NATIONAL YOUTH SPORTS INSTITUTE

Ramadan Implications for Youth Athletes

Nur Adilah

NYSI Performance Analyst

The Ramadan fast

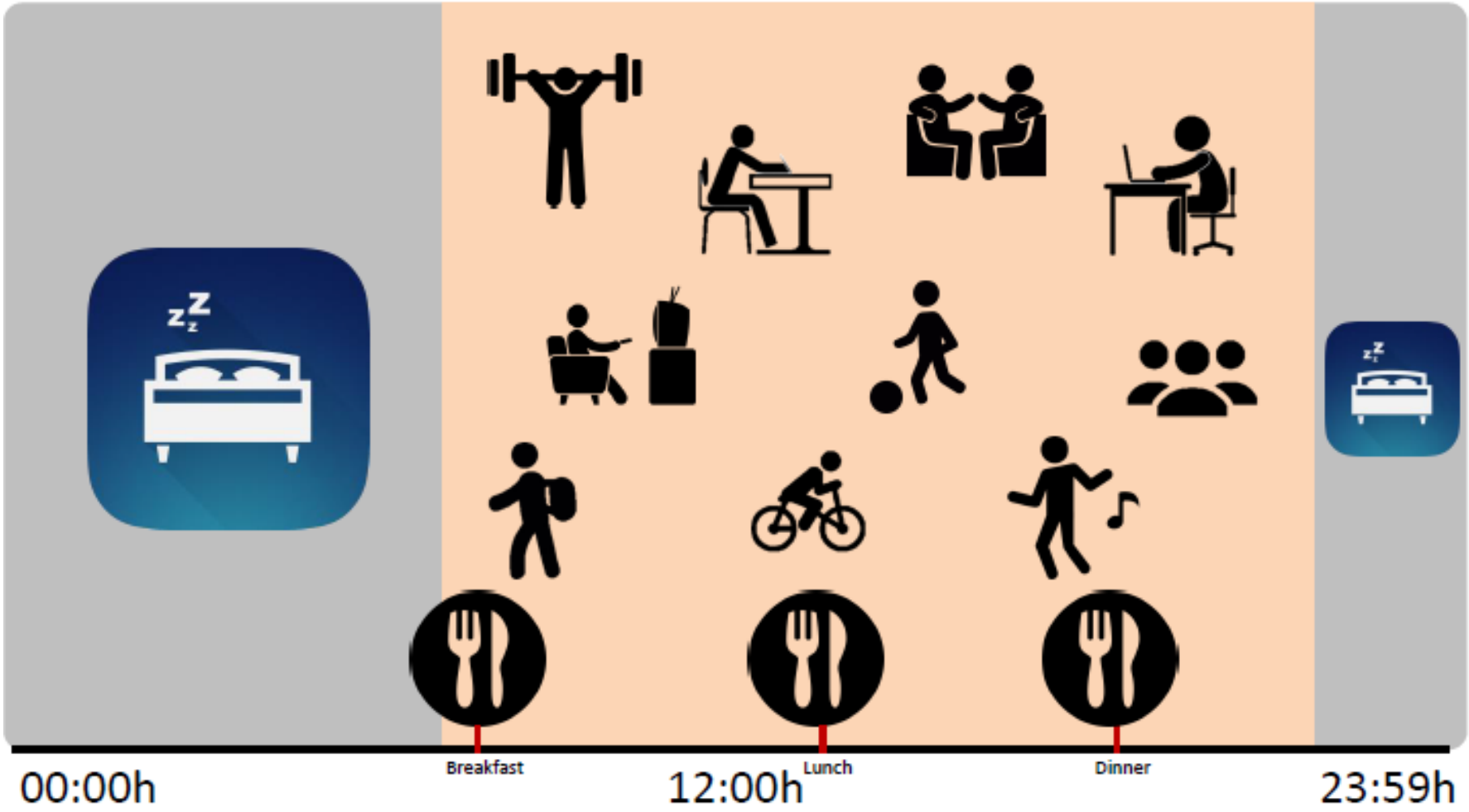
.. is an annual religious act undertaken by Muslims from all over the world

