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Effect of Protein intake on the Muscle mass among vegetarian and non-vegetarian Sports personnel using Waist-to-Height Ratio between the age group of 15-30 years in Mumbai.

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ABSTRACT

Protein intake and its effect on muscle mass is one of the most popular topics talked about especially for athletes and training individuals. They are the ones responsible for the growth and hypertrophy of muscles and this has a great impact on the performance. Our study aimed to determine the effect of protein intake on muscle mass among vegetarian and non-vegetarian sports personnel between the age group of 15-30 years in Mumbai. A study was conducted with 30 athletes, involved in training. The objectives were to evaluate the protein intake and to estimate the muscle mass of vegetarian and non-vegetarian sports personnel and compare the effect of protein intake on the muscle mass of vegetarian and non-vegetarian sports personnel. The subjects were assessed using an online questionnaire. Protein intake was analysed using the Food Frequency Questionnaire, which had all the food groups that are rich in protein content. A video tutorial was attached to the questionnaire that showed how to measure the Waist-to-Height ratio by Ashwell. The results of the questionnaire said that the Waist-to-Height ratio on average was 0.4 to 0.5 which is Appropriate. The statistical analysis revealed that, out of the total population, 75% of the population was vegetarian, 15% were non-vegetarian and the rest were vegan. Toor dal was the most common dal option that most athletes had every day. Milk was the preferred source of dairy every day followed by curd, paneer and cheese for 3 days a week. Nuts and oilseeds were also an important source of protein. Almonds and Walnuts were preferred. Eggs followed by Chicken were taken by the Non-Vegetarian population. It was seen that the protein intake of the athlete and his muscle mass are very closely related. To support the growth of muscle mass, some individuals are also ingesting protein supplements. Good quality protein plays a significant role in improving the muscle mass of sports personnel.

Keywords: Vegetarian diet, Muscle mass, Protein quality. Waist-to-Height ratio

INTRODUCTION

Protein requirement for athletic population is very necessary. Also for weight reduction programs a high protein diet has been suggested. Proteins are nitrogen-containing materials which are shaped with the aid of using amino acids. They function the important structural issue of muscle and different tissues inside the frame. In addition, they may be used to provide hormones, enzymes and hemoglobin. They can be used as an energy source but they are not the essential source of energy. Proteins need to be metabolized in its simplest form called amino acids so that the body can use it. 20 amino acids have been mentioned which are required by the body for its growth and metabolism out of which 12 are non essential that is they are able to synthesize in the body and so it is not necessary if it is present in the diet and remaining ones are essential because they are not synthesized in the body and needs to be consumed from the diet. The tissue in the body will not be able to grow, repair or be maintained if any of these amino acids are absent.

Proteins play a primary role in anabolic processes of the body. It was seen as a notion that if exercising muscles get more protein and amino acids then there will be more protein synthesis. It was seen that subjects who did resistance training took protein supplementation of 3.3 versus 1.3 g/kgBW/day, the results showed greater gains in protein synthesis and body mass of those subjects. The individuals who did resistance training increased their protein synthesis with their protein intakes of 2.62 v/s 0.99 g/kgBW/day. A study has shown that there was a positive nitrogen balance in strength trained individuals who consumed 1.8 g/kgBW/day of protein.⁽³⁾ Other studies have shown that resistance trained athletes will maintain a positive nitrogen balance if they consumed 1.4 – 2.4 g/kgBW/day. Therefore for strength/power athletes protein intake was suggested to be approximately 1.4 - 1.8 g/kgBW/day.

Protein is to be had in a whole lot of nutritional assets. These encompass meals of animal and plant origins in addition to the noticeably advertised game complement enterprise. Determining the effectiveness of a protein is executed through figuring out its excellence and digestibility. Quality refers back to the availability of amino acids that it supplies, and digestibility considers how the protein is nicely utilized. Typically, all nutritional animal protein assets are taken into consideration to be whole proteins. That is, a protein that consists of all the crucial amino acids. Proteins from vegetable assets are incomplete in that they're typically missing one or crucial amino acids. Thus, a person who wants to get their protein from vegetable assets (i.e. vegetarian) will want to devour a whole lot of vegetables, fruits, grains, and legumes to make certain intake of all crucial amino acids. As such, people are capable of attaining important protein necessities without eating beef, poultry, or dairy. Protein digestibility scores typically contain measuring how the frame can correctly make use of nutritional assets of protein. Typically, vegetable protein assets are no longer rated as excessive in scores of organic cost, internet protein usage, PDCAAS, and protein performance ratio as animal proteins.

