

Determination of calf circumference cut-off values for Malaysian elderly and its predictive value in assessing risk of malnutrition

ABSTRACT

Introduction: Malnutrition is a growing problem but quite often under-recognised in elderly people. Calf circumference (CC) is a simple measurement that can be used to identify elderly people who are at high risk of malnutrition; however, a population-specific cut-off point must be developed. Therefore, this study aimed to determine suitable cut-off points and evaluate the predictive value of the CC cut-off point for elderly Malaysians. **Methods:** A total of 820 persons comprising 433 men and 387 women were recruited as subjects. The mean age was 69.0 ± 6.8 and ranged between 60 to 97 years. Data were collected from Sabak Bernam, Selangor Kuala Pilah, Negeri Sembilan; Pasir Mas, Kelantan, and Kodiang, Kedah. A linear regression analysis with the z-score procedure by gender was used to derive the CC prediction equations. **Results:** The CC cut-off points for men and women at risk of malnutrition were 30.1 cm and 27.3 cm, respectively. The final predictive CC equations for men was $CC \text{ (cm)} = 3.69 \text{ (z score)} + 33.81$, $R^2 = 1$ and $CC \text{ (cm)} = 0.7103 \text{ (BMI)} + 18.54$, $R^2 = 1$; and for women, $CC \text{ (cm)} = 4.31 \text{ (z score)} + 31.63$, $R^2 = 1$ and $CC \text{ (cm)} = 0.6698 \text{ (BMI)} + 16.847$, $R^2 = 1$. Based on these equations, using the z-score equal to negative 1 for men (BMI 16.30 kg/m^2) and women (BMI 15.64 kg/m^2), the mean of the predictive value of the CC cut-off point was 32.0 ± 4.2 cm in men and 30.5 ± 4.6 cm in women. **Conclusion:** It is suggested that these cut-off points be used to screen elderly individuals who are at risk of malnutrition. Further studies should be undertaken to further verify the application of the findings of this study.

Keyword: Calf circumference; Cut-off point; Malaysian elderly; Malnutrition; Nutritional risk