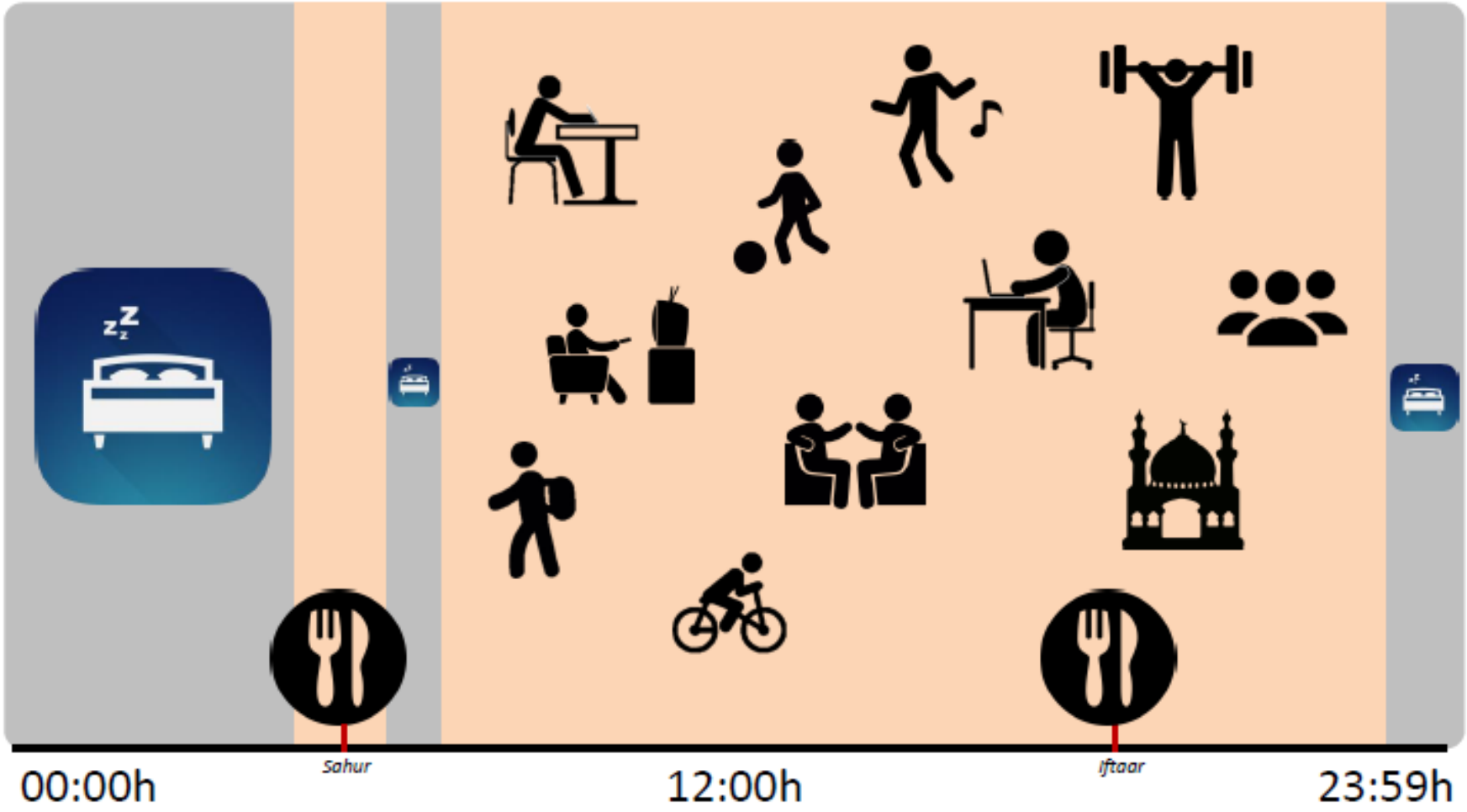
The Ramadan fast

Fasting duration depends on geographical location and climatic season.

