

CHAPTER 1

INTRODUCTION

Body fitness prolongs life. People who maintain appropriate body fitness using judicious regimes of exercise and healthy food intake, have the additional benefit of prolonged life. India is experiencing a rapid transition in food habits. Higher percentage people are consuming more processed foods due to more income, easy availability, less cooking time, changed in taste and preferences, etc (Pandey et al 2020).

Study by Katapally et al 2016, shows that around 50% of young Indian population does not meet the recommended guidelines for physical activity. Unhealthy lifestyle due to increased automation results in decreased physical activity. This was also supported by ICMR study, that the time spent in moderate to vigorous intensity activity was less than 20 mins/day among the enrolled subjects (N=14,277) (Pradeepa2014).

Physical inactivity is an independent risk factor for cardiovascular and other diseases. Interventions using physical activity can help to reduce cardiovascular risk factors, diabetes, obesity, osteoporosis, and symptoms of depression. Such interventions can also improve quality of life, which is an important predictor of physical functioning among various age groups.

Physical activity can be performed by many ways and one of them is —sports. Sport is more organised physical activity which involves rules and competition. Hundreds of sports exist, from those requiring only two participants to those with hundreds of simultaneous participants, either in teams or competing as individuals. India has a growing population keen on participating in sports. Previously Indian people preferred to play games like cricket and hockey which required more talent than physical abilities. Nowadays young population shows inclination towards games like football, basketball, lawn tennis etc which requires talent as well as physical abilities. Performance in such sports can be enhanced by consuming nutritious foods.

Body composition is another important contributing factor of sports performance. Genetics, diet and training are the major factors that influence the body composition of athletes, from which diet and training are the modifiable factors. Body composition is the relative amounts of muscle, fat and bone in the body. It is expressed as relative amount of fat mass and fat free mass which are made up of water, minerals and other components of total body mass. Body composition of athletes should be periodically assessed to determine the nutritional status of athletes, to assess the result of sport specific training on body composition, to check out appropriateness of an athlete to the chosen sport and also to determine individual's health status. Relatively low body fat, larger muscle mass and excellent aerobic power is essential for optimal athletic performance. Several studies have shown that different sports require different body size, physique and morphological characteristics (Singh, Kaur and Kau 2003). For instance, in certain sports categories like running, volleyball, high jump etc. athletes who need to carry their body weight against the gravitational force have to maintain a lower body weight (Gaurav, Singh and Singh 2010; Martin and Coe 1997 and Gore, Hahn and Burge 1997). However, the inability of Indian athletes to store more body fat is a cause for their poor performance (Yajnik, Fall and Coyaji et al 2003).

Many factors contribute to the success in sport. Diet is one of the very important components for optimal sporting performance. Inadequate nutrient intake can lead to decreased sports performance (delayed recovery and inability to adapt to training stimulus) along with health problems (depressed immune systems and problems with reproductive function) (Cupistiet al 2002).

Individuals engaged in general fitness programme can typically meet their macronutrient requirements by consuming normal diet of 45% to 55% of calories from carbohydrates, 10% to 15% from proteins and 25% to 35% from fat. However athletes involved in moderate to high volume training, need greater amounts of nutrients in order to meet their macronutrients requirements. Adequate carbohydrate intake by athletes is essential for optimal sport performance. Requirement of carbohydrates by athlete depends upon many factors like body weight, energy needs and their sports activity. Prime energy source for sports activity is carbohydrate. The body stores limited amounts of carbohydrates (approximately 400-600 gram) and

when the muscle depletes their glycogen stores, they fatigue. To maintain high performance body requires to replace the glycogen regularly.

Fat another important macronutrient is a concentrated and predominant source of energy in long duration aerobic activities. The mobilization and use of fat is slow and complex process. The use of fat to obtain energy depends on exercise intensity, duration, training status, food intake before and during exercise, composition of diet, environmental conditions and gender.

Protein is recognized as a key macronutrient for athletic success. Proteins are essential for growth and development, immunity, synthesis of hormones and enzymes and to increase muscle mass and strength in athletes. Branched chain amino acids provide energy to working muscles during endurance exercise. Body proteins are continually synthesized and degraded. Athletes all over the world have over valued protein. There exist a strong belief that high protein intake is necessary to gain muscle mass and strength. Protein supplements have become extremely popular and a multi-billion dollar industry (Juzwiak and Ancona-Lopez 2004). Protein needs depends on body weight, type of sport, intensity, duration and phase of training, age and gender. Consuming protein within 2-3 hours after resistance training is an important strategy to increase muscle protein synthesis.

