Investigating the Nutritional Habits of Long-Distance Runners in the Maltese Environment

By

Nathalie Bellizzi

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Abstract

Author
Nathalie Bellizzi

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Research/Project Title
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This study provides an overview of the dietary habits of Maltese long-distance runners. What importance do athletes place on nutrition in order to achieve peak performance by understanding when and what to eat before, during, and after training. The study also delves into the type of diet an athlete should consume, and as well the ideal cooking method. The primary research included both qualitative and quantitative methods. The major quantitative research instrument was a questionnaire given to the target audience comprising of long-distance runners whilst the research instrument for the qualitative part of the study was an in-depth interview semi-structured questionnaire with long distance athletes, coaches, and nutritionists. Following the research, outcomes, and conclusion, the author has presented a set of recommendations from which athletes can derive for optimal training and race results.

Keywords
Long Distance Running, Nutrition, Performance, Dietary Habits

Declaration of Authenticity

Student Name and Surname : Nathalie Bellizzi
Programme **:** Bachelors in Culinary Arts
Research Title **:** Investigating the Nutritional Habits of Long-Distance Runners in the Maltese Environment

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Declaration:

I hereby declare that this research study is based on the outcome of my own research. I, as the author, declare that this research study is my own composition which has not been previously produced for any other qualification. The research study was conducted under the supervision of Dr Alfred Mifsud

28/092022
Date

Nathalie Bellizzi

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Student's Signature

Acknowledgements

I would like to use this opportunity to express my gratitude to Dr. Alfred Mifsud who played an important part in the completion of my dissertation. I would also like to thank my family, my partner, and my friends for their assistance and their patience. Last but not least I would like to thank all the athletes who participated in my studies, especially the top female long-distance runner in Malta, Mrs. Lisa Bezzina and Mr. Jonathan Balzan, who both won the Malta Marathon and other numerous races, Mr. Fabio Spiteri and Mr. Has Kesra two of the best coaches in Malta, and two renowned Maltese nutritionists.

Dedication

This dissertation is dedicated to the memory of my running coach, Mr. John Walsh, who was like a father to me and in remembrance of Mr. Gerald DeGeatano and Ms. Cecilia Fenech, who were prominent Maltese long-distance runners..

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Glossary of terms

Recommended Dietary Allowance	RDA
Carbohydrates	CHO
Glycaemic Index	GI
Gastrointestinal Distress	GI Distress
Adenosine Triphosphate	ATP
Body Mass Index	BMI
Mediterranean Diet	MD
Calories	CAL
Gluten Free	GF
Ketogenic Diet	KETO
International Amateur Athletic Federation	IAAF
Metre	M
Kilograms	KG
Kilometres	KM
Less than	<
Greater than	>

1. Introduction

1.1 Introduction

Over the past three decades, a combined interest in long-distance running and its related food intake has gained a lot of popularity, especially concerning the investigation of the nutritional practices involved in this sport in the Maltese environment. This is especially connected to the food consumed during exercise, as well as before and after races. The interest in this study derives from a merging of the author's passions. It has been borne of the author's background, which includes running from a young age, working as a professional chef and reading for a bachelor's degree in culinary arts. An exposure to the world of food has given the researcher the inspiration to reflect on current food trends, what people want to eat and how to maintain fitness, all the while being cognisant of the impact of the food intake on their body.

Preparing food for marathon athletes is crucial, since food acts as fuel for competitors. Menu planning, preparing and cooking food with the right balance of carbohydrates, protein and fats constitutes a vital part of this process. Such actions serve to provide the appropriate amount of glycogen to gain energy and calories, leading runners to the finish line and permitting them to achieve the best results. It is also essential to understand when to eat, as well as what kind of food to consume in order to guarantee that the nutritional value of the food is correct and made specifically for pre- and post-training and competitions. Finally, for a high-performing athlete, such steps prove just as critical as their physical training routine.

The right nutrition also aids in post-exercise recuperation and is frequently the missing ingredient for success. Athletes can achieve and sustain peak performance with the correct healthy and balanced diet. Although the diet's end aim is the same, the path varies from one athlete to the next. Planning the meal requires working hand in hand with nutritionists, dieticians and coaches, who determine the ideal diet for marathon athletes. The former possess a solid awareness of individual dietary requirements and can translate this into suitable meals.

1.2 Purpose

Athletes' health and sporting performance can both benefit from well-chosen nutritional practices. Dieticians and nutritionists working with long-distance runners must have access to precise and reliable dietary evaluation methodologies. Providing athletes with dietary advice necessitates a thorough and comprehensive assessment of their dietary intake. This can be challenging, since athletes' food habits vary. Due to periodised training programmes, athletes can eat differently daily, and may also dramatically modify their consumption during competition periods.The basic dietary goals for optimising performance and preventing tiredness during the run consist of carbohydrate intake to sustain blood glucose levels. During races lasting an hour or more, fluid and carbohydrate consumption should also be considered. Sports drinks and liquid meal supplements are useful for long-distance athletes, as they help them to meet nutritional objectives when standard foods are not available. While caffeine is an ergogenic aid that may be beneficial to long-distance runners, most other supplements are ineffective. After a run, carbohydrate and protein consumption are critical for refuelling and muscle regeneration. According to Whitney and Rolfes, (2015) nutrition constitutes the scientific study of how food and drink affect our bodies. They state that it is a key concern for all athletes. The subject tends to focus on the basic elements required for human health. It also examines the physiological and biochemical processes that occur during feeding, as well as how food ingredients generate energy or are transformed into human tissues. Carbohydrates, lipids, fibre, minerals, proteins, vitamins and water are examples of nutrients that provide energy to our bodies. The significance of these properties to sportspeople, specifically long-distance runners ,will all be examined in this study

1.3 The Importance of Nutrition

When it comes to marathon running, nutrition is critical. Appropriate nutritional methods can help marathon runners achieve their goals while training for races, as well as maximise their performance during the particular race.

Nutritional strategies should be tailored to the goals, needs and characteristics of specific training periods and may thus differ between general training, race-specific training, pre-race preparation periods and specific training interventions used by runners, such as altitude training or heat acclimatisation. Hydration, nutrition and recovery are three of the most critical factors for athletes to consider, all of which necessitate planning ahead.