The Ramadan fast

Singapore is non-seasonal, thus the daily start and end of the fast experiences minimal changes year by year.


Breakfast
Lunch
Dinner
00:00h
12:00h
23:59h


Sahur
Iftaar
00:00h
12:00h
23:59h

Alterations to sleeping habits

Shifting of eating, physical and social activities towards the nocturnal periods could result in later bedtime. Additionally, the fasting athlete would have to consume a meal before dawn.

Alterations to eating habits

Two-meal routine – *sahur* taken before dawn and *iftaar* taken upon dusk – usually practised during Ramadan.

The Ramadan fast

Decreased sleep quality & quantity

Mood changes

Glucose deprivation

Dehydration

REACTION TIME

CONCENTRATION

ATTENTION

MEMORY

ALERTNESS

DECISION-MAKING

The athletes' cognitive abilities may be affected as a result of engaging in the Ramadan fast.

REACTION TIME

CONCENTRATION

ATTENTION

MEMORY

ALERTNESS

DECISION-MAKING

REACTION TIME

CONCENTRATION

ATTENTION

MEMORY

ALERTNESS

DECISION-MAKING

The Ramadan fast

Glucose deprivation

Dehydration

Decreased sleep quality & quantity

Mood changes

The Ramadan fast

- Ramadan fasting can induce a progressive drop in blood glucose concentration levels over the course of the day (Fakhrzadeh et al. 2003; Larijani et al. 2003)
- Brain may experience microstructural changes (Bakan et al. 2015; Boujraf et al. 2006) due to the daily progressive depletion of cerebral glycogen in Ramadan-fasted individuals repeated over several days (Tian et al. 2011)
- Changes to brain structures are likely to affect brain function as well

The Ramadan fast

- Dehydration >2% body mass results in decreased visual memory, alertness and concentration ability, vigilance, and working memory (D'Anci et al. 2009; Ganio et al. 2011; Patel et al. 2007)
- Such levels of dehydration also increase fatigue, tiredness, and drowsiness in young adults (Benton et al. 2016; Cian et al. 2001; Cian et al. 2000)
- Being passively dehydrated by merely 2% impairs performance in tasks that require higher levels of attention, psychomotor and immediate memory skills (Adan, 2012)