Supplement use is a widespread and accepted practice by athletes. “Dietary supplement”, “Nutritional ergogenic aids”, “sports supplements”- these are some of the terms used to describe the range of products that collectively form sports supplement industry. Dietary supplement is defined as a product taken by mouth that contains a “dietary ingredient” intended to supplement the diet. Dietary ingredients may include vitamins, minerals, herbs or other botanicals, amino acids and substances (e.g., enzymes, organ tissues, glandular and metabolites). Dietary supplements may also be the extracts or concentrates from plants or foods. Many athletes in order to improve their performance, for maintaining/reaching upto the desirable weight for particular sport either by gaining weight or losing weight use ergogenic aids in the form of dietary supplements (Dhar et al 2005). Sport foods and beverages (sports drinks, bars and gels) can improve exercise performance by

maintaining the blood glucose levels, electrolyte balance and by keeping the body hydrated.

Along with adequate nutrition, healthy food choices are crucial in any adolescent's life, but are exceptionally important for those associated with sports (Croll et al 2006). There is an increased energy demand for those involved in sports, however, several studies have shown that the increased energy demands and other nutrient recommendations are not being met by most of the adolescents athletes (Croll et al 2006; Petrie et al 2004; Purcell et al 2013). Nutritional status and eating habits are important when considering young athletes, not only for optimal performance but also for optimal growth and development.

Like adults, adolescents also struggle with the same environmental factors that influence nutrient intake for instance: lack of time, travel and body image (Croll et al 2006). Especially female athletes, they tend to have inadequate dietary practices due to their desire to be lean (Cupisti, D'Alessandro, Castrogiovanni, Barale, and Morelli 2002; Maughn and Shirreffs 2007). This desire of getting lean conflicts with the fact that their energy needs are increased not only because they are involved in sports, but also for their growing bodies (Cupisti et al 2002).

Every individual makes food choice several times in a day (Wansink and Sobal 2007). Many internal and external factors play role in selection of food items (Sobal and Bisogni 2009). Factors like taste, convenience, price and beliefs plays decisive role in selection of food items (Sobal and Bisogni 2009; Furst, Connors and Bisogni et al 1996). Several studies have been conducted to understand why people select particular type of foods (Bisogni, Jastran, and Shen et al 2007; Bisogni, Falk and Madore et al 2007). Studies have shown that decisions about eating is based on the environment, location, situation, availability and food choice of teammates (Bisogni, Falk and Madore et al 2007; Vartanian, Herman and Wansink 2008; Herman, Roth and Polivy 2003; Smart and Bisogni 2001; Contento, Williams and Michela et al 2006).

Many studies have been conducted to determine the factors influencing the food selection among general population by using food choice questionnaire (Stepoe,

Pollard and Wardle 1995). It was found that factors like health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity and ethical concern played big role in food selection (Prescott, Young, O'Neill et al 2002; Honkanen and Frewer2009), however, it has not been used on athlete populations (Crossley and Nazir 2007; Share and Stewart-Knox 2012;Lockie, Lyons and Lawrence et al 2002).

Children (from birth to 17 years old) do not typically prepare their own meals, so most food choices are dependent on what parents provide. Few studies have shown that children as young as five to six years old are able to identify healthy snacks if given the proper guidance (Baskale and Bahar 2011 and Pettigrew2009). Recent research has examined the role of nutrition in the young athlete's (6-13 years old) diet, by looking at types of food and beverage these athletes were consuming, parental attitudes toward the food setting at sporting events, and how willing parents were to make healthier choices (Thomas, Harwood and Sztainer2012). They found that some parents did not feel that they were capable of picking healthy snacks due to lack of knowledge and inability to decipher meaning of "healthy" snack. Study conducted by Slater et al (2011) reported that knowledge on energy balance increased when individuals had more access to healthier food choices and beverages. Thus, children are more likely to eat healthy foods if they are more readily available in the home.

Dietary habits of the people are changing from traditional to westernized diets all over the world. Processed foods are high in unhealthy nutrients and low in essential nutrients. Processed foods are very popular in comparison of traditional foods because of many factors due to conveniences, uniformity, availability, variety and economy (Schmidt, 2009). Non-nutritional factors played dominant role during buying of the processed foods namely, presentation, taste, cooking convenience, ingredients, easy to buy, cost, etc. (Vijayabaskar and Sundaram 2012; Chan et al 2005; Grunert et al 2010b; Epstein et al 2007; Drichoutis et al 2005; Annunziata and Vecchio 2012). Processed foods have many disadvantages because of high fat, high sugar and harmful chemicals etc. (Schmidt, 2009). Regular consumption of processed foods makes body vulnerable to many diseases, so it's a matter of public health concern. Prevalence of obesity in children has been linked with the consumption of sugar-sweetened drinks. In Brazil, sugar and soft drinks

consumption was found to be responsible for 13.4% of household energy availability and was correlated to the obesity prevalence (Lobato et. al, 2009).

The increasing trend of consumption of processed foods cannot be changed. But more healthy processed foods can be selected by comprehension of food labels. So sports person can be trained to select the foods according to their nutritional requirements by reading food labels.