Exercise processes create nearly all the energy during long runs. Carbohydrates are the most common energy substrates used in marathons. The relative contribution of these

metabolic fuels, on the other hand, is mostly determined by the relative exercise intensity, which is, in turn, dictated by the actual running pace as well as the runner's training state. The ideal diet for marathon training supplies nutrients to ensure the runner's overall health and to maximise the benefits of marathon training. Before, during and after a workout, eating the right foods at the right times can assist in reducing fatigue, improve training adaptations and performance along with maximising recovery. Overall dietary energy, macronutrients, micronutrients and other dietary antioxidants in addition to immune-modulating nutrients are all important for marathon training.

1.4 The Development in The Relationship Between Nutrition and Sports in Malta

The author is a professional chef pursuing a degree in culinary arts and a former competitive athlete who began training at the age of ten, participated in middle- and long-distance running, cross countries, track events of 800, 1500 and 5000m and half marathons from 1989 until 1996. At the time, Maltese athletes were not set any specific dietary or nutritional criteria to follow while competing, unlike foreign athletes, yet won multiple individual gold, silver and bronze medals in competitions in Malta. Coaches, nutritionists and dieticians were limited in Malta.

In this regard, the leading coach on the Maltese Islands, John Walsh, was a cut above the rest. The co-founder of the Malta Marathon, Walsh’s name was virtually synonymous with running, particularly in terms of the half and full Malta marathons, which he helped to establish as one of Malta's most successful sports events. Walsh was well-informed, committed to and fascinated by running and healthy diets. He advised his athletes to eat a balanced diet consisting of macronutrients, which are made up of carbohydrates, protein and healthy fats, as well as to eat well during the day and drink water, natural fruit juices and energy drinks, of which Isostar and Powerade were two popular examples. He counselled athletes to consume dishes such as pizza or pasta the night before the marathon and eat a light meal or snack the following morning. For instance, only one black coffee and a small piece of toast with jam or peanut butter were allowed the morning before the sporting event. Additionally, these had to be consumed at least 4 hours before the marathon (Joe Micallef, 2014).

1.5 Malta's Climate

Malta's weather is characteristic of the Mediterranean, with hot, humid summers and milder winters that nevertheless provide plenty of sunshine. From November to April, the temperature averages around 15°C, rising to around 32°C in later months.

Table 1. Monthly average climate variables for Malta, measured on the basis of observations conducted during the 30 year period of 1991-2020

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average temperature (°C)	12.9	12.6	14.1	16.4	20.0	24.2	26.9	27.5	24.9	21.7	17.9	14.5
Average maximum temperature (°C)	15.7	15.7	17.4	20.1	24.3	28.8	31.7	32	28.6	25.0	20.8	17.1
Average minimum temperature (°C)	10.0	9.6	10.9	12.7	15.8	19.6	22.1	23.0	21.2	18.4	15.0	11.8
Mean duration of bright sunshine (hours)	5.4	6.6	7.2	8.4	9.9	11.2	11.9	10.9	8.4	7.0	6.1	5.3
Sea level pressure (hPa)	1,019	1,018	1,017	1,015	1,015	1,015	1,015	1,015	1,016	1,017	1,017	1,019
Rainfall (mm)	79.4	68.9	39.7	18.7	11	7.3	0.2	11.2	59.2	77.6	89.1	84.8

Source: Malta International Airport Meteorological Office.

When athletes exercise or compete in a hot environment, their body temperature rises, triggering a sequence of heat-dissipating systems. Sweating is the most essential mechanism, since it accounts for up to 80% of the total heat lost during activity. Athletes generally run slower in hot and humid races because they must minimise their metabolic heat accumulation to compensate for the heat they absorb from the environment (Dr Louise Burke and Greg Cox, 2010).

When training in Malta and in hot climate countries, hydration is vital for nutrition and performance, as it replaces sweat losses. Staying hydrated is important for good health and athletic performance.

According to Dr Ramlan Abd Aziz (2010) dehydration reduces blood volume, resulting in reduced heart fullness and outflow. Less blood flows to the brain, heart and skeletal muscles when cardiac output is reduced, which may result in diminished performance.

Dehydration can also stifle the body's natural cooling systems, leading to hyperthermia. During endurance exercise, dehydration and heat can cause early exhaustion. When heat dissipation through perspiration is impeded in hot, humid conditions, the likelihood of these impairments increases. As a result, according toJ. Clifford and K. Maloney (2015) in these instances, taking precautionary actions is critical.

1.6 Malta’s Running Population

Malta hosted various competitions prior to the 2020 Malta Marathon in February. Since no national statistics are available on the size of the island’s running population, the author has considered evaluating how many participants took part in the half and full marathons in 2020 that are presented in table 2. The total number of participants distributed between the full and half marathons is 1622 runners.

Table 2. Participation of Maltese Athletes in Full and Half Marathon

Gender		Half #	Half %		Full #	Full %		Total #	Total %
F_23-34		179	12%		6	7%		185	11%
F_35-39		102	7%		4	5%		106	7%
F_40-44		108	7%		6	7%		114	7%
F_45-49		70	5%		1	1%		71	4%
F_50-54		42	3%			0%		42	3%
F_55-59		17	1%		2	2%		19	1%
F_60-64		10	1%			0%		10	1%
F_65-69		1	0%			0%		1	0%
F_70-74		2	0%			0%		2	0%
F_U23		9	1%			0%		9	1%
Sub total		**540**	**35%**		**19**	**22%**		**559**	**34%**
M_23-34		296	19%		9	10%		305	19%
M_35-39		198	13%		13	15%		211	13%
M_40-44		180	12%		21	24%		201	12%
M_45-49		129	8%		14	16%		143	9%
M_50-54		75	5%		5	6%		80	5%
M_55-59		43	3%		2	2%		45	3%
M_60-64		36	2%		2	2%		38	2%
M_65-69		12	1%		3	3%		15	1%
M_70-74		11	1%			0%		11	1%
M_U23		14	1%			0%		14	1%
Sub total		**994**	**65%**		**69**	**78%**		**1063**	**66%**
TOTAL		**1534**	**100%**		**88**	**100%**		**1622**	**100%**

Adapted by the author (Malta Marathon, 2020)

1.7 Research Questions

The following are the primary research questions that will be addressed in this study:

- What effect does nutrition have on an athlete's performance?
- What steps may be taken to help athletes improve their performance?
- Are athletes well-versed in the subject of nutrition?
- Athletes' culinary awareness about how to prepare food to obtain the greatest nutritional value

1.8 Research Hypothesis

The author wants to test whether Maltese runners follow a diet based on research and/or recommendations from coaches or specialists.