The Atkins diet promoted the most popular diet for weight reduction by following the low-carbohydrate, high protein, high fat diet in the United States. The main aim behind this diet is that it provides a feeling of satiation and caloric reduction is done voluntarily. However there are many potential risk factors if a high protein diet is consumed. Firstly the requirements for dietary protein were estimated using the individuals who were sedentary. But recommendations for athletes have also been made. Athletes who did high intensity and duration exercises like strength to endurance exercises, suggested that their protein requirements will be more by 125% with respect to sedentary individuals. It is essential for endurance athletes that they consume protein for extra energy use and supplementary sources of amino acids to build the muscle mass of individuals who do strength training. On the other hand other high quality protein sources are also very important like creatine, carnosine etc. It was suggested that individuals who did strength/speed/ power training should consume 1.7 - 1.8 g protein/kgBW/day (112 - 125 % higher than sedentary individuals) and individuals involved in endurance exercise should consume 1.2 - 1.4 g/kgBW/ day (50 - 75 % higher than sedentary individuals). Overall this much protein can come from 10% energy intake. But still few athletes may not consume so much protein as their energy intake would be low because they need to maintain a certain body weight like dancers, gymnasts, wrestlers etc. But even those individuals who are vegetarians would not

consume so much protein. But by consuming protein in greater amounts(2 - 4 g /kgBW/day) it might be beneficial for strength athletes but sometimes it may lead to liver or kidney problems.

A study has shown that central obesity has more risk factors than the total obesity which is calculated using BMI(Body mass index). So it was suggested that along with body mass index to assess central obesity, waist circumference should also be used as a proxy to know the risk factors more accurately. The study compared the adult population of the UK with the above given proxy along with another proxy, waist to height ratio(WHtR) by using a boundary value of 0.5.

Vegetarian diets which are planned appropriately provide energy in sufficient amounts and also a range of carbohydrates, protein and fat intake help to support performance and health. The distribution ranges of macronutrients which are accepted for carbohydrates, protein and fat are 45-65% , 10-35% and 20-35% respectively and are appropriate for vegetarian and non-vegetarian athletes , mainly for those who are involved in endurance events. The protein needs for vegetarian athletes can be met predominantly or exclusively from sources which are plant based which can be consumed daily with adequate amounts of energy. Vegetarians have lower muscle creatine stores than the non vegetarian athletes. Ergogenic responses can be achieved in both vegetarian and non vegetarian athletes if they are provided with creatine supplementation. Which can lead to greater ergogenic effects of vegetarian athletes on their lean body mass and work performance.

Methodology

Quantitative data was collected for the research. The sample size used for the research work was 30 and the purposive sampling technique was used. 30 athletes of Mumbai, inclusion of male and female genders were studied. The age group considered for this study was 15 years to 30 years.

The data collection method used as an online questionnaire was used as it is the most suitable approach to conduct a study during lockdown and to collect the responses of athletes. Short answer questions and multiple choice questions were asked to be filled. Information about the subjects were collected in section 1 of the form. They are as follows:

1. Personal details
2. Training type (Cardio and Strength training)
3. Sports that they play
4. Physical Activity Level of the entire day
5. Dietary preferences such as vegetarian, non-vegetarian and vegan

Section 2 of the form talked about determining waist and height measurements and calculating its ratio. This method was given by Ashwell. As it is the most easy and efficient test that could be learnt and performed without supervision, this method was chosen. Also, there is a less likelihood for errors. Participants were taught to check these measurements with the help of a video tutorial and were asked to measure themselves and write the values in the form.

A food frequency questionnaire (FFQ) was given in the form so that the dietary responses of these individuals could also be collected. This FFQ was sub-divided into various food groups predominantly rich in protein such as pulses, milk and milk products, nuts and nut oils, soyabean and its products, non-vegetarian foods such as egg, chicken, fishes etc. Data regarding protein supplement intake was also collected. Participants were asked to choose the frequency between Never, Every day, Once in a week, Twice in a week, Thrice in a week, Five days a week and Six days a week.

The analysis

Exclusion criteria included any athlete who was sick recently or had any medical conditions, athletes who are out of Mumbai, age group below 15 years and above 30 years, who was currently not into any training

