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INTRODUCTION

Sports is necessary for human development, health (both physical and mental), championship and for a spirit of friendly competition. It has a positive impact on the personality of the individual. Brilliance in sports enhances the sense of achievement, national pride and patriotism in the athlete. According to the Australian Sports Foundation (ASF,2012), sport is a human activity capable of achieving a result requiring physical exertion and/or physical skill, which, by its nature and organisation, is competitive and is generally accepted as being a sport (http://asf.org.au/who/definition _of_ sports)

There are several kinds of sport in India, most of which originate from sport forms of yester years commonly called traditional sport. Traditional sports date back to the ancient times, of Vedas and Indus valley civilization. Archeological excavations of Mohenjodaro and Harappa show that people of that time indulged extensively in physical activities- sports like hunting, swimming, boating and boxing and games using marbles balls and dice. Traditional sports were very common during the epic era. A number of Indian traditional sports like Dancing, Gymnastic, and Gilli are quoted in the epics. The Indian traditional sport, sword fighting is believed to be the fore runner of today's Fencing. The medieval and modern period witnessed the introduction of a number of new sports.

In Manipur, the tradition of sports dates back to the ancient history of Manipur - a history of small kingdoms which were in keen competition with one another. Wars among themselves and with neighbouring states resulted in a martial tradition which in turn gave due impetus to the development of indigenous games. Hiyang Tanaba (boat race), Yubee Lakpee type rugby), Mukna, Thang Ta (Manipuri martial art), Sagol kangjei (polo) are some of the traditional sports of Manipur. The Manipuri Sagol Kangjei has been adopted by the International Community as Polo and is now being played worldwide.The British learned the game of Sagol Kangjei in the 19th Century from Manipur after refinement it was transplanted to the countries as Polo. These sports are played quite extensively in different part of India even today. Some

of these games have made their way to the regional and international games such as the, Olympics, Australian Sports Foundation (SAF), Common wealth and Asians Games.

Thang Ta--"The Art of the Sword and Spear"-- is the traditional martial art of Manipur. The name denotes a set of armed and unarmed fighting techniques developed by the Meitei people of the state. The formal name for this martial system is *Huyen Lallong (*art of warfare). Bordered on the east by Myanmar (Burma), the state of Manipur (total area: 8,456 square miles) in northeastern India consists geographically of an oval valley of about 700 square miles surrounded by densely forested mountain ranges. The Meiteis have long been in to Thang-Ta. Athletes have to learn and execute a rigorous practice routine of different sets of exercises, after having mastered basic exercises that develop balance, flexibility, agility, endurance, and coordination. Sticks are used in the initial practice followed by various swords, shield, and the spear, once the student is proficient enough to use actual weapons. It is an elaborate system of physical culture that involves breathing methods, meditations, and rituals. Thang-Ta provided the basis for two basic movement traditions of Manipur: the classical Manipuri dance and the performance techniques of the ensembles of drum dancers, cymbal dancers and singers known as Nata Sankirtana. The decorative, hand gestures and the footwork of Manipuri dance are said to derive from Thang-Ta movement. Also, the basic stances of the drum dance and the cymbal dance have been influenced by this martial art (Green, 2010). Now a day's Thang -Ta is more popularized and it is play as sport Thang Ta. As it plays as sports many rule and regulation were followed during practice.

Manipur has been a good performer in sports at national as well as international level, winning quite a number of medals such as gold, silver and bronze, at the various national games. These speak volumes of the proficiency of sports persons of the state. Endowed with muscular and agile bodies, the people of Manipur influence their youth to adapt themselves to the newly introduced modern games. The salubrious climate, availability of nutritious food and other natural factors contribute to make the average Manipuri a fine sports person. Occupying second spot in the national games is quite an achievement of Manipuri players. However, there have been very little attempt to assess the nutritional status of Thang ta

athletes and provide any form of intervention to them, though this is the dire need of the hour.

Nutritional status assessment provides the data necessary to study the effect of nutrition on health and disease and to identify critical nutrients in a specific population and the groups and to develop effective public health policies to prevent and cure nutrition-related diseases. Body weight and composition shows the intake of energy level. BMI is generally considered a versatile tool to assess body weight but standardized the data measured should be under standardized conditions (Gorber *et al.,* (2007). The assessment of nutritional status is based on anthropometry, biochemical, clinical, dietary, body composition measurement and physical examination either together or separately. The definitions of physical fitness and physical work capacity (PWC) are difficult to formulate (Shephard, 1995). An expert committee of the World Health Organization was able only to relate one to the other: "Physical fitness is the Ability to perform muscular work satisfactorily" Physical fitness is frequently confused with physical performance as measured by tests representing basic performance demands (skill, flexibility, strength, etc.; Hunsicker and Reiff, 1976). American College of Sport Medicine (ACSM) has given guideline and component physical fitness, cardio respiratory, body composition, muscular strength; muscular endurance and flexibility are the health related physical fitness.