This study also aims to understand athletes' awareness of how nutrition affects their performance. It is assumed that runners who have a strong understanding of nutrition and follow a healthy diet will perform better and achieve superior outcomes.

1.9 Limitations

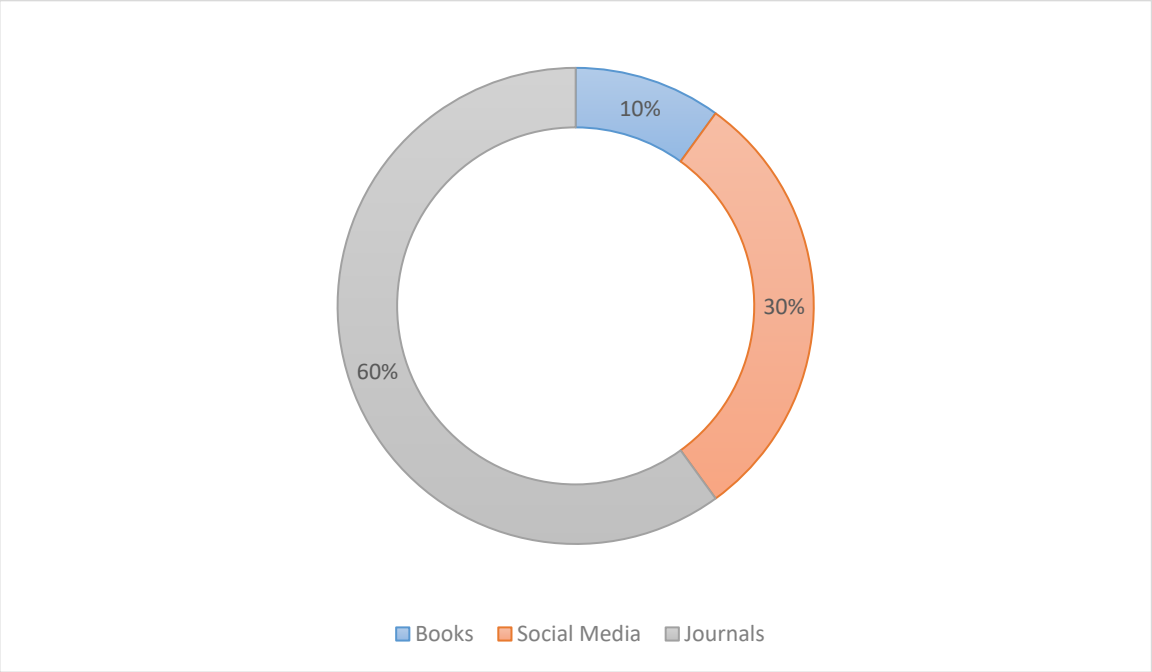
Malta does not have a public record of the population of long distance runners therefore the author had to make certain calcuated assumptions of such a population. The assumptions are based on participation in Malta's full and half marathon.

2. Literature Review

2.1 Introduction

The literature review aims to address the various ways in which food choices influence a long-distance runner's performance and how a well calibrated diet can improve the athlete's overall health and results. The author has obtained the information through various sports nutrition journals, books and social media. To understand the research better, this section discusses in detail the importance of nutrition for runners and the impact this has on their performance. Figure 1 shows a graphical representation of the sources used to obtain the literature review.

Figure 1: Sources used to obtain information for literature review



The nutritional intake will be subdivided into macro- and micronutrients, primarily carbohydrates, fat, protein, fluid, vitamins and minerals. A detailed look at specialised diets will ensue.

2.2 Nutrition for Runners

Necessary nutrients, particularly carbohydrates, have been recognised as important for endurance during consistent, long-term exercise since the early research of Christensen and Hansen (1939). To maximise muscle glycogen storage and improve performance and achievements, marathon runners must control their meals and training. A negative energy balance can be harmful and impair performance; thus, ensuring proper energy intake is critical (Helge, 2017).

Even though many athletes are nutrition-conscious and make extra efforts to eat healthily, certain food trends persist. From the local perception the author believes that most Maltese long-distance runners understand the need for a good diet, but this awareness is not often put into action. To this end, athletes seek techniques to increase their performance, such as a tailored, customised training programmes and improved diets (Jeukendrup, 2017).

Most Maltese athletes' nutrition and food intake comes from the Mediterranean diet, consisting primarily of fish, meat, vegetables and grains such as pasta, rice, pizza and bread. The tendency is to consume carbohydrate-rich meals three days before the race, such as toast in the morning, pasta for lunch and dinner comprising meat or fish with vegetables and potatoes (Geraldine Bartolo, 2020).

It is for this reason that the author felt it was important to investigate the dietary habits of Maltese long-distance runners and compare them to those of foreign runners, thus providing local athletes with options for the improvement of their nutritional status and performance. For this purpose, vegetarian, vegan, omnivorous and other diets will be studied. According to Obersby et al (2013) it has been implied in the past that vegetarian and vegan diets are low in several minerals, including vitamin B12, iron, zinc, calcium, omega-3 fatty acids and iodine. Some studies from the Medical University of Lubin Poland. Maziarz et al (2020) and the International Society of Sports Nutrition in the United States, Rogerson (2017) have shown that most of the shortages are caused by inadequate meal planning. This has been proven by great athletes around the world, such as Britain’s Naomi Mitchell and Fiona Oaks, who hold the four-time marathon world records; Michael Arnstein, who eats only fruit and 90% of Kenyan and Ethiopian athletes, who are vegetarian or vegan and nonetheless achieve excellent performance in their training and racing (Wirnitzer *et al.*, 2016). NURMI, (Nutrition and Running High Mileage) a worldwide multidisciplinary comparative study of running, also revealed similar results (Boldt et al., 2018).

