Introduction
1. INTRODUCTION

Sports are a worldwide phenomenon today. In no period of the world history sports were so popular, organized and important as today. Over the last twenty years, a revolution has occurred in the attitude of people towards sports activities and interest in the competitive sports is mainly directed towards performance. There are numerous federations, which organize sports competition every year from lower level to international level (Singh, 1984).

Every sports activity involves competition. However, winning in a competition surely depends on performance. Better the performance, greater the chance of winning (Bujurke, 1996). Sports performance is the result and expression of the total personality of the sportsman. Physical fitness, techniques, cognitive abilities, personality traits, positive belief, values, attitude which all contribute towards sports performance. Sports performance is improved with improvement of physical fitness tests, acquisition of motor skills, education and improvement of mental capabilities. Sports performance depends largely on physical fitness tests i.e. strength, speed endurance, flexibility, agility and various coordinative abilities (Singh, 1984).

Competitive sports are becoming a highly technical job. Western countries are done lot of research. As a result of these researches new techniques are being adopted for training of high-level sportsmen. The lack of adequate research facilities in the field of sports sciences in India has lead to poor performance at the international level (Vidyacharan, 1984). Based on the historical records, sports scientists say that, out of every million population in a nation, at least one world-class athlete should emerge. It is indeed ironical that India with more than 1000 million population is not in a position to produce at least 10 world-class athletes today. It is unfortunate to note that the performance of sports activities is neither desirable nor laudable in India. One major reason is that 70-80 per cent of population in India live in the shadow zone of poverty and are mostly undernourished because the consumption of food is below the optimum level (Sathyanarayana and Suryakumari 1999).
The crucial factors that influence athletic performance are physique and physical fitness. Nutrition has a key role to play in determining the physique of a person. Optimal body dimensions are one of the most important pre-requisites of physical fitness and performance (Astrand and Rodahl 1986). Body composition reflects the overall nutritional status of an individual (Brozek and Grande 1955). Nutrition plays an important role in attaining a high level of achievement in sport and athletes, besides other factors like motivation, skill, techniques, commitment, physical fitness and training (Narasingarao, 1996).

The International and National Olympic committees consensus conference on sports nutrition and sports performance marked the official recognition for the importance of nutrition in sports performance. Now nutrition is one of the most important factors affecting optimal performance. Sports nutrition aims at the improvement of performance. It is formulated in such a way that the sport is able to win or at least successfully participate in competitions. Optimum nutrition that is prevention of nutritional deficiencies and excess is vital for athletes.

Diet significantly influences athletic performance by providing appropriate nutrients. An adequate diet in terms of quantity and quality before, during and after training will maximize performance. Sports persons need 2-3 folds higher level of nutrients for optimal performance with adequate stores of nutrients. In the optimum diet for most sports, carbohydrates is likely to contribute about 50-55 per cent of the total energy intake and fat about 30 per cent and protein about 15-20 percent (Narasingarao, 1996). Each athlete has unique energy requirements, which influence their ability to meet total nutritional goals (Burke, 2001).

Nutritional supplements like carbohydrates and ergogenic aids are often seen as promoting adaptation to training, allowing more consistent and intensive training by increasing recovery between training sessions, reducing interruptions to training because of illness or injury and enhancing competitive performance (Burke et al., 1999, Ron
Maugan et al. (2004). Kathryn et al. (2004), reports that the college athletes use of nutritional supplement for their good health, to improve speed, agility and strength.

In athletic events of high intensity and long duration, performance is generally limited by carbohydrate availability, body stores of carbohydrates are limited, in fact the availability of carbohydrate as a substrate for the muscle becomes a limiting factor in the performance of prolonged, intermittent high intensity exercise, as a result sports nutrition guidelines on carbohydrates included intake of carbohydrates before, during and immediately after the events to enhance body carbohydrates availability (International Olympic Committee Consensus on Sports Nutrition 2004).

High carbohydrate diets maximize glycogen stores and improve performance. (Burke, 2001) stated that high intake of energy and carbohydrate (8-11g/day) by male players during intensive training programme. A carbohydrate meal before exercise at 70 per cent VO₂ max improved endurance running capacity. However the combination of the meal and a carbohydrate electrolyte solution during exercise further improved endurance running capacity (Costas, 2002). Pre-exercise nutritional strategies are to maximize carbohydrate stores, thereby minimizing the ergolytic effects of carbohydrate depletion. Mark et al. (2004) stated that increased dietary carbohydrate intake before competition increases muscle glycogen levels and enhances exercise performance. Carbohydrate feeding during intermittent high intensity exercise similar to that of team sports benefited both physical and CNS function, Winnick et al (2005).

Vitamin and minerals requirements of sports persons are considered to be much higher than those of normal due to heavy expenditure and for the increased metabolism of fat and protein (Hackman, 1984). Sports anemia is induced by severe exercise especially in runners (Yoshinobu Ohira, 1995). High prevalence of magnesium depletion, anemia and iron deficiency anemia were found among basketball players of both genders (Gal and Naama, 2004).
Sue (2003) reported that Gaelic football demands a balanced diet rich in carbohydrate, with adequate calcium to meet the energetic demands. Research has revealed that athletes are prone to having calcium (Kies, 1995) and magnesium deficiency. Magnesium is required to express higher level of strength (Bazzarre et al, 1993).