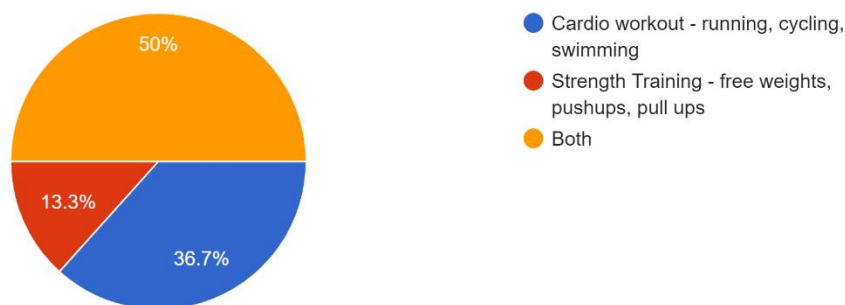
Results and Discussions

SECTION 1 – Personal Details

1. Out of the responses received, 12 are female and 18 are male.
2. Athletes of various sport categories such as hockey, basketball, gymnastics, cricket, football, handball, tennis, swimming and water polo were seen.
3. Training sessions – It is inferred that 50% of athletes perform both Cardio as well as strength training, 11 participants perform only cardio workout and 4 athletes only perform strength training. Hence it is understood that most of them have moderate to high physical activity levels.

What kind of Training do you perform?

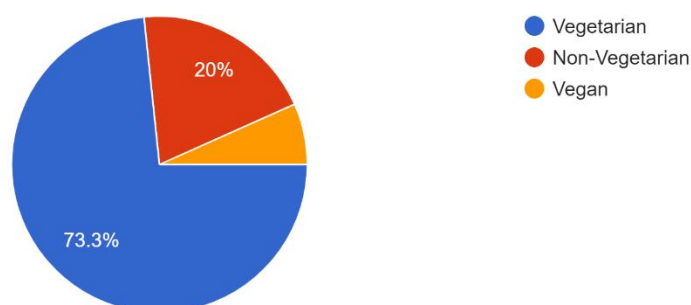
30 responses



4. Dietary preferences – 22/30 participants are vegetarian, 6 are non-vegetarian and 2 are vegan.

What are your dietary preferences?

30 responses



SECTION 2 – Determining waist and height measurements and their ratios

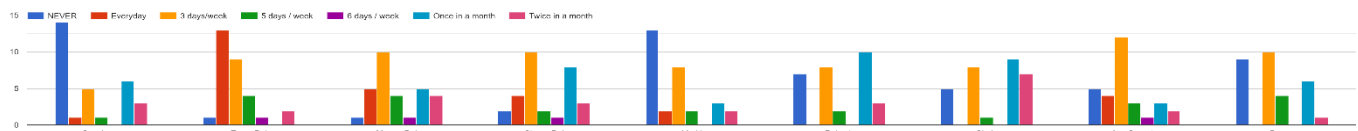
1. The waist to height ratio, on an average was 0.4 to 0.5 which is appropriate. We can infer that the fat mass of these athletes is in a good range and thus their risk of cardiovascular diseases is very less. As their weight is also under normal BMI, we understand that their muscle mass is in proper proportion.

SECTION 3 – Food frequency questionnaire for assessing protein intake

1. Food group – Pulses

Pulses, dals and sprouts are had everyday by everyone. It is the most consumed food group here.

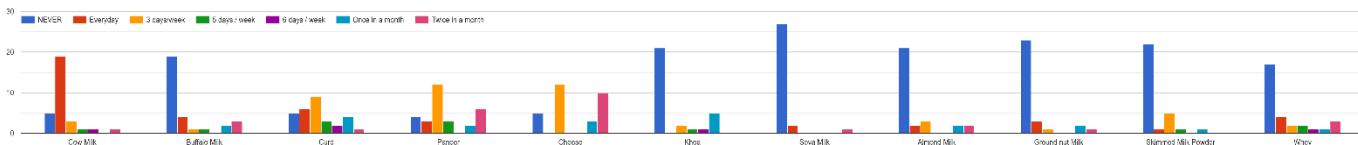
Select appropriate number of days that you eat a particular food if not select never.



2. Food group – Milk and milk products

Milk is the most preferred dairy item that athletes consume on a regular basis. Curd and paneer are also had almost 3 days/week by these athletes.

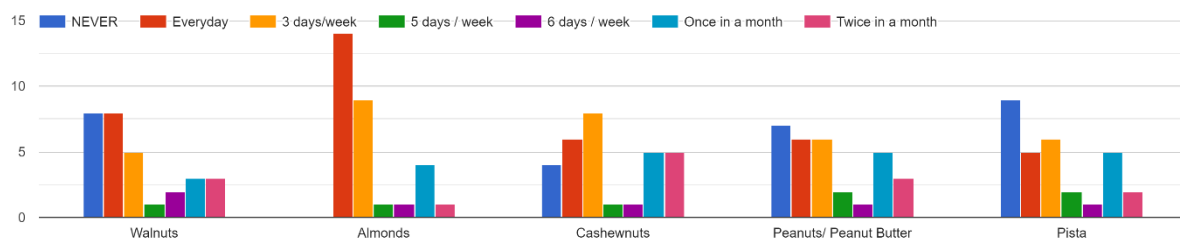
Select appropriate number of days that you eat a particular food if not select never.