A variety of philosophies exist in dieting. These include a focus on high carbohydrates, low or high glycogen, Mediterranean food, the Keto and low carbohydrate combined with high fats principles and many others. This renders it challenging to come up with the optimum

choice for marathon athletes or select the cooking methods most conducive to the maximum preservation of vitamins and minerals in the food.

2.3 Performance

The International Amateur Athletic Federation has consistently acknowledged the importance of food and nutrition programmes in assisting runners in achieving execution objectives. Monaco hosted the inaugural meeting on nutrition for athletics in 1995, with an update in 2007. Both sessions resulted in a consensus declaration regarding the significance of nutrition in the preparation and performance of track-and-field competitions. Individualisation was arguably the most frequently used word at the conference of the IAAF's 2nd International Consensus Conference on "Nutrition for Athletics," appearing in practically every presentation. The participants appeared to agree that the amount of energy, protein, carbohydrates, fat, micronutrients and water in sports diets should be tailored to the demand of athletes. General recommendations can be made, but should be followed on a case-by-case basis, considering the athlete's stage of maturation, sex, genetic factors, training stimuli and environmental factors, as well as data gathered from body composition, blood (iron) parameters, sweat loss and other sources (Burke et al., 2019).

Practice and knowledge of food varies over time and must be continuously improved and included in the preparation of athletes. In fact, since the last IAAF consensus meeting a decade ago, a variety of significant breakthroughs in sports nutrition have been acknowledged internationally by professional organisations such as the American College of Sports Medicine, Academy of Nutrition and Dietetics and Dietitians of Canada. The IAAF has recently commissioned an assessment of the present state of knowledge, attitudes/cultures, practices and the potential for the application of sports nutrition to athletics competitions. This statement presents a review of the current concepts of sports nutrition's "well-chosen food" and identifies tactics that athletes may employ to enjoy a long, healthy and productive career in their selected session, ultimately achieving their performance goal (Thomas, Erdman and Burke, 2016).

Nutrition alone is insufficient to increase performance significantly in long endurance sports. Muscle physiology plays a critical role in athletic performance, which is a complex phenomenon. Fatigue, which is related to muscle metabolic processes, is another critical component. By altering these factors and processes, exercise can be sustained for extended periods of time and overall performance can be significantly improved. The metabolic variables ATP, phosphocreatine, lactic acid, glycogen and carbohydrates are critical to sports performance maintenance and regulation, in addition to endurance (Jeukendrup, 2017).

According to research by Asker E. Jeukendrup, (2011), both muscle and liver glycogen can be depleted during longer-activity events and strategies to replenish these reserves before and during exercise by consuming high levels of carbohydrates have been proven to be highly effective in reducing tiredness and improving performance. Introduced in the late 1960s.,carbohydrate loading is renowned as one of the first nutrition strategies used to improve performance (Marcus, 2013). The manipulation of such variables inevitably impacts performance.

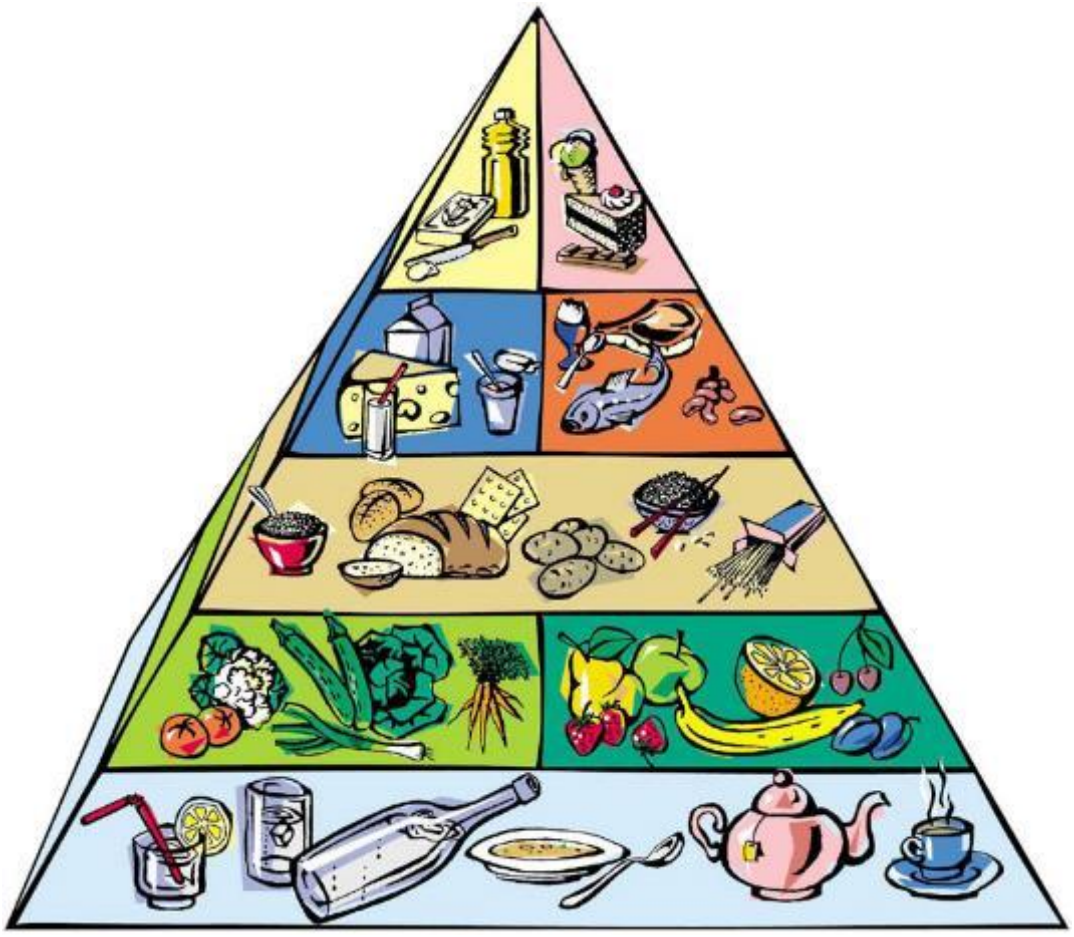
Adrian Sedeaud et al (2014) concluded that the Body Mass Index (BMI) is a useful indication in relation to performance in a study he conducted. Sedeaud also discovered that an athlete's BMI was connected to their achievements across many disciplines and levels of performance.

