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“ROLE OF NUTRITION IN SPORTS”

Dr. Chinmay Anand Shinde¹, Dr. Jayshree Patil²

¹P.G. scholar, Swasthvritta Dept

²H. O. D., Swasthvritta Dept,

L.R.P. Ayu. Medical College, Islampur

Corresponding Author's mail ID: chinmay.shinde5514@gmail.com

ABSTRACT:

Nutrition plays more important role in humans in day today's life. It just not only means proper consumption of food but also time intervals of intake of macro and micro nutrients. As in 21st century sports is recognized as well known career option. It not only requires proper training, skills but also good and proper nutrition to gain a good source of energy. As also participation in physical activity is essential for physical and mental health of children and adolescents or adults, taking part in sports have high demands of nutrition due to additional need of physical activity. This may lead an athlete to increase their performance level as it is said that 80% of the routine is totally depended upon nutrition and 20% on rest of the training and skill development. As in poor nutrition can lead to injury, fatigue and poor recovery all three can hinder as to how efficiently an athlete performs.

The purpose of the review is to represent nutritional needs of athlete participating in different sports activities and also to empower and teach the athletes the importance of nutrition before, during and after the participating in sports activity.

Keywords: Sports, nutrition, fitness, hydration.

INTRODUCTION

Now days sports are became not only the source of entertainment but the option to develop their financial growth. To improve their performance an athlete must get acknowledged about parameters effecting their health and fitness.¹

Till the date there are around 200 registered games played internationally and more than 1000 games played regionally. For those athletes who perform in sports need a years of practice, strength, skills to develop within. But now day nutrition is a key factor when considering sporting performance, because it provides a proper or it can be said as required source of energy to perform the physical activity and maintain mental health.

The food we eat impacts on our strength, training, performance and recovery. Not only is the type of food important for sports nutrition but the times we eat throughout the day also has an impact on the performance level and the body ability to recover after exercise. Here we will elaborate the specific amounts of nutrients and the sources of them which will be required to fuel the athlete body and also the information about hydration of body during exercises and all day along activities. We also have to think on the time intervals of consumption of the food and nutrition which is very important. Also this is intended to every athlete to know personally about the nutrition and hydration required for their specific sports event.

AIMS AND OBJECTIVES

- To enlighten the basics of nutrition and to elaborate the concept of nutrition and fluids required during physical activity.
- To provide proper knowledge to athletes about proper food, proper time to have food and improvement of their performances.

- Optimal performance, fast recovery, mental clarity and injury prevention.

MATERIAL AND METHOD

Books used are:

1. Preventive and social medicine – K.park
2. Journal of nutrition
3. Indian journal of medicine

WHAT IS SPORTS NUTRITION?

Sports nutrition is the study of nutrition and diet as it relates to athletic performance. It is the science that provides and maintains food necessity for health, growth and physical performance.

Research suggest that the athlete can benefit from nutrition education increasing KAP i.e. knowledge attitude and practices. (ABOOD et al, 2006)

BASIC NUTRIENTS AND THEIR NEEDS:

There are 6 nutrients classified accordingly producing energy, contributing to growth and development of tissues, regulating body process and preventing deficiency and degenerative diseases.²

They are:

- Carbohydrates
- Proteins
- Fats
- Vitamins
- Minerals
- Water/fluids

CARBOHYDRATES

- Carbohydrates are stored in the body in form of glycogen, which can use during physical activity.
- It provides energy for muscle contraction. These are smaller sugars as like glucose, fructose, galactose which gets absorbed and provide energy.

- Adequate carbohydrate intake prevents proteins from being used as energy.³

sports drink rich in carb provides energy and helps in rehydration.

Recommendation-

Athletes in heavy training should have an intake of 6-10g/kg body weight to prevent daily carbohydrate and glycogen depletion (ADA, 2000). The amount required depends on : Athletes TDEE, type of sports, environmental condition etc.

Before exercise-

It serves 2 purposes:

- Keeps the athlete from feeling hungry before exercise
- Maintains optimal level of blood glucose for exercising muscles (ACSM,2009)
- Should provide 200-350 gm of carbohydrate, 3-4 hrs before the event.

E.g. - toast with jelly, baked potato, cereal with milk etc.

During exercise-

For exercise lasting longer than an hour, carb intake ensures availability of sufficient amount of energy during later stages of exercise and improves performance, maintains blood glucose level too. Form of carb is not important, some may have sports drink.

- **Carb feeding doesn't prevent fatigue, it delays it.**

After Exercise-

Immediate carb consumption is important. Delaying carb intake for too long will reduce muscle glycogen synthesis.

- Recommendation- consume 100g of carb within 30 minutes maximize glycogen synthesis.
- Consuming food immediately after exercise seems difficult. Therefore,

PROTEINS

According to Wikipedia Proteins are large biomolecules, or macromolecules, consisting of one or more long chains of aminoacidresidues. Proteins perform a vast array of functions within organisms, including catalysing metabolic reactions, DNA replication, responding to stimuli, providing structure to cells, and organisms, and transporting molecules from one location to another.

