

Nutritional strategies for Ultra-endurance recreational runners

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Abstract: Physical exercise is beneficial for functional health and hence people are involved in different types of physical exercises and among those physical exercises, running is an exercise form which is preferred by several. But, during the modern times, marathon running has become a passion among urban youth and urban populations and large number of people are participating in such marathon events. These recreational runners are not professionally trained and monitored during their training. Most of them may be self-coached or may take the help of some trainers or else would follow the internet resources. The scientific evidences are favouring that the high intensity sustained aerobic activities like marathon running may induce inflammatory and oxidative stress, which may cause to affect the immune function of the individuals causing some perceptible disturbances in the functional health of the individuals. The recreational ultra-endurance runners need to adapt several strategies and methods to minimise these negative effects of the long distance running. Rest, recovery and proper training protocols are among the several methods followed for adapting to the higher loads of these physiological stresses. Nutritional strategies are also very essential for both the professional and recreational marathon runners. Proper nutrition not only provides the energy and other nutritional elements to the exercising individuals, it also provides recovery from the inflammatory and oxidative stresses of the prolonged physical exercise.

Key words: marathon running, functional health, inflammation, oxidative stress, recreational running.

Introduction and background of the study: Fitness and lifestyle issues are becoming so important in the perspectives of the people and many are trying to understand the science of fitness and healthy life. Importance of physical activity and exercise is very much recognised in terms of improvement in functional health and the disease free life. People are investing time and money for enhancing their health and exercise seems very much an important part of many people's lives. Certainly, it may be said that the more and more people are taking up the physical exercise as part of their lifestyle program improve their health status. People are trying to participate in several forms of exercise, but the scientific knowledge of these who involve in regular exercise seems somewhat doubtful. Though exercise mostly produces the positive effects on the functional health of the individuals, there are some exceptional circumstances wherein the exercise may become fatal sometimes and may affect negatively the functional health of the exercising individuals. It is important to mention the effects of functional

stress of the exercise, and cytokine rush especially due to high intensity sustained aerobic exercises like marathon running (1).

Though physical exercise enhances the functional health through improving the immune function of the body, some forms of high intensity exercises need to be undertaken with scientific caution (18,19). Enhanced anti-inflammatory and anti-oxidative capacities in individuals could also secure heightened immune strength among the individuals. When exercise is conducted on moderate lines like moderate time and intensity, it may cause for better anti-inflammatory and anti-oxidative capacities of such exercising individuals. But, also depending on the functional metabolic health of the individuals, the exercise may show significant differences in its impact. However, it is highly desirable that scientific caution needs to be applied while undertaking the high intensity sustained aerobic exercises like marathon and ultra-marathon running etc. Physical exercise induces inflammatory stress through activating the inflammatory cytokine production, which may further trigger to release of anti-inflammatory cytokine mechanism, causing to act to neutralise the inflammatory stress of the tissues under inflammatory stress.

Various scientific studies in exercise science, especially the studies in exercise endocrinology and exercise immunology indicate that the physical exercise in fact enhances the anti-inflammatory strength of the tissues through creating inflammatory stress, which in turn provides opportunity to the organism to respond with the anti-inflammatory mechanism. Whereas during the high intensity sustained aerobic physical activity like marathon and ultra-marathon running the oxidative stress seems so high that sometimes, this may exceed the tolerable limits of the organism leading to the negative effects of this oxidative stress (14). During the sustained aerobic physical activities, the substrate mainly used seems the free fatty acids and these free fatty acids may require additional or excessive amounts of oxygen for deriving the energy through the process called beta oxidation and through the electron transport chain reactions. During this excessive oxidative stress, the tissues may produce excessive quantities of oxidants which may cause damage to the tissues and sometimes, these oxidants may even cause mutations at the nucleus, which might bring forth the pro-cancerous conditions to the tissues that are under the severe oxidative stress. Hence, there must be some strategies to be adapted on scientific lines to counter these severe stress effects (15, 16).