2.4 Nutrients Needed for Athletes

The body requires seven different types of nutrients: carbohydrates, proteins, fats, minerals, vitamins, fluid and fibre. Macronutrients are necessary for the metabolism and play an important role in distance running. Consuming healthy food and drinks is essential to a successful athletic performance. Figure 2 displays a food pyramid prioritising the consumption of certain foods over others. Athletes and non-athletes should consume the volume of macronutrients within the distribution ranges as follows daily: carbohydrates at 45-65 percent, protein at 15-25 percent and fat at 20-35 percent of the daily caloric intake, which is further explained in Figure 3.

Figure 2. Development and Validation of a Food Pyramid for Swiss Athletes

Figure 2 shows that fluid is the most important for hydration. Vegetables, grains, meat, fish and dairy products are important for carbohydrates, protein, vitamins and minerals. The least effective foods are at the top of the pyramid and comprise salty, sugary and generally unhealthy food.



Source (Mettler, Mannhart and Colombian, 2009)

2.5 Carbohydrates (CHO)

Carbohydrates are crucial for endurance athletes' balance and metabolism. The two forms of carbohydrates are simple carbohydrates, which come from fruit, milk, honey and sugar and complex ones, deriving from potatoes, pasta, cereals and other grain-rich foods. Once consumed, carbohydrates are converted to glucose. Following this, the glucose is converted to glycogen and stored in the liver and muscles. The body can store just a small amount of carbohydrates in the muscles and liver. The latter provides the athlete with enough energy for the first 90 minutes of physical activity. As a result, a long-distance runner's ability to maintain a high level of activity for the first 90 minutes is determined by the amount of carbohydrates stored as glycogen (Vitale and Getzin, 2019). This was also confirmed by Burke et al (2011) in their publication Nutrition for Distance Events.

Fruit and vegetables are sources of carbohydrates. They are also high in vitamins, minerals, antioxidants and anti-inflammatory compounds. According to Jen A. Miller (2010) and Dr.Zhaoping Li, Professor of Human Nutrition at UCLA medicine school, antioxidant and anti-inflammatory components in fruit and vegetables appear to help with muscle discomfort and injury prevention, whereas berries (blueberries, strawberries and raspberries), stone fruits (peaches, plums and cherries) and vegetables of various colours (sweet potatoes, red bell peppers and kale) are particularly high in anti-inflammatory compounds (J. Clifford and K. Maloney, 2015).

Fruit and vegetables can be consumed at any time, but if a person experiences gastrointestinal distress when running and/or competing in long races raw fruits and vegetables should be limited 24 to 48 hours before a long run. Instead, cooked versions of the above may be preferable. Beets could also help athletes' performance by increasing blood flow to fast-twitch muscle fibres, according to a study by PubMed database,(Ormsbee, Lox and Arciero 2013). Beetroot juice can help athletes improve their cardiorespiratory endurance by increasing efficiency, which improves performance over a wide range of distances and increases time to exhaustion at endurance intensities (Zamani et al., 2021).

Sugar (glucose) from simple carbohydrate meals reaches the bloodstream around half an hour after ingestion, according to (Ellingson et al 2010). As a result, consuming sugar or honey prior to an event to increase energy levels is ineffective.

According to Louise M Burke et al (2019), this higher sugar load induces pancreatic insulin production, resulting in a hazardous reduction in blood glucose levels within around a half-hour. Rather than increasing performance, sugary foods ingested prior to an event may cause the athlete to feel fatigued, nauseated and dehydrated.

Carbohydrate loading and consumption during endurance exercise can both help delay tiredness and increase performance. Following endurance training, consuming a suitable amount of carbohydrates can aid muscle regeneration.

Prior to an event, it was believed that a three to four-day glycogen depletion phase would be required, followed by a two to three-day glucose loading phase according to (Mahmud et al 2019).Further analysis revealed that the glucose depletion phase was not required to achieve maximum glycogen storage. Apart from the fact that the depletion phase is unnecessary, research indicates that only one day of high carbohydrate intake is required to achieve near-maximal glycogen reserves in muscle. Carbohydrate loading is now defined as increasing carbohydrate intake the day before an event while decreasing or avoiding activity. Carbohydrate loading and a pre-race meal high in carbohydrates enable a person to run for longer lengths of time before feeling weary. According to one study by Douglas J. Casa et al (2019), runners who consumed more than 10-12 g/kg body weight of carbohydrates the day before a race outscored those who consumed less according to Louise M Burke et al (2019).This was also confirmed by (Williamson, 2016).

2.6 Low and High Glycogen

Carbohydrate needs for long-distance runners are diverse and complex. Low glycaemic index (GI) foods are rather controversial in this respect. In principle, such foods provide a steadier supply of glucose to the body than meals with a high glycaemic index. Several trials have proven that consuming low-GI meals before exercise improves endurance performance. However, such results are somewhat contentious, as other studies by Donaldson, Perry and Rose (2010) have demonstrated that low-GI meals before exercise have no influence on endurance performance. Additionally, another study by the department of Sports Nutrition at the Australian Institute of Sport found that when carbohydrates are consumed during exercise, the GI of the pre-event meal had no effect on endurance performance (John A. Hawley, 2014).

According to Durkalec-Michalski et al (2018) a low-carbohydrate diet may potentially impair performance if followed for an extended length of time. If there are benefits to managing glycogen stores for workouts, these are likely to emerge naturally because of a top runner's high-volume programme's periodisation. According to Burke (2010) the train low, race high idea is based on human genetic evolution and proposes that having low muscle glycogen levels may benefit performance. In another study, scientists uncovered many exercise genes that play a role in adaptation to exercise and training. These genes may aid athletes in adjusting to a carbohydrate-restricted environment (Impey et al., 2018).