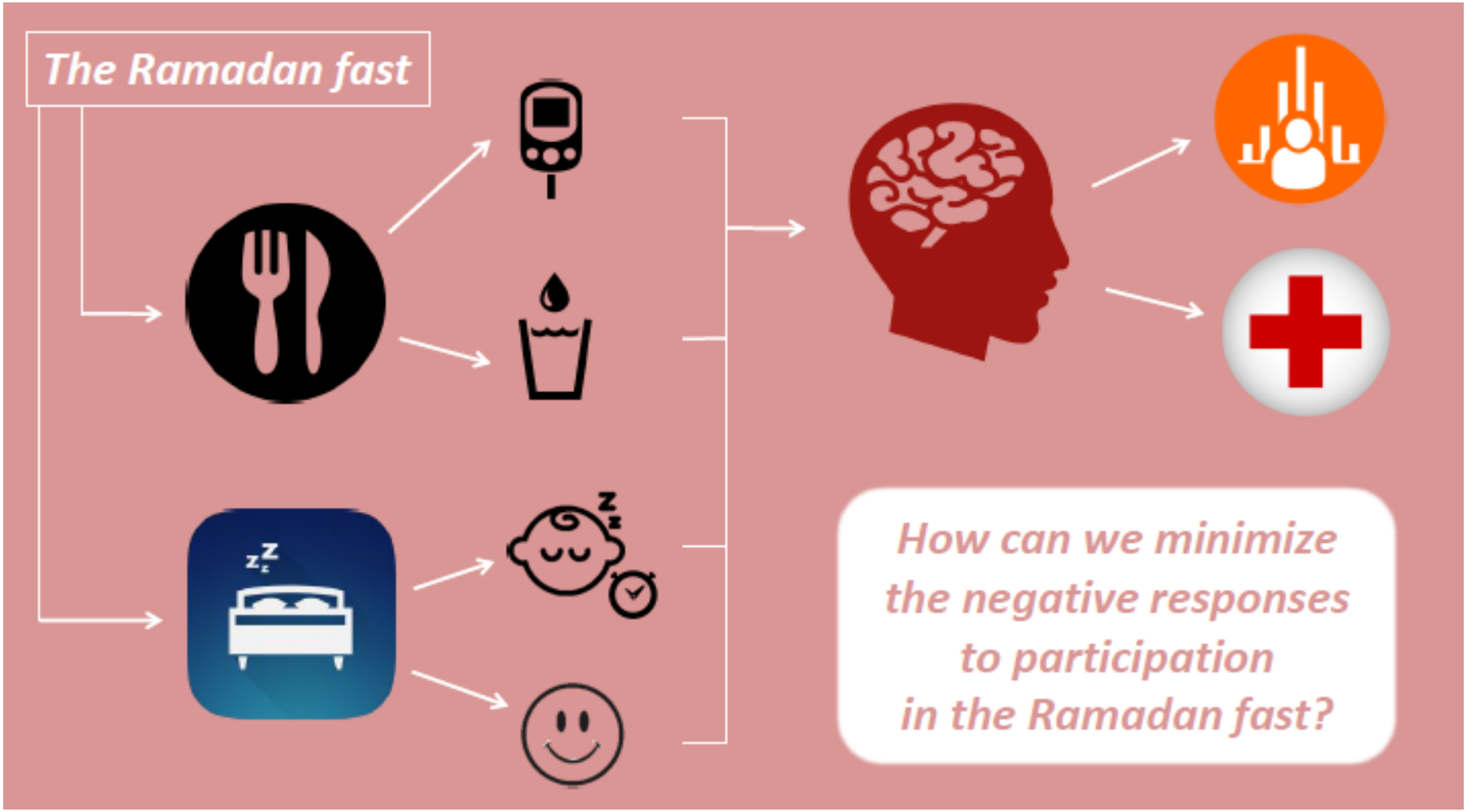
The Ramadan fast



- Sleep latency increased from approximately 20 min before Ramadan to approximately 58 min during Ramadan (Roky et al. 2000)
- Total sleep time decreased from approximately 420 min before to approximately 380 min during Ramadan (Roky et al. 2000)
- Reduced sleep or partial sleep deprivation on consecutive nights negatively affects vigilance, reaction speed and attention levels (Sadeh, Gruber, and Raviv, 2003; Jarraya et al., 2013)

The Ramadan fast

- Subjective daytime alertness decreased progressively throughout the four weeks of Ramadan (Roky et al. 2000)
- Accumulation of chronic delay in bedtime and shortened sleep hours result in a shift in the individual's daily circadian rhythm
- This causes alterations to body's biological functions including body temperature, sleep-wake cycles and hormonal secretion (Bogdan, Bouchareb, and Touitou, 2001; Reilly and Waterhouse, 2007)


The Ramadan fast
How can we minimize the negative responses to participation in the Ramadan fast?

Suggestions for training

A.M.			Noon	P.M.		P.M.		P.M./A.M.
05:00-05:30 h	06:00-08:00 h	08:00-10:00 h	11:00-12:00 h	12:00-17:30 h	17:30-19:15 h	19:15-20:00 h	20:30-22:00 h	23:00-05:00 h
Eat & drink (*Sahur meal*)	Sleep/Rest	Train (non-physically challenging / technical exercise session)	Day nap	Rest	Train (high-intensity exercise)	Eat & drink (*Iftar meal*)	Rest and/or Eat & drink	Sleep
Daylight						Darkness		

Figure 2: Model B for a suggested twice-a-day training sessions during Ramadan (when training after breaking of the day's fast is not feasible). Model modified from Reilly and Waterhouse (2007) [27].