There are several such strategies which are essential to be incorporated both during the training and also during the serious competition times, especially those who are constantly involved in high intensity sustained aerobic activities like marathon running and training for such marathon and ultra-marathon running. Proper recovery periods during the high intensity chronic and acute training to sustain the stress rigors of the inflammatory and oxidative stress is highly essential. Though rest and recovery seem an ideal strategy for high intensity training and participation in high intensity aerobic activities, other strategies like recovery through the proper nutrition and nutritional

supplementation (20) is recognised as desirable for sustaining the acute and chronic effects of the high intensity aerobic physical activity training and participation (17).

Perspective on the physiological condition of the recreational marathon runners: Since, the introduction of marathon running in the modern Olympic Games, the running event is gaining momentum in interest among the enthusiastic runners and in the modern Olympic Games marathon running event is also considered as one of the toughest running events. Slowly and steadily the running has become very passionate physical exercise among the health seekers of modern times. With the result, several long distance running and cycling events have been introduced for the health seeking population. Several cities have started hosting their signature marathon running events like Boston marathon, Chicago Marathon, Tokyo marathon, Airtel Hyderabad marathon etc. and these events are attracting several enthusiastic health seeking runners, who are not the professional runners but who participate in such events for the sake of health mainly. Hundreds and thousands of enthusiastic health seekers are taking up long distance running for enhancement in their functional health, and with the result the participation in these events is growing exponentially. Especially during the last decade the participation by the recreational runners in these ultra-endurance events also witnessing the participation from the master runners, who are aged more than sixty years. Several combination ultra-endurance events are also happening frequently in metropolitan cities attracting recreational runners and health seekers to participate in these combined events like triathlon, duathlon etc in very large numbers.

The recreational runners comprising both men and women including the master runners may not undergo the scientific training before they participate in such acute high intensity aerobic physical activities which may pose severe inflammatory and oxidative stress, making them easily prone for negative health issues. Though the same may not happen with every recreational runner, but certainly those whose functional metabolic physiology is not properly consolidated for providing tolerance to such acute high intensity physical activities may get affected. It is also important to understand that individual differences basing on the genotype, may also distinguish the suitability of persons for such a gruelling acute high intensity sustained aerobic physical activities like marathon running and ultra-endurance cycling etc.

Scientific studies of the exercise immunology are clearly indicating that, the individuals need to have proper phase wise exposure and conditioning program basing on the exercise physiology principles, which would provide enough physiological consolidation to the recreational runners to effectively offset and neutralise the inflammatory and oxidative stress issues during such acute high intensity aerobic activities. Strong endogenous anti-inflammatory and anti-oxidative capacities are highly essential for the recreational runners. These two physiological capacities can be heightened through prolonged training and steady involvement in scientific physical training and competition participation including nutritional strategies (7). Exercise endocrinology and exercise immunology studies support that the regular physical

training at moderate intensities is beneficial in terms of enhancing these two physiological capacities, and even the tolerable limits of high intensity sustained aerobic physical activities may also provide some enhanced anti-oxidative capacity to the individuals.

Health and performance perspectives of recreational ultra-endurance runners:

High intensity sustained aerobic physical activities, especially the events like marathon and ultra-marathon running and marathon cycling events are highly stressful physiologically to the participants. As already explained in the foregone literature, those who participate in such activities are required to be very cautious as they may be vulnerable to some health complications and sometimes even serious health consequences. Several studies of the exercise immunology are indicating that some ultra-endurance runners especially the recreational marathon runners may get affected with immune related health issues, starting from the respiratory tract infections to the intestinal tissue disturbances and very rarely even the intestinal carcinomas, unless proper protective care is taken both during their preparation for such events and during the competition times.

Respiratory tract infections among the ultra-endurance athletes seems to occur frequently due to the disintegration of the respiratory tract epithelial tissue disintegration due to exposure to the high levels or uncontrolled inflammatory and oxidative stress during these ultra-endurance physical efforts like marathon running. Excessive inflammatory stress that may arise due to the very long sustained high intensity aerobic physical activities like ultra-endurance running seems to influence on the integrity of the epithelial tissue of the respiratory tract causing disintegration to the tissues of the epithelial layers of the respiratory tract, causing openings for the pathogens to infect the respiratory tract. More specifically, this process of epithelial tissue damage seems very cogent with respect to the upper respiratory tract epithelial tissue, where the high intensity breathing could bring such damage during the high intensity sustained aerobic activities. Not only the respiratory tissue disintegration may happen due to such high intensity aerobic activities, the possibility of the suppression of the mucosal immunity is also seen happening due to restriction in the synthesis of the immune proteins like immunoglobulins like IgA and IgG, Lactoferrins etc (10, 11,12).

