International Centre for Allied Health Evidence

University of South Australia

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iCAHE

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*i*CAHE JC Critical Appraisal Summary

Journal Club Details

Journal Club location	**Repatriation General Hospital**
JC Facilitator	**Cassandra Ofner**
JC Discipline	**Dietetics**

Question

Review Question/PICO/PACO

P: older >65 years (preferably Australian)

I: Body composition (i.e. muscle mass) evaluation and accuracy using BIA scales (Bioelectrical Impedance Analysis)

C: Compared with DEXA scales

O: Fat Mass, Fat Free Mass (%)

Article/Paper

Scafoglieri A, Clarys J, Bauer J, Verlaan S, Malderen L, Vantieghem S, Cederholm T, Sieber C, Mets T, & Bautmans I, 2017, Predicting appendicular lean and fat mass with bioelectrical impedance analysis in older adults with physical function decline – the PROVIDE study, *Clinical Nutrition,* vol. 36, pp. 869-875

Please note: due to copyright regulations CAHE is unable to supply a copy of the critically appraised paper/article. If you are an employee of the South Australian government you can obtain a copy of articles from the DOHSA librarian.

Article Methodology: Cohort Study

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Ques No.	Yes	Can't Tell	No	Comments
1	✓			**Did the study address a clearly focused issue?** Yes – The authors acknowledge that 'no generalizable formulas exist that are derived from bioelectrical impedance analysis (BIA) for predicting appendicular lean mass (ALM) and fat mass (AFM) in sarcopenic older adults' The focus of this study was to: 1) Develop and cross-validate soft tissue BIA equations with GE Lunar and Hologic DXA systems as their reference 2) To compare our new ALM equation to two previously published models and 3) To assess the agreement between BIA- and DXA-derived soft tissue ratios as indicators of limb tissue quality. The overall aims and issues presented in the study description give all aspects of the PICO
2	✓			**Did the authors use an appropriate method to answer their question?** Yes – The cohort method was appropriate for this study **Is it worth continuing?** Yes
3	✓			**Was the cohort recruited in an acceptable way?** Yes – The cohort was representative of a defined population (Sarcopenic Older Adults; Older persons with functional limitations) from a number of clinical settings (18 study centres across 6 European countries) recruited as a result of their condition.
4	✓			**Was the exposure accurately measured to minimize bias?** Yes – The exposure was measured using objective measures which have been validated and reflect the aims of the authors. All subjects of the study were treated equally.
5	✓			**Was the outcome accurately measured to minimize bias?** Yes – All measurements used in the study were objective in nature which ensures minimisation of bias by not allowing feelings or opinions to influence the representation of fact/statistics. All participants were also assessed with the same measurements to ensure consistency of the reliability of the results.

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6	✓			**Have the authors identified all important confounding factors?** Yes – The confounding factors in the study limitations, design and/or analysis are described as follows: "It has to be emphasized that DXA cannot distinguish skeletal muscle from other lean components such as skin, connective tissue and blood vessels" "The newly proposed formulas apply to whole body BIA devices that produce raw data (resistance, reactance) at a single frequency of 50 kHz. This implies that these equations are not validated for segmental BIA devices (foot-to-foot, hand-to-hand) and multifrequency analyzers (e.g. bioimpedance spectroscopy devices)." **Have they taken account of the confounding factors in the design and/or analysis?** "Unfortunately, no direct measure of extracellular hydrationwas available. Thus, we do not know whether this factor had any effect on the study outcome." "In our study no assessment of interrater reliability of the users of BIA was made. Although the authors recognize its importance in multicentre trials, this was practically and financially unfeasible. This bias, however, was minimized by restricting BC analysis to well-trained clinicians with an expertise in the use of BIA." "Finally, the subjects assessed by Hologic and GE Lunar were similar but not identical. Because of the lower male/female ratio in the GE Lunar group we expected ALM to be significantly lower in this group compared to the Hologic group. However, this was not the case. It is therefore suggested that Hologic and GE Lunar use different hardware and software equations to estimate BC."
7		✓		**Was the follow up of subjects complete enough?** Unsure – There is little description of the subjects post-study data collection

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8	✓			**What are the results of this study?** Cross-validation gave rise to 4 equations using the whole sample: ALM_{LUNAR} (kg) = 1.821 + (0.168*height^2/resistance) + (0.132*weight) + (0.017*reactance) - (1.931*sex) [R^2 = 0.86 and SEE = 1.37 kg] AFM_{LUNAR} (kg) =_6.553 _ (0.093* height^2/resistance) + (0.272*weight) + (4.295*sex) [R^2 = 0.70 and SEE = 1.53 kg] $ALM_{HOLOGIC}$ (kg) = 4.957 + (0.196* height^2/resistance) + (0.060*weight) - (2.554*sex) [R^2 = 0.90 and SEE = 1.28 kg] $AFM_{HOLOGIC}$ (kg) = -4.716-(0.142* height^2/resistance) + (0.316*weight) + (4.453*sex) - (0.040*reactance) [R^2 = 0.73 and SEE = 1.54 kg] Both previously published models significantly overestimated ALM in our sample with biases of -0.36 kg to -1.05 kg. For the ratio of ALM to AFM, a strong correlation (r = 0.82, p < 0.0001) was found between the mean estimate from BIA and the DXA models without significant difference (estimated bias of 0.02 and 95% LOA -0.62, 0.65).
9	✓			**How precise are the results?** Results are presented with a 95% CI
10	Journal Club to discuss			**Do you believe the results?**
11				**Can the results be applied to the local population?** **CONTEXT ASSESSMENT (please refer to attached document)** – *Infrastructure* – *Available workforce (? Need for substitute workforce?)* – *Patient characteristics* – *Training and upskilling, accreditation, recognition* – *Ready access to information sources* – *Legislative, financial & systems support* – *Health service system, referral processes and decision-makers* – *Communication* – *Best ways of presenting information to different end-users* – *Availability of relevant equipment* – *Cultural acceptability of recommendations* – *Others*
12				**Were all important outcomes considered?**
13				**Are the benefits worth the harms and costs?**
14				**What do the study findings mean to practice (i.e. clinical practice, systems or processes)?**

15		**What are your next steps?** ***ADOPT, CONTEXTUALISE, ADAPT*** **And then (e.g. evaluate clinical practice against evidence-based recommendations; organise the next four journal club meetings around this topic to build the evidence base; organize training for staff, etc.)**
16		**What is required to implement these next steps?**

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