Competitive and recreational athletes frequently use vitamin and mineral supplements. Vitamins most likely to be deficient in the diet are folate, B4, B12 and E. Biochemical evidence of vitamin deficiencies in some athletes have been reported for thiamin, riboflavin B6. Female athlete’s diets are low in calcium, iron and zinc (Haymes, 1991). Creatine supplementation improved performance of some repeated sprint and ability tasks simulating soccer match play (Cox et al., 2003).

Antioxidant supplementation prevents the decrease of serum iron and the iron saturation index (Antoni, 2004). Increased fluid intake is necessary to avoid dehydration, to reduce physiological stress and improve performance during prolonged exercise, especially when sweat loss is high. Sportsmen undertaking regular exercise, and fluid deficit that is incurred during exercise session can potentially compromise the next exercise session if adequate fluid replacement does not occur (Susan et al., 2004).

To reduce fatigue 30-60 g of carbohydrates are ingested throughout each hour of athletic events to the fluids consumed (Edward, 2004). High rate of post exercise fluid consumption resulted in a faster rate of plasma volume and fluid balance restoration compared to low rate of fluid consumption (Eva, 2002).

In India very few studies are conducted in the field of sports and nutrition and its impact on the performance level. Choudery et al. (1996) stated that intake of food by Indian male rowers was very poor. Study on swimmers, cricketers about meal consumption pattern prior to competition indicated that nutrient intakes were less than the RDA (Subbulakshmi, 1996). Supplementation with extra nutrients antioxidants may
reduce free radical stress (Narasingarao, 1996). Nutritional profile of sports persons was studied by Satish *et al.* (2004). Effect of antioxidant supplementation on the body composition, oxidation stress and performance of Indian athletes was studied by Kelkar *et al.* (2004). The endurance capacity of distance runners tested using durum and Dicoccum wheat pasta fed trial. Dicoccum wheat pasta fed trial had shown an improvement over durum wheat (Kavitha and Yenagi 2006).

Food security ensures physical fitness. The magnitude of poverty indicates the food insecurity. The average calorie intake by an adult is less than 2100 Kcal per day in India. Diet surveys conducted by NNMB (National Nutrition Monitory Bureau) revealed that cereals and millets constituted the major portion (59%) of the total items. Protective foods like green leafy vegetables, fruits, milk and milk products fish, flesh foods were consumed in a small proportion per day in all the states. Hence, Indian diets, mostly vegetarian in nature are not balanced in terms of nutrients. Consumption of other foods was below recommended dietary allowances (RDA) and ranged between 25-85 per cent as reported by NNMB (1999).

Nutritional security indicates nutrient intake, which reflects in nutritional status of a person. It is an expression of the total effect of various factors like food and nutrient intake, utilization of nutrients, age, sex and environment. The average intake of different nutrients expressed as the percentage of the RDA at all India level, revealed that protein, calcium, iron, thiamine and other nutrient intake were below RDA as reported by NNMB (1997-99).

The optimum diet for Indian sports is carbohydrate and is likely to contribute about 50-55 per cent of the total energy intake and fat about 30 percent and protein about 15-20 per cent. It is stated that meals were not consumed adequately at sports authority of India mess at Bangalore due to improper planning and complaints of monotony. (Narasingarao, 1996).
The performance of athlete can be impaired significantly as a result of faulty or inadequate diet. However the actual eating habit of sportsmen may not reflect the existing level of knowledge in the science of sports nutrition. It is thus not surprising that earlier studies on food intake and nutritional intake of different groups of sports have confirmed that the existence of below desirable intake, as compared to the Recommended Dietary Allowances, for several key nutrients (Chen et al 1989, Grandjean 1989, Hickson et al 1987). Concluding the need for nutrition education and diet counseling (Sham et al 1992). Poor nutrient intake not only affects athletic potential (Crosby 1987, Haymes 1983) but may also affect general health of sports men (Leaf and Frisa 1989). Berning et al (1991) and Green et al (1989) reported that calorie intakes were adequate where as vitamin and mineral deficiencies were observed due to low nutrient density of diet.

Studies have shown that (Douglas and Douglas, 1984), low levels of nutrition knowledge of coaches and physical education teachers who have great potential to influence their athletes have been identified as having poor nutrition knowledge (Bentiregua et al., 1979). The coaches occupy a position having significant influence on the dietary practices of young athletes (Greaves et al., 1991).

The results of the study conducted by Christina et al. (2004) studied on nutritional status of Brazilian elite swimmers, stated that nutrition education is essential to promote intake of balanced diet. To maximize the optimum performance of sports persons, sound nutritional practice is one of the key factors. Nutrition education for sports personnel needs to be more practical so as to address eating strategies and key food choices that will help to achieve the goals of sound nutrition.

There are no studies available on team games with respect to nutrition education and carbohydrate supplementation, hence the present study is undertaken to study the food and nutrition security of sports personnel and the intervention programme which
included nutrition education and carbohydrate supplementation is proposed to improve their nutrition knowledge, practice and sports performance with the following objectives.

➢ To assess the dietary habits and food security of school children who have represented the school in various sports.

➢ To assess the food and nutrition security of selected sports personnel.

➢ To conduct nutrition intervention programme to empower the selected sports personnel with knowledge, practice, nutrient security by education and supplementation of specially developed foods.

➢ To evaluate the impact of nutrition intervention programme on knowledge, food and nutrition security and sports performance.