesity: systematic review and evidence appraisal

Reilly JJ, Kelly J, Wilson DC

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CRD summary

The review concluded that evidence was lacking for either large waist circumference or body mass index (BMI) using the International Obesity Task Force approach in preference to national BMI percentiles for identifying children and adolescents with excess fatness and cardiometabolic risk factors. Poor reporting of the review process and included study results mean these conclusions should be viewed with caution.

Authors' objectives

To assess the evidence on the use of body mass index (BMI) and waist circumference for diagnosis of high body fat content and adverse cardiometabolic risk factors in children and adolescents.

Searching

MEDLINE and EMBASE were searched from January 2002 to January 2008. The MEDLINE search strategy was reported in full. Bibliographies of included studies, recent guidelines on paediatric obesity and previous relevant systematic and narrative reviews of diagnosis and definition of paediatric obesity were screened for additional articles.

Study selection

Studies that assessed the diagnostic accuracy of BMI and/or waist circumference in participants aged up to 18 years and that reported summary statistics (such as sensitivity and specificity, predictive values and receiver operator characteristic analysis) were eligible for inclusion.

Study participants were aged from four to 18 years. Reference standards included cardiometabolic risk factors, dual energy X-ray absorptiometry (DXA), skin-fold thickness, impedance and total body water.

The authors did not state how many reviewers assessed studies for inclusion.

Assessment of study quality

Two reviewers independently assessed the methodological quality of included studies using the QUADAS tool; any disagreements were resolved by consensus.

Studies were assigned an overall quality rating from high (++), medium (+) to low (-) quality on the basis of the number of QUADAS criteria satisfied (no further details reported).

Data extraction

Short summaries of the results of individual included studies were extracted and reported in a table.

The authors did not state how many reviewers performed the data extraction.

Methods of synthesis

Studies were combined using a narrative synthesis.

Results of the review

Twenty-seven studies (n=24,582 participants) were included in the review. Descriptions of study recruitment, sampling and methodology were frequently poor.

BMI was compared with waist circumference for classification of high body fat content and/or cardiometabolic comorbidities in 10 studies. Nine studies compared the ability of BMI with that of waist circumference to diagnose cardiometabolic risk factors and one study compared waist circumference and BMI for the diagnosis of high body fat. DXA was the reference standard. QUADAS scores ranged from low to high. The diagnostic performance of waist circumference and BMI was similar in all studies.

BMI (national reference data compared with International Obesity Task Force approach) for classification of high body fat content and/or adverse cardiometabolic risk factors was investigated in eight studies. Seven of the eight studies compared accuracy of the two classifications for detection of high body fat only. One study compared accuracy for detecting both high body fat and cardiometabolic risk. QUADAS scores were low for all studies. Five of the eight studies found significantly poorer lower sensitivity with BMI using the International Obesity Task Force classification; the other three found that sensitivities were similar. Seven studies compared specificity estimates between classifications and all found them to be similar.

Authors' conclusions

The present review provided no compelling evidence for use of either high waist circumference or BMI interpreted using the International Obesity Task Force approach in preference to the use of national BMI percentiles for the identification of children and adolescents with excess fatness and adverse cardiometabolic risk profile.

CRD commentary

The review defined inclusion criteria in terms of index test, participants and outcome measures. Sources were searched for relevant studies and it appeared that no language restrictions were applied, which reduced the likelihood of missed studies. The review process (inclusion screening and data extraction) was poorly reported and potential for error and bias could not be judged. Methodological quality of the included studies was assessed, but only summary QUADAS scores (not recommended by QUADAS use guidance) were reported without a full description of their derivation. Use of a narrative synthesis appeared appropriate. The inclusion criteria specified that studies must report accuracy measures, but in most cases the numerical values of these were not reported in the review.

The authors' conclusions appear to reflect the data presented, but should be viewed with caution given the limitations described.

Implications of the review for practice and research

Practice: The authors did not specify any recommendations for practice.

Research: The authors stated that setting up (and funding) new studies sufficiently large to answer all the major questions on definitions of childhood obesity with greater confidence may be problematic. They suggested that use of existing cohort studies in which both simple diagnostic indices and sophisticated outcome measures were measured in large samples may offer a practical solution. The authors further stated that research was required to determine whether waist circumference, BMI using national reference data or BMI using the International Obesity Task Force approach provided the optimal simple definition of overweight for a given circumstance (such as surveillance or clinical practice).

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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.