3. Food group – Nuts

The most consumed nut on a daily basis is almonds. Followed by Walnuts and Cashew nuts, Peanuts and Pistachio.

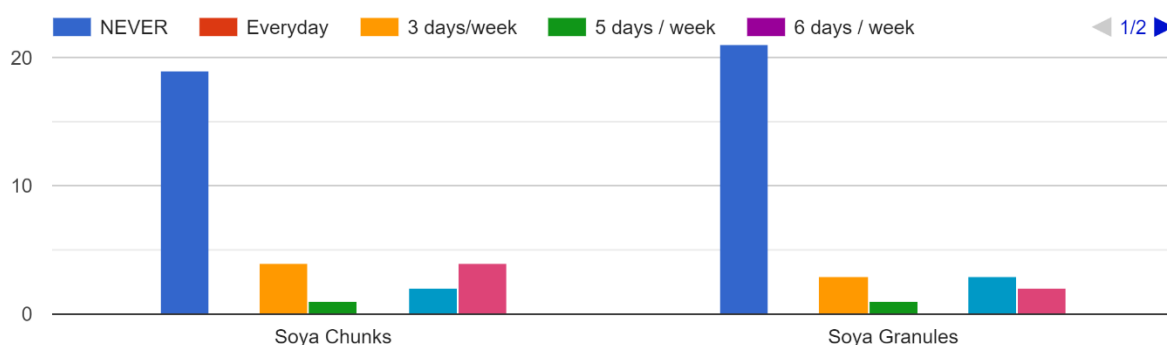
Select appropriate number of days that you eat a particular food if not select never.



4. Soya products

Very few consume soya products, and the frequency of having soya products those who consume is very less i.e., on an average 2 days/week.

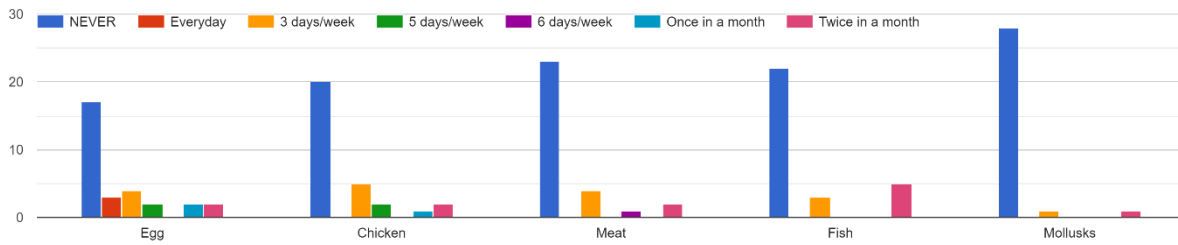
Select appropriate number of days that you eat a particular food if not select never.



5. Non-Vegetarian foods

Egg is the most common choice of athletes who are consuming non-vegetarian food, followed by chicken, meat, fish and Mollusk.

Select the appropriate number of days that you eat a particular food if not select never.

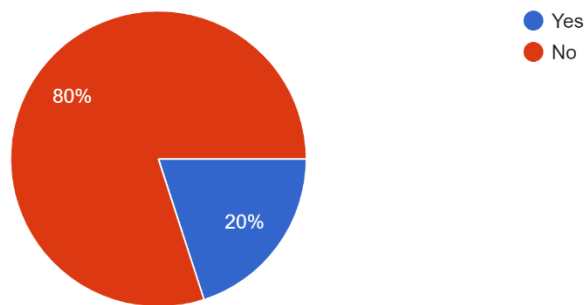


6. Protein Supplements

Most of them are not consuming supplements. Some examples of the supplements that people who are consuming are whey protein, GNC, BCAA, Arginine.

Do you have any protein or amino acid supplements?

30 responses



CONCLUSION:

It does appear that sports personnel do require good quality protein to build their muscle mass appropriately. Waist-to-Height ratio is a good indicator to measure obesity but indirectly we can conclude the muscle mass of a person by looking at the content of fat mass in the body and also by looking into their protein sources. We can also conclude that sports personnel who are vegetarian and involved in strength training exercise would need protein supplementation as vegetarian sources do not provide a complete protein. Animal sources that have high protein content are mostly good quality protein as it contains the essential amino acids which is said to be a complete protein.

We also conclude that the Waist-to-Height ratio of the subjects were appropriate, that is it was between 0.4 to 0.5 and so they do not have any cardiometabolic risk factor and have a normal range of BMI so we can infer that they have a good muscle mass.

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