- Tactical/technical training to be done during the mornings
- More intense trainings (e.g. conditioning exercises) to be done either just before breaking of the fast or at night after

- Also important to consider recovery post-training

NATIONAL YOUTH SPORTS INSTITUTE

Sports Nutrition for Ramadan

Ng Ee Ling

NYSI Sport Nutritionist

POSSIBLE SITUATIONS THAT MAY BE CHALLENGING FOR A FASTING YOUTH ATHLETE

Events held late in the day and before Iftar

Events held early in the day

Competitions held for several days or multiple events on the same day

Endurance events held in hot and humid climates

Making weight sports

Without the **RIGHT** nutrition strategies, these are the factors that could produce *fatigue* or *suboptimal performance*:

Muscle glycogen depletion/
Fuel depletion of the
central nervous system

Low blood glucose

Long periods w/o consuming
sufficient energy / protein
→ Increase net protein loss

Dehydration

TYPICAL NUTRITION STRATEGIES *for the fasting youth athletes*

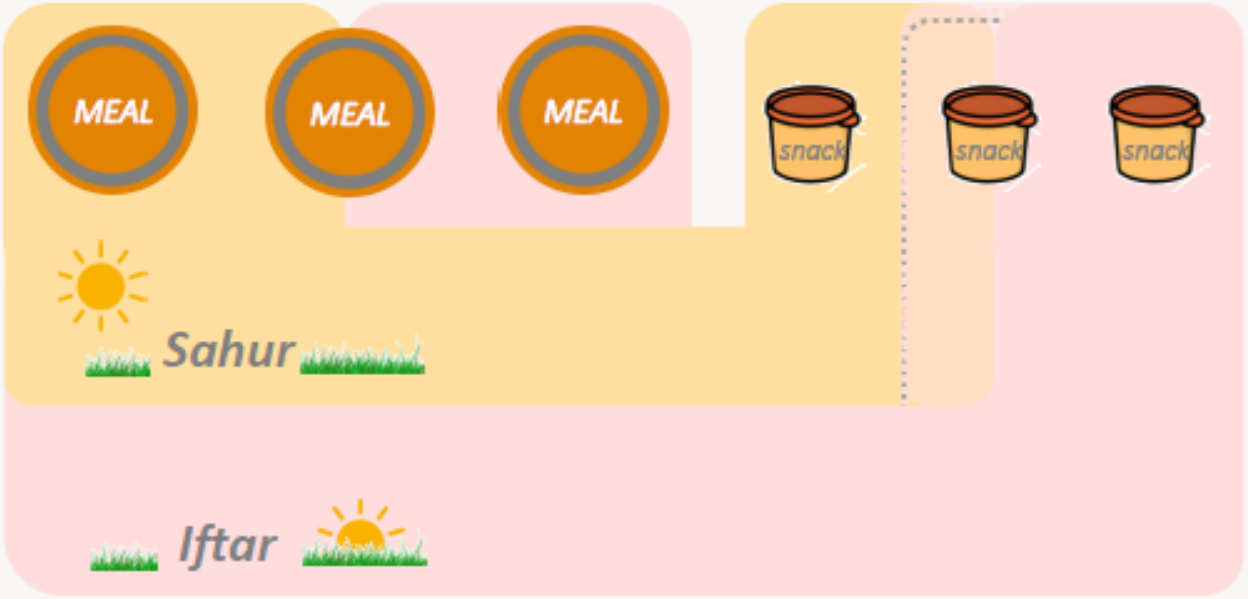
Quantity of food

Quality and type of food

Frequency of
eating and drinking

TYPICAL NUTRITION STRATEGIES *for the fasting youth athletes*

Quantity of food



TYPICAL NUTRITION STRATEGIES *for the fasting youth athletes*

Quality and type of food

Without the **RIGHT** nutrition strategies, these are the factors that could produce *fatigue* or *suboptimal performance*:

Muscle glycogen depletion/
Fuel depletion of the
central nervous system

Low blood glucose

Long periods w/o consuming
sufficient energy
→ Increase net protein loss

Dehydration

What nutrient do you think helps?