It is said that an army marches on its belly. This is true of the 'sports army' too. Athletes in general, represent the sports caliber of a nation and have to be fed the right type of food in the right quantities to give them that million-dollar-worth 'winning edge'. When everything else is equal, nutrition can make the difference in sports performance. In today's world of neck to neck competition, a person cannot afford to take chance in any area since even a minute fraction can deprive him of fame and fortune. Proper physical training combined with sound nutrition can go a long way in getting optimal results. Hence sports nutrition is vital in to the sports outcome and career. It is defined as, a special application of the science of nutrition to performance enhancement in sports. It implies the application of nutrition principles to sports with the intent of maximizing performance. Success in sport depends on three factors- genetic endowments, the state of training and nutrition. Genetic make- up cannot be changed. Specialized training is the major means to improve athletic performance and nutrition is an important component of the total

training programme as it helps to exploit the maximum athletic potential. To become an all rounder in sports and games, an individual needs to eat nutritious, balanced food derived from macro as well as micro nutrients. Individuals who seek to boost physical performance rely on power diet and training. The growing awareness on the synergy between diet and physical activity has focused on expanding interest in the valuable role that micro nutrient can play in maximizing genetic potential in physical performance (Lukaski, 2004).

The primary focus of sports nutrition is in the recovery between training sessions to allow the athlete to undertake consistent intensive training without succumbing to injury, illness and chronic fatigue. This led to a particular focus on a daily carbohydrate intake and high fluid intakes to ensure replacement of sweat losses. However there has been a shift towards looking for ways in which sports nutrition can promote the adaptations that take place in tissues in response to the training stimulus. But Athletes still need energy, macronutrients and micronutrients, but sports nutrition is now more about using nutrition strategies to modulate training-induced muscle adaptation (Hawley *et al.,* 2011).

All athletes should adopt specific nutritional strategies before, during and after training and competition to maximize their mental and physical performance. Energy demands depend on the periodical training load and competition program, and will vary from day to day and across the season. Diet provides energy from a wide range of commonly available foods can meet the carbohydrate, protein, fat and micronutrient requirements of training and competition. An appropriate diet will only help athletes reach an optimum body size and body composition to achieve greater success in their sport. Careful selection of nutrient rich foods to reduce the risk of developing nutrient deficiencies that impair both health and performance is especially important when energy intake is restricted to reduce body and/or fat mass (Lausanne, 2011).

The foundation of an effective nutrition care plan for active individual should integrate assessment status factor. From the joint position statement of American college of Sport Medicine and American Dietetic Association and Dietitian of Canada recommends that an adequate diet for athletes should cover energy, micro nutrients and hydration need. Nutrition status is a critical determinant of athletic

performance(Julia and Teresa, 2005). All nutrients needs for endurance athletes can generally be net by an adequate, well balance and varied. Furthermore, the timing and frequency of foods intake has implications for metabolism and nutrient availability and can be manipulated to achieve specific nutrition goal (Burk, *et al*., 2003). Adequate sports nutrition for athletes can effectively transform the picture of the typical underfed and under competent Indian athlete to an athlete of national or international caliber.

During exercise periods, athletes may suffer from the depletion of glycogen stores, dehydration and muscle damage. Therefore it is required the ingestion of nutrient rich foods (lean meat/milk, fruits, vegetables and complex carbohydrates) and water may improve thermoregulation, enhance energy stores, maximize muscle protein synthesis and provide the supply of vitamins and minerals Thomas *et al.,* (2016).

Fatigue towards the end of a prolonged exercise may result as much from the effects of dehydration as from substrate depletion. Beginning exercise in a dehydrated state is certainly harmful to performance of high intensity exercise and to endurance performance (Gigou *et al*., 2010; Goulet *et al.,* 2010). Dehydration can compromise exercise performance and it is therefore important to start exercise in a euhydrated state. A fluid loss of 6 per cent to 10 per cent of body mass may result in shortness of breath, dizziness, circulatory disorders and vomiting. Therefore fluid and electrolyte are very essential for athletes to maintain body homeostatic and fluid balance.

