Dietary and fluid requirement for athletes

For this event, proper training for endurance running is important to achieve the optimal ability of all participating athletes. The training for the ARWS events includes high intensity and moderate intensity physical training which is between 50-90% of the final race distance. The optimal dietary intake is necessary as it fuels the athletes to complete the race

Two main objectives will be outlined to determine optimal nutritional choices for endurance runners which are the

1. Carbohydrate requirement
2. Fluid requirement

Carbohydrate requirement

Dietary adjustment on carbohydrate intake include

- Pre-competition
- During competition
- Post competition
- Carbohydrate Loading
- Training Day Nutrition

A carbohydrate is defined as an organic compound containing hydrogen and oxygen, and typically broken down to release energy in the body. Carbohydrates supplies energy to the muscle and the availability of carbohydrates in the body has the ability to alter performance, particularly during runs and high intensity physical activities. The ingestion of carbohydrates should be a practice integrated into an endurance runner's every day diet, but particularly during training seasons.

Pre competition

Prior to any endurance event, a runner must be aware of energy needs and timing of carbohydrate ingestion. In general, pre-competition guidelines for carbohydrates are as follows:

- 4 hours prior to competition: 4-5 g/kg body weight
- 1 hour prior to competition: 1 g/kg body weight

If the event begins in the morning, the most reasonable approach to carbohydrate consumption would be following guidelines for 1-2 hours prior to competition. If the athletes plan to eat a meal about 2 hours prior to competition, he/she would require about 2 g/kg body weight, therefore requiring about 120 grams of carbohydrate (if your weight is 60kg). By ingesting a double bowl of oatmeal, 3 pieces of dried fruit, and one piece of whole-wheat toast, your carbohydrate needs would be met.

During competition

Ingesting carbohydrates during competition can be highly individualized based on race distance and the athletes' preference. We recommend that during an endurance event, some level of carbohydrate be ingested to ensure body processes and reactions remain stable, as well as maintenance of mental acuity. concentrated carbohydrate solutions, or sport gel are a less fluid alternative that makes ingesting large amounts of carbohydrate possible. During the ARWS event, there will be no specific "breaks" as the teams shall decide when and where they will stop for rest, therefore the timing of carbohydrate ingestion during competition is very important. Once an athlete begins to feel fatigued, their body has already lost a significant amount of muscle glycogen. Muscle glycogen levels are extremely hard to maintain after falling too low. We advise carbohydrate intake during an endurance run occurs before the athletes feel muscle fatigue. Keeping high levels of carbohydrate in the body system spares precious muscle glycogen needed to complete any event.

Post competition

After completing the race, Immediate carbohydrate ingestion is required within the 2 hour window. The ingestion rate is slightly increased during this time, which results in increased glycogen synthesis. The post-competition carbohydrate intake should reach about 600 g within 24 hours, and can be divided into approximately 50 g/2 hours following the competition. For the ARWS athletes, accumulating carbohydrates with adequate carbohydrate-rich sources post-race will be provided. Although not all sources must be consumed to recover, they do become available so the body does not reach a low point of muscle glycogen. If muscle glycogen storage drops to an unsafe level, there is risk for brain glycogen to deplete, rendering a runner incapable of full brain function. Therefore, carbohydrate ingestion is necessary and must occur immediately.

Carbohydrate-loading

The concept of carbohydrate loading has been introduced to endurance athletes as a way of increasing muscle glycogen stores hours or days before an event. The use of carbohydrate loading is fairly popular in organized endurance events, such as marathons However, the concept has little evidence on its effectiveness in increasing performance. Although carbohydrate loading the night before an event has not proved to deliver physiological improvements, there is a “runner mentality” that carbohydrate loading the night before an event can do nothing but help. Although the science does not prove physiological changes, the mind of a runner can be put at ease through carbohydrate-rich dinners. In practice, carbohydrate loading can only render benefits to a runner’s muscle glycogen stores if practiced over the 3-5 days prior to the event.

Fluid Requirements

An athlete's hydration level is important for maintaining proper physiological function. Adequate fluid intake is required before, during and after competition. The amount of water needed depends on a variety of factors: intensity and duration of the exercise bout, environmental conditions (including temperature), and the body structure and state of hydration of the particular individual. Water is crucial for maintaining both core body temperature and optimal electrolyte concentrations.

Water Intake

Maintaining proper hydration levels during long distance running events is imperative for both the safety and performance of the athletes. One of the biggest questions then, is how much water is necessary to meet most runners' needs. According to the current American College of Sports Medicine recommendations, an athlete should consume approximately 0.4-0.8 liters of water per hour throughout the competition. This estimated amount is to ensure the runner loses no more than 2-3% of their total body mass. Excessive water consumption is also detrimental during the race. When water intake rates exceed sweating rates, the electrolyte balance can be disrupted, resulting in a condition known as hyponatraemia as research suggests that severe or prolonged hyponatraemia can cause potential harm to a runner. Therefore, a balance between adequate consumption of water is required and fluid overload is not recommended.

Electrolyte imbalance

Consuming electrolyte-containing beverages as opposed to plain water may be beneficial to the performance and health of the athletes as hyponatremia sets in much later as compared to athletes who consumes water only.

Hydration Status Assessment

How can one tell if the athletes are sufficiently hydrated before, during or after a race?

1. The first thing to always analyse is one's perceived level of thirst. Dry mouth, light-headedness, or even fatigue are some of the obvious signs of thirst and dehydration.
2. to measure one's body mass and compare it to the body mass before the race. As noted in a previous section, dehydration is generally defined as a 2-3% loss in body mass.
3. Examine urine colour. Urine colour is as good of an indicator of hydration status as plasma or urine osmolality or urine specific gravity. When inspecting the urine, a more yellowish and odorous colour is generally a strong indicator of dehydration. Conversely, clear and odorless urine indicates proper hydration.
4. runners can use a few simple methods to determine their hydration status before, during and after competition in order to prevent harm and help with performance.