Abstract 3360 **Program 890.2**

Background: In an exercise aimed at assessing trunk-to-leg ratio from photographic imaging, a derivative study examined its accuracy to estimate standing height.
Objective: To compare photographic imaging procedures to measured standing height in preschool children.
Methods: The photographic images of 200 preschool children, 100 each from Sololá and Quetzaltenango were evaluated for estimation of standing height. Original standing height was measured with a wall-stadiometer. A photograph was taken from a 3-m distance with the child standing sideways and looking forward in the Frankfort Plane Gaze while standing in front of a color-coded metric ruler. An ocular estimation of height, at the intersection with the ruler was made from print outs, enlarged on a computer screen and from the zoomed camera screen.
Results: The mean measured standing height was 108.8 cm (median: 109 cm) compared to 109.0 cm (median: 109 cm)($p<0.05$) determined by a photo-image. The Pearson correlation coefficient was r=0.988 and the Lin concordance correlation was r=0.987. According to the Bland-Altman agreement analysis, height derived from a photo-image overestimates measured height by 0.20 cm. For 34.5% of the photo-image data, the estimates were identical, and for an additional 50.0% they were ±1 cm of the measured value.
Conclusion: This study shows a high correlation to measured height from photographic imaging, using the same sagittal photograph applied to body-segment analysis. Equivalent validity was obtained with direct reading from the camera or computer screen as with measurement from a photographic print.

Validity of photographic imaging for assessing standing height of preschoolers

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Introduction

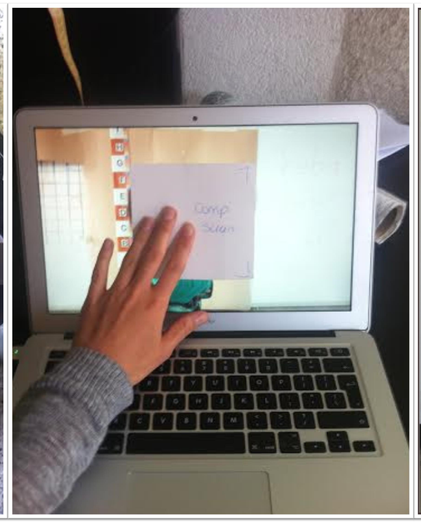
In theory, the evaluation of standing height (stature) in anthropometry is a routine and reliable measurement. The measurement precision is typically to the nearest 0.5 cm, (Lohman et al, 1988) such that for a child who is 100 cm (1 meter) tall, the discrimination of difference would then be 1.0 cm, or 1% error. Height measurement is used in clinical pediatrics to follow the serial growth and nutritional status of a child, and in public health epidemiology for the assessment of poor linear growth ("stunting" or "chronic malnutrition").

In certain settings, however, one might have concern about the validity of the height measurement, particularly in large census surveys in which those who take the measurements are rapidly and cursorily trained using rudimentary statiometers. One example of such a survey is in Guatemala, where a periodic height census is carried out for all enrolled first-grade pupils. The Guatemala census collects over 300,000 individual measurements. Alternative approaches, such as photographic assessment, could help facilitate the rapid collection of child height assessments. It is therefore important to study whether a photographic approach, could be carried out with comparable or less error, than direct height measurements,

In the context of a study aiming to apply photographic methods to assess trunk-to-leg ratios in preschool children, we included a height reference bar in the photographic frame, allowing for a photographic estimation of height.

Objective

To compare photographic imaging procedures to measured standing height in preschool children



Methods

- The photographic images of 200 preschool children were evaluated for estimation of standing height
- Original standing height was measured with a wall-stadiometer
- Photographic height was determined as follows:
  - a photograph was taken from a 3-m distance with the child standing sideways and looking forward in the Frankfort Plane Gaze while standing in front of a color-coded metric ruler
  - an ocular estimation of height, at the intersection with the ruler was made from print outs, enlarged on a computer screen and (zoomed) camera screen

Results

- The mean measured standing height was **108.8 cm** (median:109 cm) compared to the height as estimated from the photograph **109.0 cm** (median: 109 cm)
- The mean differences comparing measured and photographic height were statistically significant (***p<0.05***)
- The Pearson correlation coefficient was **r=0.988** and the Lin concordance correlation was **r=0.987**

- According to the Bland-Altman agreement analysis, height derived from a photo-image overestimates measured height by **0.20 cm**
- For **34.5%** of the photo-image data, the estimates were identical, and for an additional **50.0%** they were ±1 cm of the measured value

Conclusion

- The correlation coefficients show a high correlation to measured height from photographic imaging, using the same sagittal photograph applied to body-segment analysis
- Although there are statistically significant differences in measured versus photographic heights, the differences are small, and unlikely to be of any clinical significance on an individual basis or any epidemiological significance on a population basis.
- Equivalent validity was obtained with direct reading from the camera or computer screen as with measurement from a photographic print

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