It is the position of the Academy of Nutrition and Dietetics, Dietitians of Canada, and the American College of Sports Medicine that physical activity, athletic performance, and recovery from exercise are enhanced by optimal nutrition. These organizations recommend appropriate selection of foods and fluids, timing of intake, and supplement choices for optimal health and exercise performance (Rodriguez *et al.*, 2009).

Improper nutrition intake in adolescence can jeopardize growth and hinder puberty and it lead to an increase in fractures and anemia as well as a lack of energy to perform in athletic competitions (Cotugna, 2005; Litt, 2004; Zawila et al 2003). Therefore, it is essential for young athletes to receive appropriate nutrition education.

The entire world is dependent upon plants to meet their foods demand. The plant organs consumed by human as vegetables have various botanical origin eg. leaves, stem, shoots, flowers, roots, rhizomes, tuber, buds, seeds, pods and even some fleshy fruits. Many of them are good source of phenolic antioxidants and constitute an important part of our daily diet. Regular consumption of phenolic antioxidant may provide protection against diseases including cancer, cardio and cerebrovascular disease.

Consumers are looking for variety in their diets and are aware of the health benefits of food rich in micronutrients. Regular consumption of plant foods are associated with numerous health benefits rooted in their various physiological effects as a result of their phytochemical and nutritional constituents (Hunter and Fletcher, 2002). These days many precious herbs are being used for the preparation of herbal medicines used to improve the vitality to human system. A variety of scientific publication demonstrate that adequate consumption of the plant food is associated with a decreased risk of chronic degenerative diseases, such as coronary heart disease ,stroke, diabetes or certain types of cancer. The risk attributing factors are attributed bioactive components including phytochemicals, phytonutrients and vitamins minerals and fibers. Studies had proved that natural fruit drinks such as young coconut water (Saat *et al.,* 2002), Earnest *et al*., (2004) and milk (Watson *et al*., (2008) and Shirreffs *et al.,* (2007) been shown to be effective hydration drinks.

The United States Department of Agriculture (USDA) defines a standardized recipe as one that “has been tried, adapted, and retried several times for use by a given foodservice operation and has been found to produce the same good results and yield every time when the exact procedures are used with the same type of equipment and the same quantity and quality of ingredients”. The most important of standardization is to cost nutrient per serving and consumer satisfaction. The use of standardized recipes ensures that menu items will be consistent in quality each time they are prepared and served. Standardized recipes will ensure that nutritional values per serving are valid and consistent (http://www.nfsmi.org/Resource Overview).

India is making rapid strides in the field of sports and Indian Athletes are endeavouring their best to excel in the national and International arena. Though rigorous training is given to athletes, yet their performance is often obstructed by nutritional deficiency and disorders. Sports scientists and nutritionists alike, now realize that adequate nutrition coupled with scientific training alone can give the winning edge to athletes. Hence, there is a dire need for sports scientists and nutritionists to arrive at a common consensus to tap the maximum performance potential of athletes. From time immemorial athletes are engaged in the quest for that magic 'potion' that would give them the winning edge back of over their opponent.Commercial sports drinks are expensive and make the athlete apprehensive about their composition. Herbal drinks are safer than synthetic concoctions. With the rich floral diversity in India, several indigenous, safe, nutritious and healthy sports supplements could be formulated, standardised, and patented and popularised. The present study attempts to develop a sports drink which could benefit the athletes nutritionally and ergogenically.

*Hibiscus sabdariffa Linn*popularly known as Silog Sougri in Manipur is one of the common food consumed with other accessories to meet the daily nutritional requirements. Wild edible flowering plants are inexpensive, locally available and have a great socio-economic significance because of their food and medicinal values. In Manipur these flowering edible plant is used in the preparation of special dish in big feast. In most of the houses these plant is planted as in kitchen garden. The Hibiscus calyx is used in tea, jam, jellies, sauces and wine production. It is also reported that *Hibiscus sabdariffa drink* can safely be used in the prevention and management of anaemia and cardiovascular disease (Ghislain *et al.,* (2011). Studies have reported that *Hibiscus sabdariffaLinn* contains high level of antioxidant. The dried calyx contains flavanoid, anthocyanin and high level of citric acid. The ascorbic acid and sugar contents of the juice were found to be 31.34±0.48mg/100g and 11.29±0.08mg/100g respectively, while the pH was determined to be 3.80±0.01 (Ajala Lo *et al*., 2013). However, studies on supplementation of *Hibiscus sabdariffa Linn* on athletes are not available. Because of its nutritional and medicinal potentials, the study is undertaken the supplementation and ascertain its effect.