TYPICAL NUTRITION STRATEGIES *for the fasting youth athletes*

Quality and type of food

Nutritious Carbohydrates *(Rice , noodles, pasta, potato, banana, whole-grain biscuits / cereal / crackers, etc)*

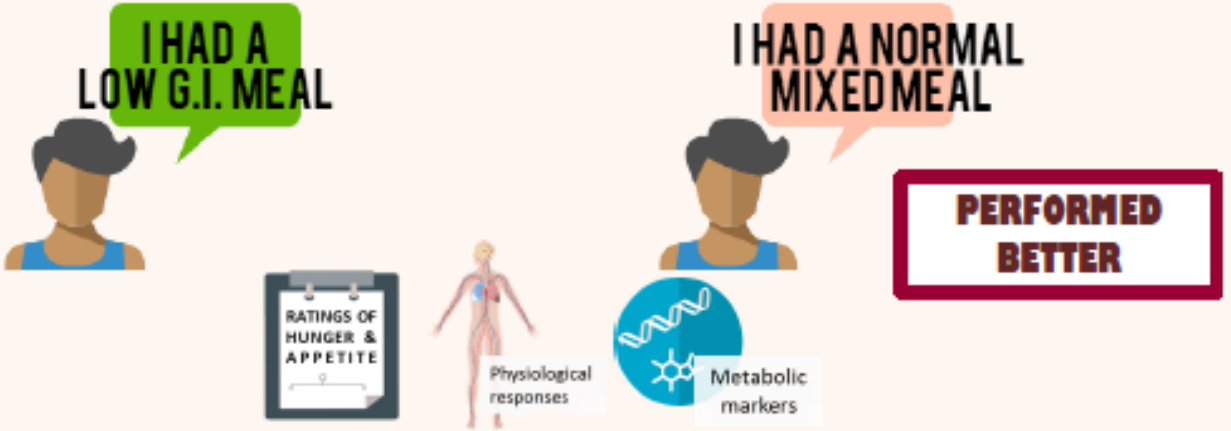
Continue to consume small amounts of carbohydrates during exercise after breaking of fast *(even there is little need for additional fuel)*

- Mouth contact with carbohydrates may promote 'happier' brain for better performance

TYPICAL NUTRITION STRATEGIES *for the fasting youth athletes*

Quality and type of food

***Sahur and low GI food** – any differences in sports performance?*



Png WL, Bhaskaran K, Sinclair AJ and Aziz AR (2014) Effects of ingesting low glycemic index carbohydrate food for the sahur meal on subjective, metabolic and physiological responses, and endurance performance in Ramadan fasted men. Int J Food Sci Nutr, 2014; 65(5): 629–636

TYPICAL NUTRITION STRATEGIES *for the fasting youth athletes*

Sahur and low GI food – *any differences in sports performance?*

Quality and type of food

Png WL, Bhaskaran K, Sinclair AJ and Aziz AR (2014) Effects of ingesting low glycemic index carbohydrate food for the sahur meal on subjective, metabolic and physiological responses, and endurance performance in Ramadan fasted men. Int J Food Sci Nutr, 2014; 65(5): 629–636

Without the **RIGHT** nutrition strategies, these are the factors that could produce *fatigue* or *suboptimal performance*:

Muscle glycogen depletion/
Fuel depletion of the
central nervous system

Low blood glucose

Long periods w/o consuming
sufficient protein
→ Increase net protein loss

Dehydration

What kind of food sources contain protein?

