Abstract

**Background:** During early childhood regular physical activity contributes to the overall development and well-being of children. For children living in food insecure settings in developing countries, the exposure to multiple risk factors is a constraint for their development with a consequently potential negative impact on physical activity.

**Objective:** To assess the prevalence of total physical activity (total PA; counts per minute, cpm) and the fraction of time in sedentary (SED)- and moderate-to-vigorous intensity physical activity (MVPA) in rural, Cambodian children aged 13-17 months, and to investigate if early nutrition, sociodemographic characteristics of children and their household, gross motor development, morbidity and nutritional status is associated with physical activity behavior.

**Methods:** A cross-sectional examination of 397 Cambodian children aged 13-17 months and in risk of food-insecurity. The study was conducted as part of the endline of the Winfood intervention study, in which 325 children had received improved complementary foods throughout a 9 month period. Additionally, 72 children who had not received improved complementary foods were recruited for comparison. Physical activity was assessed objectively by accelerometry over 6 days. Background information in addition to morbidity during wear-time, was obtained by questionnaire. Acquisition of six WHO gross motor development milestones was assessed by observation and anthropometric measures (height, weight, arm circumference and skinfolds) were performed.

**Results:** The prevalence of total PA, SED and engagement in MVPA comprised (mean ±SD) 890 ±245.65cpm, 0.64±0.05 (64%) and 0.80±0.04 (20%), respectively. While no differences were observed between the two study populations (p>0.05), all outcomes indicated higher activity in boys. With control for age and gender, physical activity behavior was significantly associated with several modifiable sociodemographic factors, but not morbidity. Furthermore, acquisition of all six milestones was significantly associated with a 3% decline in sedentary activity (p<0.001). Stunting (25%) was more prevalent than wasting (11%) and 4% of children exhibited both stunting and wasting (SW). Stunting-non-wasting (SNW) was adversely associated with acquisition of milestones, but SNW children had significantly higher total PA than children of normal nutritional status (NSNW) (mean difference, 95%CI: 67.75cpm, 7.07-128.43). In turn, wasting overall revealed adverse effects on all three outcomes of physical activity, while wasting and stunting combined did not affect the outcomes. Only SSFZ and MUACZ persisted to predict all three outcomes, when adjusting for age and gender.

**Conclusion:** Young Cambodian children exhibit high physical activity, influenced by both modifiable and non-modifiable factors. Early malnutrition may compromise healthy growth and development. However in malnourished children, the amount of subcutaneous adipose tissue and the depletion of peripheral lean mass may be more crucial to physical activity than body proportion. As confounding of the estimates cannot be out ruled, further studies with a stronger design are advised. Furthermore, long-term implications of malnutrition on physical activity need exploration as the obtained knowledge could contribute to understandings and prevention of the double burden of malnutrition.