Processed food manufacturers communicate with the consumers through food labels. They are used to promote and provide nutritional information to the consumers (Kumar and Ali 2011b). So to make healthy food choices, it is very important to understand and comprehend food labels correctly.

An athlete's dietary requirements depend on several aspects, including the sport, the athlete's goals, the environment, and practical issues. The importance of individualized dietary advice has been increasingly recognized, including day-to-day dietary advice and specific advice before, during, and after training and/or competition.

If athletes are guided properly what to eat, when to eat and how much to eat, definitely it will help them in enhancing their performance and maintaining their energy levels throughout the different phases of sports.

It has been observed that athletes undergo nutritional stress due to intensive training, lack of knowledge and competitive schedules which ultimately affects their performance. They can perform better by modifying this nutritional stress by adopting proper dietary guidelines and healthy food choices which in return will help them to recover faster through muscle reconditioning, reducing on going fatigue, physiological adaptations and will help them in quick return to their training sessions (Beelen et al 2010).

One cannot change the genetic makeup but specialized exercise training and proper nutrition (the amount, quality and quantity of foods consumed before, during and after competition) will surely help them in achieving optimal sports performance.

Heavy training schedules leads to extreme physical stress and so immuno-depression is seen in athletes, which make them susceptible to infections, particularly upper respiratory tract infections [URTI] (Gleeson et al 2004; Maughan 2010). Exercise has either positive or negative effects on immunity. It is depended upon factors like age, fitness of subject, nature, intensity and duration of exercise (Nieman 2008; Brolinson and Elliott 2007). Post-exercise nutrition is very important for an athlete's in order to replenish glycogen stores, fluid and electrolyte losses and in order to manage the negative effects of exercises like muscle damage and associated inflammation. Optimal recovery can enhance adaptations to training and help them to prepare for the next workout.

Athletes require very specific diet regime in comparison of common active individuals. Footballers are supposed to play highly active game in very short period. So they should consume proper nutrition in order to sustain their activities and optimise their performance. Therefore, habit of consumption of nutritionally appropriate foods should be nurtured since childhood.

For young athletes, transitioning onto another sport, it is just as important that their nutrient intake is adequate to meet their needs for growth as it is for an older retiree to ensure that their diet is sufficient to maintain muscle strength and bone density as they age. Proper education can help athletes master the art of eating right foods which can greatly improve the quality of life, reduce non-communicable diseases e.g. diabetes, obesity, heart disease and also reduce the risk of the other extremes of maladaptive behavior which might have an impact on the poor food habits on body composition.

Learning how to maintain a healthy body weight and level of fitness should not be seen as just the responsibility to athletic population but something that they can all do for a healthier, fitter lifestyle.

Nowadays use of mobile phones is widespread. Smartphones are already used for training and measuring fitness status of individuals. Similarly this technology can also be used to assist them to comprehend food labels.

Thus, the rationale of the study is:

Several studies have reported that both male and female soccer players' nutritional intake was not adequate (Abood, Black, & Birnbaum, 2004; Caccialanza et al., 2007; Clark et al., 2003; Garrido et al., 2007; Gravina et al., 2012; Iglesias-Gutiérrez et al., 2012; Martin et al., 2006 and Russell & Pennock, 2011). More studies are needed among athletes as their food choices keeps on changing. The increasing number of Front OfPack (FOP) leads to the confusion of consumers. There is still debate on which system is the most appropriate and effective. In order to facilitate and help making a more effective debate on the current FOPs, a clear overview of the existing FOPs is warranted. There is paucity of such type of studies among athletes. Hence, the current study is focused to understand food choices and utility of nutrient profile in making healthy food choices among the football players of urban vadodara. With the abovementioned background, the research will be carried out in the following sequential manner:

Broad objective:

To study the status of nutrient profiling on the processed foods; development and feasibility trial of smartphone application for healthy food choices among the football players of urban Vadodara.

Specific objectives:

- ✓ To assess the anthropometric status, fitness status and body composition status of the football players.
- ✓ To study the dietary profile of the football players.
- ✓ To assess the frequency and consumption of processed packaged foods among the football players.
- ✓ To analyse the variables associated with selection of processed packaged foods among the enrolled subjects.
- ✓ To analyse the factors affecting the food choices.
- ✓ To examine in detail various components of food labels of processed packaged foods and sports supplements.
- ✓ To evaluate reported various components of food labels for their compliance with Food Safety and Standards Act (FSSA) of India and Codex Alimentarius.

- ✓ To assess the ability of the football players to comprehend food labels and identify knowledge gaps.
- ✓ To carry out capacity building of the enrolled subjects towards healthy food selection by using appropriate intervention tools.
- ✓ To develop module on “Food Labelling” and “General Dietary guidelines” for football players.
- ✓ To develop smartphone application based on: Colour coded Guideline Daily Amount (GDA) labelling scheme.
- ✓ To study the impact of smartphone application and modules on knowledge and comprehension skills among the enrolled subjects.