TYPICAL NUTRITION STRATEGIES *for the fasting youth athletes*

Quality and type of food

High-quality protein *(Lean meat, seafood, egg, milk, cheese, soy)*

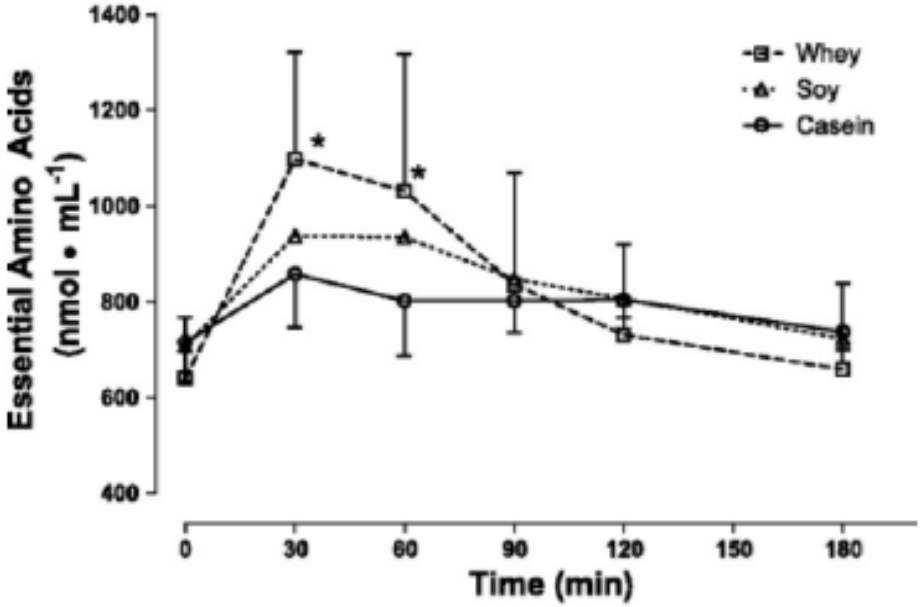
Digestible Indispensable Amino Acid Score (DIAAS)

(Measurement of protein quality)

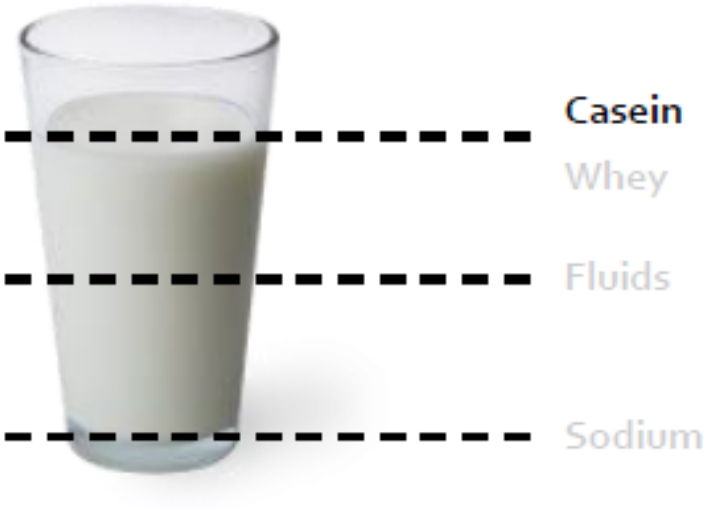
Rank	Protein Type	DIASS
1.	Milk	1.00
2.	Egg	1.00
3.	Beef	0.92
4.	Cooked Rolled Oats	0.67
5.	Cooked rice	0.62
6.	Cooked peas	0.60
7.	Roasted peanuts	0.51

Remember to include protein at every meal!

Changes in the blood amino acid concentrations



Require 'fast' high-quality protein soon after exercise (when possible)



'Slow reacting'

Excellent for Sahur, Iftar and pre-bed snack

- **Low fat / skim milk**
- **Low / non fat plain yogurt *(add some nuts and fresh fruits!)***

Select milk/laban based Ramadan drinks!

TYPICAL NUTRITION STRATEGIES *for the fasting youth athletes*

Sahur — As close to sunrise, just before the start of day's fast

Iftar — Immediately after they break fast

Frequency of eating and drinking

Helps reduce the period that the body is in the 'fasted state'

Skipping of Sahur or Iftar is
STRONGLY discouraged

Without the **RIGHT** nutrition strategies, these are the factors that could produce *fatigue* or *suboptimal performance*:

Muscle glycogen depletion/
Fuel depletion of the
central nervous system

Low blood glucose

Long periods w/o consuming
sufficient energy / protein
→ Increase net protein loss

