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Diagnostic accuracy of indirect calorimetry in adults with overweight or obesity: rapid systematic review

W. Bruce[1], L. Law[2], E. Chen[1], X. Tang[1] and S. Marshall[3]
[1]*Bond University, Gold Coast, Queensland, Australia*
[2]*La Trobe University Latrobe University, Melbourne, Victoria*
[3]*Deakin University, Melbourne, Victoria*

Indirect calorimetry (IC) is regarded as the benchmark for measuring resting energy expenditure (REE)[(1)] but validity and reliability in adults with overweight or obesity have not been systematically appraised[(2)]. The aim of our research was to evaluate the diagnostic accuracy of IC for REE in adults with overweight or obesity. A rapid systematic review was conducted. PubMed and Web of Science were searched to December 2023. Eligible studies measured REE by IC in adults with overweight or obesity (BMI ≥ 25 kg/m^2 or mean BMI > 30 kg/m^2) reporting validity and/or reliability. Studies were selected using Covidence and critically appraised using the CASP diagnostic study checklist. From n = 4022 records, n = 21 studies utilising n = 13 different IC devices were included (n = 10 reported concurrent validity, n = 7 reported predictive validity, n = 7 reported reliability). A hand-held IC had poor validity and inconsistent reliability (n = 6 studies). Standard desktop-based ICs (n = 9 devices) were examined by across n = 18 studies; most demonstrated high validity, predictive ability, and good to excellent reliability. An IC accelerometer showed weak validity (n = 1 study); a body composition-based IC showed strong validity (n = 1 study); and a whole-room IC demonstrated excellent reliability (n = 1 study). Standard desktop-based IC demonstrated the most consistent validity, predictive ability, and reliability for REE in adults with overweight or obesity. Hand-held IC may have limited validity and reliability. Accelerometer, body composition-based, and whole-room IC devices require further evaluation. Inconsistent findings are attributed to differing methodologies and reference standards. Further research is needed to examine the diagnostic accuracy of IC in adults with overweight and obesity.

References

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