Protein requirements remain contradictory.

Popular belief that additional protein increase strength and enhances performance, but research doesn't support this. Calories play an important role in protein sparing action and protein will be used if calories are insufficient.⁴

Recommendations:

The average athlete needs 1.5-1.7g/kg bw/d (Ada)

Suggested High Protein Foods

Fish,	3	oz,	21	grams
Chicken,	3	oz,	21	grams
Turkey,	3	oz,	21	grams
Beef,	3	oz,	21	grams
Milk,	8	oz,	8	grams
Tofu,	3	oz,	15	grams
Yogurt,	8	oz,	8	grams
Cheese,	3	oz,	21	grams
Peanut butter,	2	tbsp,	8	grams
Eggs, 2 large,	13 grams			

FATS

- It is most concentrated source of energy.
- It provides essential fatty acids necessary for cell membrane, transport of fat soluble vitamins. (ACSM, 2009)
- It is a major fuel from light to moderate intensity exercises.

- It can be also used in production of hormones, lining of nerves for proper activity
- Whereby carbohydrates account for the majority of energy during short duration or low intensity exercise, fats make up the most part of energy during longer or more intense exercise sessions (marathons).
- When we are not receiving enough energy from our diets, stored fat in the form of adipose tissue is broken down to supply the necessary energy.

Recommendations-

Athletes should consume

- 20-30% calories from fat.
- 1g fat = 9 kcal
- High fat diets are associated with CVD, obesity, diabetes etc, delays gastric emptying and take longer to digest, lead to nausea.⁵

VITAMINS

Play imp role in metabolic pathways-protein and bone synthesis, hemoglobin synthesis, and immune function. It has been assumed that if increased energy needs are met, vitamin and mineral requirement would also be met.

Poor nutritional status- Athletes report poor nutritional status due to training and poor work schedules, rely on snacking resulting in nutrient deficiencies.

All the vitamins play role specially vitamin B,C,D,E plays important role in athlete performances.⁶

VITAMIN B

B-vitamins like thiamine, riboflavin, niacin, pyridoxine (B6), pantothenic acid, biotin, folate, and B12, are important requirements for any athlete because they are involved in energy production while working out and micro-nutrients like folate and B12 are required to produce red blood cells, protein synthesis, and in tissue repair and maintenance.

- Popular sources of vitamins are whole grains, eggs and dairy products, red meat, fish, legumes, seeds and nuts,

and dark leafy vegetables among others.

VITAMIN C

Vitamin C has immune-boosting properties and is especially an essential vitamin for athletes training outdoors because it prevents airborne viruses and common colds.

- Rich sources of Vitamin C are citrus fruits and strawberries, and vegetables like broccoli, cauliflower, and capsicum among others.

VITAMIN D

The kind of high intensity training undertaken by athletes puts a lot of pressure on the bones and joints. Fragile bones will eventually lead to injuries and impair development. That is why Vitamin D3 is very essential for increasing calcium absorption and strengthening the immune system (by fighting free radicals).

- Sunlight is the best source of Vitamin D but there are foods rich in Vitamin D like egg yolks, fatty fish like tuna, mackerel and salmon, soy milk, cheese among others

VITAMIN E

While Vitamin E does not improve overall athletic performance, it is an important antioxidant for athletes because it prevents oxidative cellular damage, reduces the risk of picking up viruses from public spaces, increases one's anaerobic threshold, lowers output of pentane and lactic acid, and eases muscle cramps. —

IANS

IRON

Iron is required for red blood cell production.

• Iron is required for a healthy immune system inadequate iron in the body can impair aerobic metabolism by decreasing the delivery of oxygen to tissues and reducing the capacity of muscles to use oxygen for the oxidative production of energy.

- Athletes have a high risk of iron depletion for several reasons:

1. High requirements

- Increased red blood cell mass means athletes have higher iron needs.
2. Increased losses-
- Iron is lost in the sweat. Athletes with high sweat losses have higher iron losses. Iron concentration of sweat during exercise ranges from 0.13 to 0.42mg/l
3. Dietary Issues-
- Iron intake is often sub-optimal in athletes with restricted food intakes: o Eating poorly balanced diets.
 - A high reliance on snack and convenience foods and failure to consume regular meals reduce the athlete’s intake of iron.
 - Hard exercise results in an increase in the volume of plasma in the blood. This can dilute hemoglobin levels and incorrectly suggest that there is a problem with iron status. This condition is known as ‘sports anemia’.⁷

CALCIUM

Osteoporosis- major health concern

- ACSM, 1997 identified Ca deficiency in female athletes- characterized by estrogen deficiency, disordered eating, athletic amenorrhea, loss of bone mass.
- Athletic amenorrhea- female athletes who exercise strenuously stop menstruating (Warren and Stiehl, 1999).

Diet modification-

More calcium, Vitamin D intake- i.e. calcium fortified fruit juices, soy milk and tofu, milk and products, sesame seeds etc.