A study by John A. Hawley (2014) hypothesised that beginning endurance-based exercise with a low glycogen availability would result in a more favourable adaptation to training than performing the same workouts with normal muscle glycogen levels. This notion appears to contradict the long-held belief that athletes who engage in lengthy, intense endurance training should always consume a high-carbohydrate diet. However, some modifications to the sports nutrition recommendations for CHO consumption in the athlete's everyday diet have been made (Jeukendrup, 2017). Rather than suggesting a high-CHO diet for all athletes, current recommendations advocate for a scale ranging of CHO consumption that corresponds to the athlete's anticipated training and recovery fuel costs (Burke et al., 2011). Finally, research on alternative "train-low" strategies has lasted only a few months, with little or no consideration given to incorporating experimental interventions into an athlete's competitive periodised training cycle. Before conducting lab-based research on "train-low," it should be investigated whether successful athletes have previously created effective nutrient-training practices that boost endurance performance (Dr Louise Burke and Greg Cox, 2010).

2.7 Fat

Fat is involved in a multitude of bodily activities: for instance, it is used as a source of energy during strenuous exercise. Since marathon runners exercise for extended periods of time, fat is a critical component of their diet. Additionally, fat aids in the delivery of a variety of vital micronutrients, including vitamins A, D, E and K. Vitamins are involved in a range of processes, including metabolism, immune function, cellular maintenance, and a variety of other functions. As a result, they play a significant role in a diet. Marathon runners should be able to obtain adequate vitamins and fuel from a diet that contains between 20 and 35% fat. According to Williamson (2016), the athlete's ability to consume stored fats is dependent on the duration of the event and their condition; the better trained the athlete, the better will the fats be absorbed.

There are healthy fats such as avocado, olive oil, coconut oil, nuts and almond butter, as well as unhealthy ones such as saturated/trans fats found in butter and margarine, fried foods, cheese and high-fat meats.

Endurance exercise is known to improve an athlete's fat oxidation capacity during exercise. Fat oxidation contributes the most to energy expenditure at low to moderate intensities of activity. The body can adjust to utilising fat at higher rates after 2–3 weeks on this diet, conserving more carbohydrates (Jen A. Miller, 2010).

2.8 Protein

Proteins are the body's third source of energy after carbohydrates and lipids. Consuming an adequate amount of protein prior to and following an exercise routine is also critical. Skeletal muscle tissue has a remarkable capacity to adapt to changes in muscular use. As a result, long-distance athletes will be able to improve their performance (Luc J C Van Loon, 2014).

The amino acids and proteins that comprise the body's building blocks include actin and myosin filaments, which are responsible for muscle fibres (Moore *et al.*, 2014).

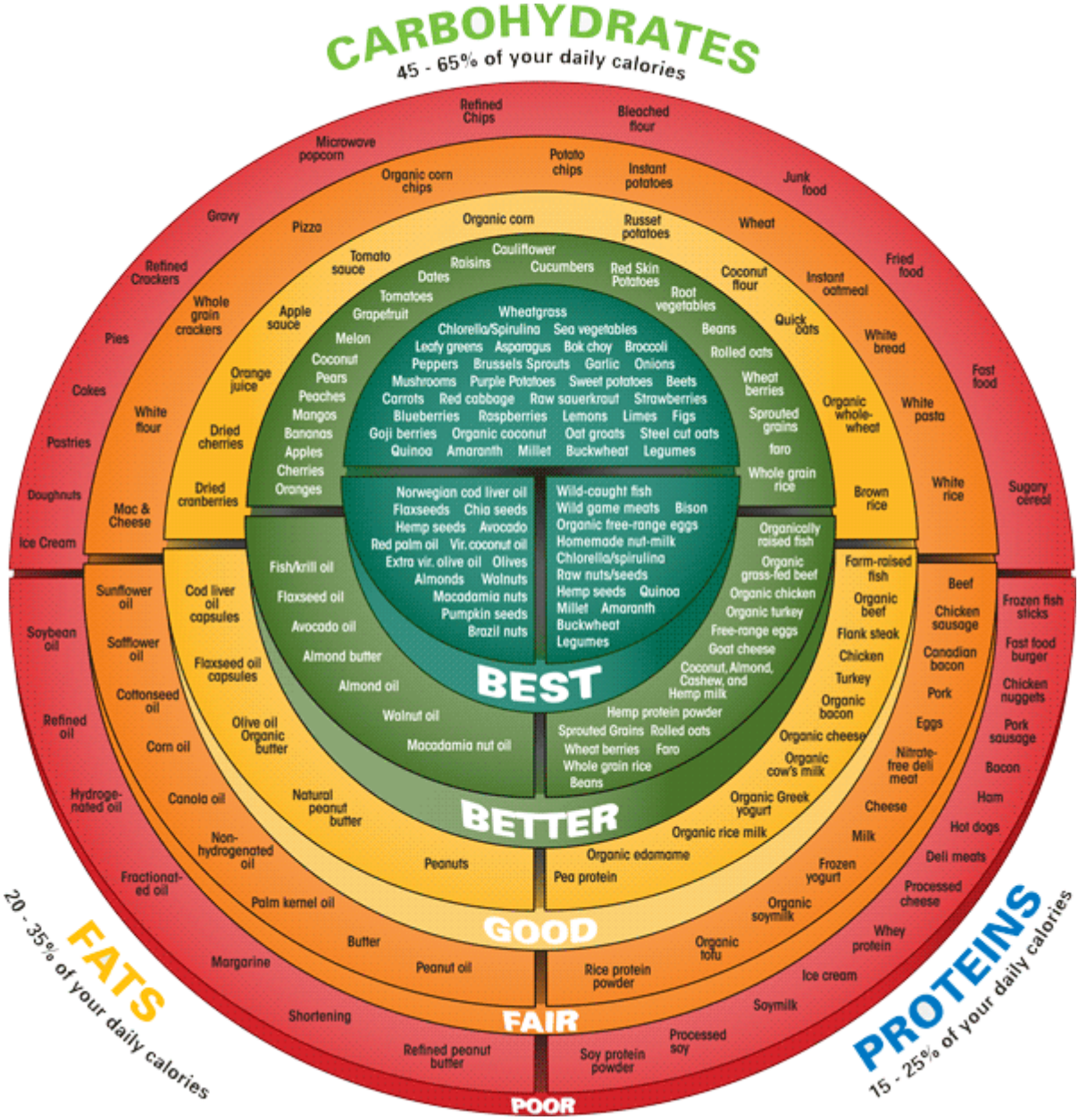
To increase training effectiveness, significant effort is being made to fine-tune and create nutritional strategies that can enhance the adaptive response to extended exercise training. The current RDA for protein is 0.8 grammes per kilogramme of body weight per day. On the other hand, the Academy of Nutrition and Dietetics and the American College of Sports Medicine recommend that endurance athletes consume between 1.2 and 1.4 grammes of protein per kilogramme of body weight per day, while resistance and strength-trained athletes need between 1.2 and 1.7 grammes (J. Clifford and K. Maloney, 2015).