Nutritional knowledge is related to eating behavior (Burke, Cox, Cummings and Desbrow, 2001; Wiita *et al*., 1995). Research shows that athletes who receive

nutrition education have significantly higher knowledge and attitude scores, and as their knowledge increases, they are more prone to eat or avoid certain foods (Werblow, Fox & Henneman, 1978). Dietary behaviors may hinder health status and athletic performance. Nutrition education is widely used for a range of population groups as a medium to deliver healthy diet and nutrition information; however, this type of intervention is still rarely implemented for college students. Few studies have studied nutritional interventions on improving the athlete's hydration practices (Cleary *et al*., (2012), Kavouras *et al.,* (2012) or their nutritional knowledge Gonsalves *et al*., (2014). It is necessary to explore nutrition education regarding on hydration in order to develop specific strategies to these individuals.

Problem of statement and Significance of the study:

In India many famous athletes were from rural areas and having traditional background. So it is high time to identify and assess their nutritional and performance status. Athletes require special diet depending on particular training or event. Nutrition is also one of the important factors in achieving high performance. And rural athletes were always often to the back seat. In this study, particular Thang -Ta athletes were chosen because many national or international athletes from Manipur particularly on body contact game were having Thang –Ta (martial art) background. It is high time to identify their nutritional and performance status. And the Numerous studies had confirmed that performance can be impaired when athletes are dehydrated. Rural athletes were lacking of knowledge regarding on sports nutrition. As for health supplement, commercial health drink are costly and rural athletes cannot able to afford it therefore formulation of low cost nutritious health drink based on locally available source and assessed its effects is must crucial . Beside these, there is no data regarding on nutritional and performance status of Thang Ta athletes so far. Therefore the investigator selected this intervention study.

Local regional data on traditional sports is very less in Manipur. Some few researches had done on athletes. But there is no data on nutritional status and supplementation of local herbal supplement on traditional athletes in Manipur. Singh *et al*., (2015) analyzed and differentiate the body composition between footballers (n=40) and Thang-Ta (n=40) practitioners of Manipur. Resultsshowed thatthey have the similar body composition on BMR. But the % of fat was lower among Thang-Ta

practitioners than the footballers. Meetei and Singh (2017) studied the anthropometric and physical fitness profile of elite and non -elite boxer of Manipur. Result shows that elite boxer had reduced neck girth and calf girth, lower skinfold supra iliac and sub scapular skinfold than the non- elite counterpart. Elite boxer had more Sit up, Standing broad jump, Plat Taping, cardiovascular endurance and flexibility than non- elite boxer.

Study on Herbal supplement on athletes was done by many researchers in other countries some of them were Bock *et al*., (2004) investigate the effect of acute and 4-week Rhodiola rosea intake on physical capacity, muscle strength, speed of limb movement, reaction time, and attention. Result showed that acute Rhodiola rosea supplementation increased time to exhaustion, VO_2 peak and VCO_2 peak. Houaton et al., (2010) reported that cherry juices provide recovery on extraneous exercise by increasing total antioxidant capacity, reducing inflammation, lipid peroxidation. Hoon *et al*., (2014) also informed that beet root supplementation consumed, 2 hour before exercises improve performance in highly trained athletes.

Manipur contribute significantly to the medal tally of the country. However, nutritional problems are rampant among athletes here, as elsewhere in the country.Since there is a dearth for data on nutritional and hydration status, and physical performance of athletes in Manipur, this study was conducted. It aims at identifying some of these concerns among Thang- Ta athletes and assessed the efficacy of selected interventions to alleviate some them.

The objectives of the study are to:

1. Determine the Socio Economic Status of Thang –Ta athletes in Manipur.
2. Assess Nutritional Status and Body Composition and Physical Performance of Thang –Ta Athletes.
3. Formulate Standardize, assess Acceptability and Nutrient content of a sports drink from *Hibiscus sabdariffa Linn* and assess its nutrient content
4. Supplement the standardized drink and evaluate its effect on Thang- Ta athletes
5. Impart Nutrition Education and Assess its impact on KAP of Thang –Ta athletes

Hypothesis of the Study:

1. Supplementation of Hibiscus sabdariffa juice will significantly improve biochemical parameter as well as performance parameter
2. Supplementation of *Hibiscus sabdariffa* juice will improve micro nutrient intake and fluid intake level.
3. Effect of nutrition education will improve Knowledge, Attitude and Practice