The chances of pathogen inundation into the interior layers of the mucosal epithelial tissue would be considerable if the mucosal epithelial tissue gets disintegrated due to inflammation stress that may be very high through the acute high intensity sustained aerobic endurance and ultra-endurance activities like marathon and ultra-marathon running. The infection to the respiratory tract and especially to the upper respiratory tract may be estimated through the upper respiratory infection symptoms. Respiratory infections among the runners, especially among the ultra-endurance runners including the recreational endurance runners could cause for compromises in the respiratory capacities leading to even performance reductions considerably during the competition(21). Apart from this respiratory tract issues, the chance of suppressed

immunity getting affected the general health of the individuals may also be considered to avoid unnecessary health complications. However, all these consequences of compromised health or suppressed immunity could not be identified with all the runners or with all the ultra-endurance activities, as the immune suppression because of the effect of the ultra-endurance activities and chronic training seems mostly depend on the factors like conditioning levels or fitness levels, rest and recovery periods and methods of recovery adopted like protein intake (8) and many more such issues. Even the genetics of the individual marathon runners could also influence on the issues of immune suppression due to the ultra-endurance aerobic physical activities like marathon running. It is important to understand the ultra-endurance physiology than to depend on the studies which are expressing contradictory results in this regards. Some studies identified that the acute ultra-endurance efforts like ultra-marathon running may cause for the lymphocyte reduction post the endurance effort and this lymphopenia that occurs may cause for temporary suppression in the immune surveillance. However, some studies are indicating that this temporary lymphopenia would in fact enhances the immune surveillance by enhancing the lymphocyte circulation after few hours of the acute marathon running.

Nutritional strategies for Ultra-endurance marathon recreational runners:

Nutritional strategies for ultra-endurance marathon runners are highly scientific (2) and it will be more specific in case of recreational marathon runners, since their foundation training and competency in terms of tolerance to such acute high intensity sustained aerobic physical activities may be less when compared to the well trained professional ultra-endurance runners (3 and 4). Recreational marathon runners need to be very scientific in terms of their food consumption both during preparation and competition. The recreational marathon runners need to concentrate on two aspects of nutrition, one being the performance aspect and another being the health aspect (6).

It is important that the recreational marathon runners take sports nutrition help in scheming their nutritional strategies both during their training and competitions. Sufficient energy in terms of muscle and liver glycogen and circulating glucose for performances and for metabolic energy pathways is an essential ingredient of the nutritional strategy for these runners. They may consider including Multiple Transporter Carbohydrates in their diet so that they can tap the several cell signalling and glucose transporter related glucose metabolism for considerable energy supply for performance and for synthesis of essential proteins like immune proteins, enzymes and hormones. Inclusion of enough Branched Chain Amino Acids with leucine and isoleucine would provide sufficient protein base for the purposes of synthesis and transport of hormones and also provide sufficient protein base for tissue regeneration and for anti-inflammatory metabolic activities(22).

The most essential aspect of the recreational marathon runners' nutritional strategy would be with respect to inclusion of the anti-inflammatory and anti-oxidative nutrients in their daily diet (9). Gut health seems very important to preserve the

functional health of the marathon runners, especially the recreational marathon runners, which may in many ways affect the immune signalling and hormone functions of the body. Pro-biotic and prebiotic diets are to be included into the regular diet of the ultra-endurance runners and recreational marathon runners of all ages (5,13). Rich nutritional strategies for recreational marathon runners, which provide enough multiple transporter carbohydrates, essential proteins like BCAAs, anti-inflammatory and anti-oxidative minerals and vitamins supplementation, rich diets containing these substances are highly essential for protecting the functional health of these recreational marathon runners and also to secure consistent performance during the competition. Proper nutrition with all the essential nutrients would provide excellent recovery and protection among the recreational marathon runners.

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