As calorie intake rises, a diversified diet should offer more than enough protein. Vegetarian athletes, on the other hand, should consult a dietician to ensure that their protein consumption is adequate. Excess protein might deplete more efficient fuel sources and cause dehydration in athletes. High-protein meals increase the amount of water required to excrete nitrogen through the urine and strain the kidneys (Williamson, 2016).

Additionally, an increase in the metabolic rate and, as a result, higher oxygen consumption may occur. Supplementing with protein and amino acids is unnecessary and inadvisable. The best approach is to eat entire meals, such as fish, poultry, lean meat, nuts, milk, beans, steak, pork, dairy, eggs, barley, soy and quinoa, rather than supplements. Before continuing to use supplements as a meal replacement, athletes should check with their doctor or a qualified dietitian (J. Clifford and K. Maloney, 2015).

This nutritional chart in Figure 3 below appears in the On Target Living book. It divides each macronutrient - carbohydrates, lipids and proteins - into designated parts. The inner blue circle represents the best foods, followed by the green, yellow, orange and red circles respectively.

Figure 3. Nutritional Chart



(Chris Johnson, 2013)

2.9 Fluids, Dietary Supplements and Ergogenic Aids

According to Jeukendrup (2017), maintaining proper hydration is critical both throughout training, during and after the event itself. As everyone's hydration demands vary based on age, body shape, body composition, gender, external temperatures and fitness level, it's impossible to create universal standards on fluid consumption for long-distance athletes Asker E. Jeukendrup (2011).

A study by Douglas J. Casa et al (2019) maintains that water is also a crucial nutrient for athletes. Individuals lose different amounts of water during sporting events held, for instance, at destinations featuring hot climates, such as the World championship in Doha IAAF 2019 or Tokyo Olympic Games 2020 (Dr Louise Burke and Greg Cox, 2010). Sweat loss can be monitored by weighing yourself before and after the activity concerned. J. Clifford and K. Maloney (2015) recommend that athletes drink 5 to 7 mL per kilogram of body mass four hours before an event to avoid dehydration. They should subsequently consume cooled water or electrolyte drinks throughout the event, imbibing enough to replace sweat losses. Fluids that are chilled are absorbed more quickly and help to reduce body temperature (Impey *et al.*, 2018).

When considering water use, it is critical to consider environmental problems. In hot and humid weather, sweat rates can increase considerably, making it even more critical for an athlete to stay hydrated. Competing at high altitudes necessitates more water (Williamson, 2016).

Ergogenic assistance refers to a product or method that enhances athletic performance, often through physiological or psychological causes. Examples of these are protein powder and carbohydrate powder, creatine supplements, beta-alanine, essential amino acids, electrolytes and caffeine. Caffeine levels should be monitored by athletes who consume sports or energy beverages. Caffeine has been demonstrated to improve athletic performance by moderate doses, consuming 3-6mg/ Kg between 30 to 90 minutes before training, according to Vitale and Getzin,(2019). Athletes should, however, exercise caution when it comes to ergogenic devices that claim to improve sports performance. Numerous claims are unsupported and certain aids may be hazardous or impair performance (J. Clifford and K. Maloney, 2015).Caffeine use, on the other hand, can cause insomnia, restlessness and ringing in the ears. It also works as a diuretic, making urination more frequent often during competition (Louise M Burke *et al.*, 2019).

Fluids are frequently paired with carbohydrates and electrolytes during a race. This supplies carbohydrates with energy while simultaneously replacing electrolytes and fluids lost via sweating. Electrolytes and carbohydrates, on the other hand, aid in fluid absorption. In this way, sports drinks with electrolytes and carbohydrates help to maintain fluid and electrolyte

balance while also giving exogenous carbohydrates. Multiple transporter carbs may also play a role in absorption; some research suggests that eating glucose and fructose together during endurance activities can boost absorption even more than glucose itself (Lauren Flynn, 2014).

For marathon runners, electrolytes are a crucial part of nutrition to consider. Electrolytes such as sodium and potassium are important for muscular function. People may have serious repercussions if levels are too high or low, including collapse, heat-related sickness and muscle cramping. Sweat contains sodium and potassium, and athletes who exercise for long periods of time may lose considerable amounts of these electrolytes, which must be replaced. Electrolyte-containing sports drinks are widely available and can aid marathon runners in maintaining electrolyte balance. There is a variety of electrolyte drinks and energy gels available to runners these days. Sports beverages prepared with matcha tea powder and pleasant-tasting gels can aid athletes cover a greater distance Ready-prepared electrolyte drinks and energy shots are convenient, however, athletes are encouraged to prepare their own homemade versions. An example of this is the Limey Pineapple drink recipe by Matthew Kaeley (2020) which is composed of 2 cups water,1 cup pineapple juice,1 tablespoon fresh lime juice and 1/8 teaspoon salt.

2.10 Vitamins and Minerals

Maintaining suitable vitamin and mineral levels is critical for body function and sports performance. As an athlete's activity level rises, so does the need for certain vitamins and minerals. This requirement, however, can easily be met by consuming a well-balanced diet that includes a range of foods. There is no evidence that providing supplements to increase vitamins by means of a varied diet can improve performance (J. Clifford and K. Maloney, 2015).

According to Williamson (2016) calcium as well as vitamins D, C, E and B, iron, zinc, magnesium, beta carotene and selenium, all of which have antioxidant characteristics, are vitamins and minerals that athletes should pay special attention to. Vitamin D and calcium are crucial for bone tissue formation, maintenance and repair, as well as nerve conduction modulation and skeletal muscle development and homeostasis. Low bone mineral density and stress fractures are linked to a deficit in both calcium and vitamin D.

