Dietary Intake of Hong Kong Male Road Cyclists during a Multistage Event

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Purpose Tour of Japan is an 8-day multistage cycling event. The competing cyclists must ride about 730 km in 8 days inclusive of 2 days travelling days. Energy and macronutrient needs, especially carbohydrate and protein, must be met in order to maintain body weight, replenish glycogen stores and provide adequate protein for building and repairing tissues. The purpose of this study was to evaluate the dietary intake of Hong Kong male road cyclists during a multistage event, the Tour of Japan.

Method A total of five male cyclists, all members of the Hong Kong national team, were recruited for this study. The average age, height, body masses and maximal oxygen uptake of the cyclists were 24.6 ± 5.4 years, 172.4 ± 5.5 cm, 65.3 ± 2.5 kg, and 3.9 ± 0.6L/min, respectively. Daily food consumption for a total of eight days, which included race and rest days, were recorded and calculated by the Sport Nutritionist. Total energy and macronutrient intakes were estimated by Nutritionist Pro (First Data Bank, USA). Energy expenditure during race periods was recorded by heart rate monitoring device (Polar Electro Oy, Finland). Total energy expenditure was estimated using methods previously adopted by Saris et al.[3] where sleeping energy expenditure was estimated by multiplying sleep duration by 0.0177kcal·min^{-1}·kg^{-1}. Energy during remaining time awake was estimated using 0.0265kcal·min^{-1}·kg^{-1}. Body mass and skinfold thickness measurements (sum of 6 sites: triceps, subscapular, supraspinale, abdominal, mid thigh and chest) were measured by the Sport Nutritionist. Skinfold thickness measurements were converted to an estimation of percent body fat using the formulae presented by Nagamine[2] and Brozek[1]. Body mass was measured with a portable electronic scale (to the nearest 100 g) in the morning prior to breakfast, before and after race. Subjects were weighed in their underwear or in the lightest cycling gear before and after race. Statistical analyses were performed using Statistical Package for the Social Science (SPSS version 12.0, Chicago, Illionois, USA).

Result Estimated energy intake and energy expenditure were compared for race and rest days. In general, cyclists appeared to be in a positive energy balance during rest days (+ 44%), whereas, energy deficit was shown on race days (- 11%). Total energy intake was somewhat below total energy expenditure (37,197.4 ± 4,650.1 kcal vs. 38,155.8 ± 3,461.5 kcal, *p*-value = 0.41). Energy intake and expenditure were significantly higher on race days compared to rest days (5,041.2 ± 538.2 kcal vs. 3,474.6 ± 883.7 kcal). The variations of energy intakes between race and rest days were primarily due to changes in carbohydrate intake. During rest days, a higher percent of fat intake was found due to consumption of fast food while travelling by coach, e.g. cream buns, chocolates, instant noodles etc. The five cyclists, who participated in the Tour of Japan eight-day event, consumed diets that met recommendations for daily intake of carbohydrate 11.6 ± 0.8 g·kg body weight^{-1} on race days and 6.2 ± 1.6 g·kg body weight^{-1} on rest days, mean protein intake was 2.1 ± 0.3 g·kg body weight^{-1} and mean fat intake was 30.3 ± 1.8% of total energy intake. Changes in body mass, sum of six skinfolds, and the estimated percent body fat of the cyclists measured before and after the 8-day event were minimal. Mean body weight increased by 0.1 kg and mean percent body fat decreased by 0.4%. No significance was found in these minor changes.

Conclusion Although slight energy deficit (intake: 37,197.4 ± 4,650.1 kcal vs. expenditure: 38,155.8 ± 3,461.5 kcal) was found over the 8-day event, all cyclists macronutrients intake met the guidelines for endurance athletes. Since adequate amount of carbohydrate intake can restore glycogen level, further nutrition intervention is needed to improve dietary practices and strategies to obtain more low fat carbohydrate foods on rest days that meet the healthy eating guidelines. Cyclists need to focus on adequate food intake during the race as they were in energy deficit. In addition, there was limitation to evaluate energy expenditure in this study. Energy expenditure during race, rest, and non-cycling activities were not directly measured. Therefore, the absolute values for total energy expenditure were only estimates and assumed that energy expenditure during non-competition hours was similarly sedentary for all subjects.

References

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