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Exploring the Alternative Method in Estimation of Actual Body Weight by Knee Height and Mid-Arm Circumference in Chinese Population by Evidence Based Approach

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Introduction

Body weight is a significant parameter for health care workers to review patients' nutritional status and use for doctor's medication dosage prescription. However, there are some reasons that they couldn't obtain the data due to patients' critically ill condition or severe pain, therefore, a convenient alternative method should be explored to measure patients' body weight. As a result, a study was conducted in Prince of Wales Hospital (PWH) to assess the possibility of the knee-height caliper and mid-arm circumference in estimating actual body weight among Chinese population in Hong Kong.

Objectives

The objectives of this study were to validate the use of Ross Laboratories equations to estimate patient's body weight, and to develop ethnic-specific regression models for body weight estimation.

Methodology

This was a correlational study that was conducted in PWH. Adult patients were randomly recruited. After gaining their consent, the measurements were performed by trained data collectors. Inter-rater reliability was performed to test the variation among data collectors about the measuring techniques. The deviation rate for each data collector from the mean was maintained within 5% error.

Result

In early 2017, there were 161 subjects recruited in each of the four study groups with Ross Laboratories equations. When the measurements were put into the equation, estimated body weight of each subject would be calculated. After comparing the estimated body weight with the actual figure, around 11-22% of subjects were found more than 15% error. By putting knee height, mid-arm circumference and age as dependent variables and actual body weight as independent variable in multiple linear

regression model, four new equations would be derived. Power analysis for these equations could achieve nearly 100%. After comparing the estimated body weight with the actual figure, only 9-14% of subjects were found more than 15% error; which were less than the error rates by using Ross Laboratories equations. The present results suggested that Ross Laboratories equations were not adequate to estimate actual body weight in our data involved. New equations were then generated after statistical adjustment, but further studies are necessary to validate them for Chinese population.