FLUIDS AND HYDRATION

DEHYDRATION

Your body needs adequate water for all activities and cannot adapt to dehydration. Internally, you're about 65% water. Without water, you can only survive a few days. Dehydration makes your blood thicker, increasing your heart rate and decreasing the amount of blood

your heart can pump with one beat and causing your blood pressure to fall.

Dehydration makes it harder for fat to get into your muscles to be used for fuel, so your muscles burn the limited sugars (glycogen) already there. Since your brain is about 85% water, even mild dehydration can bring on changes in your mood and a decline in your concentration and alertness.

Dehydration may produce further causes

1. Physiological function: (exercise performance)
 - Premature fatigue
 - Increase in body temperature
 - Increased excretion
 - Risk of injury
2. Cognition
 - Hampered memory
 - Poor attention
 - DNA damage
3. Psycho-physiological function
 - Increased heart rate
 - Decreased reaction time

HYDRATION

Water is a popular choice of liquid and whilst it is suitable for low intensity sports, it is not that effective for high intensity or endurance sports. If you train for more than an hour then use a sports drink, preferably one that is high in electrolytes. This type of drink will replace sodium and other nutrients lost during exercise and will prevent dehydration. It will also maintain your energy levels as well.

Ideally, you should ensure that you are properly hydrated before exercise by drinking water (or diluted fruit juice) during the day. Aim to drink at least 2 liters a day although you may find that you require as much as 4 liters.

Fruit juice, carbonated water, fruit and vegetables all contain water and can help to keep you hydrated but nothing beats good old plain water. It doesn't

matter whether it is tap or bottled as long as you consume enough of it. ⁸

HYDRATION GUIDELINES: (Position Statement ADA, 2000; SAI, ILSI and NIN, 2006; Lal, 2006)

Before exercise: consume 500ml of water 1-2 hours before exercise

During exercise: 250 ml of water/sports drink every 15-20 min

After exercise: amount equivalent to body weight loss

STEPS FOR ADEQUATE HYDRATION

Be aware of sweat loss

- 1 kg water loss after exercise = 1 liter of water loss
- Develop a conscious drinking pattern
- What to drink
- When to drink
- How much to drink

Before activity –

Plain cold water/ glucose-electrolyte drink

During activity-

Glucose- electrolyte drink/ juice

After activity-

Glucose- electrolyte drink juice continue till urine is pale,

1gm wt loss= 1 ml of water

Coconut water, sugarcane juice, sports drink are also consumed.

OTHER CONSIDERATIONS

ALCOHOL-

- Has a detrimental effect on athletic performance.
- Many athletes incorrectly believe that alcohol contains carbohydrates, and will improve performance.
- It is a poor source of carbohydrate, vitamins, electrolytes and minerals
- It has no effect on physiological processes of exercise.

- Light social drinking during the day does not influence athletic performance.⁹

DISCUSSION

In human life health is an important aspect being a living thing and to maintain this health "nutrition" is contributing a lot. A healthy food always keeps an individual healthy. As we all know, to be in the healthy state, regular exercise and sports do play a major role. Now a days, sports is being adopted as a career as well. Being a sportsman or sportswoman, if someone is planning on ramping up levels of physical activity, it is very imperative to alter and enhance the nutrition to match the body's and mind's demanding needs. Talking at baseline, nutrition is important for athletes and sports person because it provides a source of energy required to perform the activity and/or sports. The food and ways/methods of eating the food also impacts on strength, training, performance and recovery. Not only "perfect" type of food is important for sports nutrition but the time is also an important criteria. It has great deal of effect on performance levels and bodies ability to recover after exercising. Meals eaten before and after exercise are the most important in sports nutrition but you should really be careful with everything that you put into your body. For example, sports person should always know when to eat and what to eat, e.g., the correct amount of nutrients should go in considering carbohydrate, protein, and fat. For this purpose, one should know which are major and which are minor nutrients, and how much of them body needs and when (before or after exercise or sports). The proportions of these "nutrients will vary depending on both the intensity and type of sport or exercise and professional help is always welcomed from an expert in sports nutrition.

CONCLUSION:

Though many nutrients are present and available for humans, the proper intake of

this is needed. In sports persons these foods should always be selective in a way so that they can provide regeneration and repair. Talking in detail, proteins are needed, one cannot survive only on proteins and vitamins are needed in a very small amount, so there is no need to consume vitamins in large amount. This proper knowledge is important about micro as well as macro nutrients, and for a sports person this plays important role. As a general rule of thumb athletes should eat about two hours before exercising and this meal should be high in carbohydrates, low in fat and low to moderate in protein. We know carbohydrates are the main source of energy that powers your exercise regime and protein is required to aid muscle growth and repair. After exercising you need to replace the carbohydrates you have lost and you need to ensure proper muscle recovery by including protein in your post training meal. This practice of "eating properly" always will enhance the physical as well as mental abilities of an athlete to perform for longer and highest levels.

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