

3636948 NUFN/M : MAJOR : FOOD AND NUTRITION FOR DEVELOPMENT: M.Sc.

KEY WORDS : BODY COMPOSITION/ ADOLESCENCE/ DUAL-ENERGY X-RAY ABSORPTIOMETRY/ ANTHROPOMETRY/ BIOELECTRICAL IMPEDANCE ANALYSIS

SUNEE SAETUNG : BODY FAT AND LEAN BODY MASS ESTIMATED FROM DUAL-ENERGY X-RAY ABSORPTIOMETRY, ANTHROPOMETRY AND BIOELECTRICAL IMPEDANCE ANALYSIS IN THAI CHILDREN. THESIS ADVISORS: VONGSVAT KOSULWAT, Ph.D. SOMSRI CHAROENKIATKUL, D.Sc. UMAPORN SUTHUTVORAVUT, M.D. SURAT KOMINDR, M.D. NIPA ROJROONGWASINKUL, M.Sc. 163 p. ISBN 974-662-532-2

The aims of this study were: (1) To determine body composition (body fat mass, lean body mass, and bone mass) of 281 apparently healthy Thai children aged between 9-12 years (141 boys and 140 girls). (2) To determine physiological factors affecting body composition. (3) To Develop the equations for the prediction of body fat mass and lean body mass from anthropometric measurements and bioelectrical impedance analysis (BIA) by using dual-energy X-ray absorptiometry (DEXA) as a reference method. Physical activity was assessed by questionnaire and expressed in terms of kcal/kgBW/day

The results of the study revealed that girls had significantly higher body fat mass and bone mass than boys. Pubertal stage and age were the significant determinants of lean body mass and bone mass. Gender and physical activity also proved to be the significant determinants of lean body mass. Only pubertal stage influenced the change of body fat mass and percentage of body fat among the study subjects. Among boys, as pubertal stage advanced, their body fat mass increased while percentage of body fat decreased. Among girls, both body fat mass and percentage of body fat increased with advancing pubertal stage.

The prediction of body fat and lean body mass by BIA variables alone gave an adjusted  $R^2$  ranging from 0.91-0.95 and the corresponding SEEs ranged from 1.10-1.31kg for both sex-combined and sex-specific prediction equations. The prediction of body composition by anthropometric variables alone gave an adjusted  $R^2$  ranging from 0.94-0.96 and the corresponding SEEs were 0.91-1.12 kg. When BIA variables were added as predictors, the  $R^2$  increased by approximately 1% and the corresponding SEEs decreased by 3-9%. When the prediction equations were validated among the study subjects, the results showed that the predicted values obtained from the equations with anthropometric variables and the equations with the combination of variables from BIA and anthropometry were significantly different from the measured values but the differences were small. The accuracy of the values derived from prediction equations for classifying individuals into broad category of body composition was also tested. Between 75 and 88% of the study subjects were classified in the same quartile of the body composition range. The kappa values for these analyses were in the range of 0.67 to 0.83 which indicated relatively satisfactory agreement of the two sets of body composition data in categorizing individual subjects according to the value of body composition.

This study demonstrated that gender, pubertal stage, age and physical activity had significant effects on the change of body composition in children and adolescents. BIA with anthropometric variables appeared to be the valid measure of lean body mass and body fat mass in this group of children.