Dehydration

STRATEGIES ON

HYDRATION

Assess hydration status

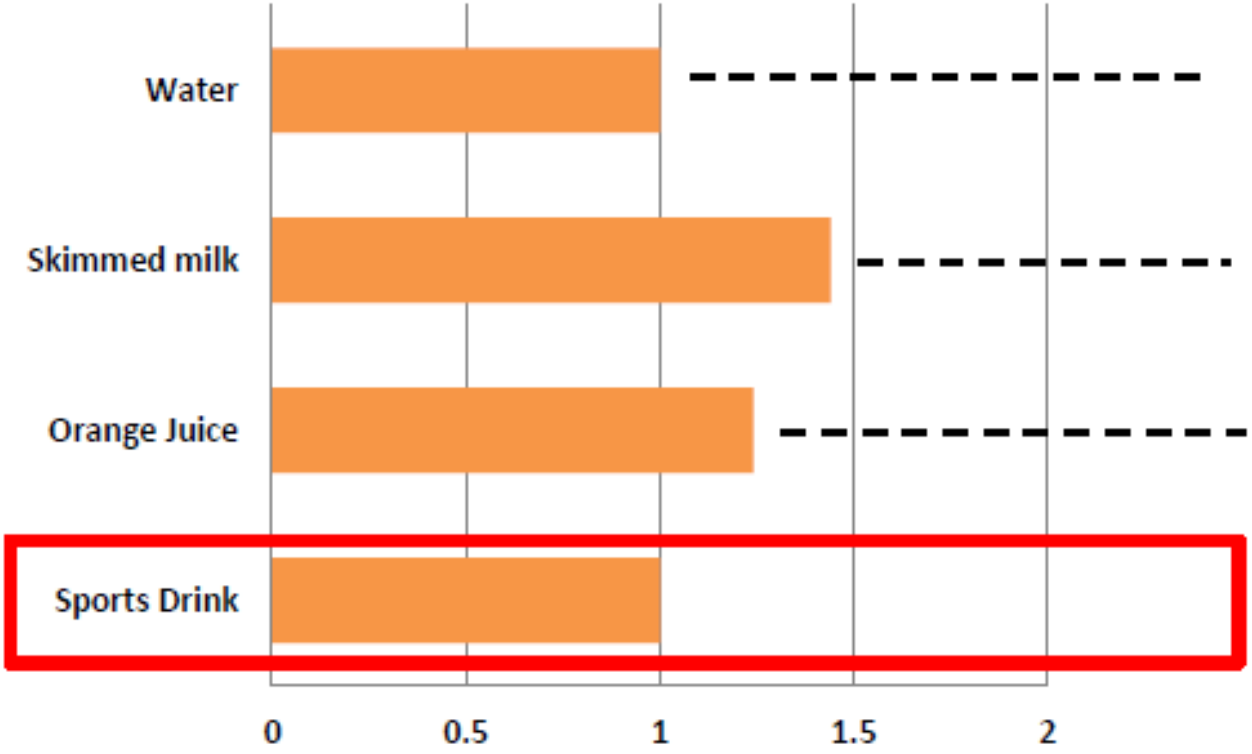
Space the consumption of fluids over the available time instead of consuming large volumes before bed (~200ml/30min)

Consume beverages such as milk and orange juice before going to bed

Consume fluids with your meals. You may need a high energy nutritious drink

URINE COLOUR CHART

BEVERAGE CHOICES



Standard beverage to help with hydration

Better hydration
Contributes to the additional energy and nutrients → Avoid OVERCONSUMPTION especially for juices

Fasted state

TIPS

Ask for your student-athletes to splash some water on their face/body *BEFORE, DURING AND AFTER* training to help cool themselves

WHAT HAPPENS IF THEY HAVE COMPETITION DURING RAMADAN?

TEST OUT THE SITUTATION DURING TRAINING TO SEE WHAT KIND OF FOOD THEY ADAPT BETTER IN THE FASTED STATE

&

FOLLOW THE NUTRITION STRATEGIES!

ANY QUESTIONS?