Exercise causes the body to experience more oxidative stress, which increases the requirement for antioxidant vitamins such as C and E. Vitamin C and B-complex vitamins are water-soluble, non-storable vitamins that must be eaten daily. These micronutrients are readily damaged or washed away during food preparation and storage. Numerous foods include B-complex vitamins, including cereal grains, meat, chicken, eggs,

fish, milk, legumes and fresh vegetables. Vitamin C is abundant in citrus fruits, peppers, strawberries, potatoes, broccoli and kiwi. The use of mega doses of multivitamins or dietary supplements is not advised. Vitamin E is a fat-soluble vitamin that can be found in a variety of foods, including nuts, seeds, and vegetable oils. Excess fat-soluble vitamins (A, D, E, and K) are stored in fat throughout the body when consumed in excess. Excessive doses of fat-soluble vitamins can be hazardous since they are stored (J. Clifford and K. Maloney, 2015).

B vitamins, particularly vitamin B12 and folate, play a role in energy production as well as the growth and repair of muscle tissue. Anaemia is caused by a deficit in either of these nutrients, which can significantly impair deferment of exhaustion and, as a result, endurance performance. Since vitamin B12 is obtained from animal products such as meat and dairy, vegetarians and vegan athletes may need to take vitamin B12 supplements (Williamson, 2016).

Magnesium, iron and zinc are the three most essential elements for a healthy body and optimal athletic performance. The explanation relating to the importance of these three properties in terms of athletics is given below.

2.11 Iron

According to the Academic of Nutrition and Dietitian Canada (2016) with or without anaemia, iron deficiency can affect muscle function and reduce work capacity, resulting in poor training adaptation and athletic performance. Limited iron intake from haem dietary (iron comes from animal proteins) sources and in sufficient calorie intake (about 6 mg iron taken per 1,000 kcals) are common causes of suboptimal iron status. All female athletes' iron requirements could be increased by up to 70% of the projected average requirement. Distance runners and vegetarian athletes, for example, should be evaluated on a regular basis and strive for an iron consumption exceeding their RDA (ie, >18 mg for women and >8 mg for males) J. (Clifford and K. Maloney, 2015).

2.12 Zinc

Zinc is important for muscle regeneration, energy metabolism and immunity. Zinc deficiency can cause thyroid hormone levels to be disturbed, lowering metabolic rate and performance. Athletes are at higher risks of having insufficient zinc levels and should attempt to consume enough zinc through zinc-rich meals. Shellfish, green leafy vegetables and seeds are all high in zinc. Athletes should get advice from their health care practitioner as to whether supplements are required (Williamson, 2016).

2.13 Magnesium

According to the US National Institutes of Health Stella Lucia Volpe (2015), magnesium has numerous advantages for athletes trying to increase their performance. Energy production, muscle rehabilitation and bone formation all require this mineral. It protects athletes from oxidative damage, which is exacerbated by the energy generated while they run. It also serves as a smooth-muscle relaxant and helps mental stress resistance. Magnesium may also aid in the reduction of lactic acid build-up during intense workouts. Magnesium deficiency can cause fatigue and muscle spasms or cramps. To avoid this, individuals should consume between 300 and 400 milligrams of magnesium per day. Leafy greens are high in magnesium, which can be ingested by incorporating a large handful of spinach or kale into a post-run smoothie or salad. Magnesium is also found in nuts and seeds (Stella Lucia Volpe, 2015).

2.14 The Timing of Food

The timing of eating is just as important as what is consumed. An essential initial step for any athlete to take is to determine the kind of nourishment that is best suited to them. This involves not only the matter of range, but also timing. Several weeks prior to the event, the long-run training should be chosen, and the schedule built accordingly. Experimenting with various foods is also essential, including the consideration of alternative products if standard ones prove inappropriate. Nutrient timing entails meticulous planning and the use of entire foods, fortified foods and dietary supplements.

2.15 Eating Before Training and Competitions

When compared to exercising during a fast, eating before a competition can improve performance. Three to four hours prior to the event a pre-game meal should be consumed to ensure maximum digestion and energy supply. Most specialists counsel small pre-event meals of 500–1,000 calories. The diet should be sufficient but not excessive, as both hunger and undigested food should be avoided. Fasting during practice or races may consequently put athletes at risk (Maughan, 2010).

The food must be loaded in starch, as it is more quickly digested than protein and fat. Examples of starchy food include bread, cold cereal, pasta, fruit and vegetables. These are digested at a rate that supplies the body with consistent energy and are evacuated from the stomach in two to three hours.(Asker E. Jeukendrup, 2011).

Foods high in sugar cause a quick high blood glucose level, followed by a fall in blood sugar and decreased energy. Additionally, intense sweets can drag fluid into the GI tract, resulting in dehydration, cramps, nausea, and diarrhoea (Louise M Burke *et al.*, 2019). Carbohydrate consumption one and a half to two hours before an event should be avoided. This may result in an early depletion of glycogen reserves during endurance events.

Before the event, food should be fat-free. Fat as well as meals high in fibre and lactose take longer to digest.

It is critical to consume familiar foods prior to an event to ensure that they can be tolerated prior to exertion.

At least one long training run at the same time as the marathon's start time should be planned as far as marathons are concerned. This provides sufficient time to plan when and what to eat on race day.

2.16 During a Run

Hydration poses a considerable risk of dehydration throughout a half-marathon, so that collecting water or a sports drink along a run is beneficial (Sygo, 2011).
Carbohydrate mouth rinses have been demonstrated to boost performance sufficiently appropriately (Jeukendrup & Chambers, 2010). This suggests that carbohydrate eating during exercise has benefits beyond its traditional metabolic benefit and may also act as a positive afferent signal capable of influencing motor activity (Gant, Stinear, & Byblow, 2010). These findings imply that it may not be essential to consume substantial amounts of carbohydrates during exercise lasting 30–60 minute, and that a carbohydrate mouth rinse may be adequate to achieve a performance gain. In most cases, the performance effects of the mouth rinse were comparable to those of consuming the drink, therefore there does not appear to be a disadvantage to imbibing the drink. However, athletes may experience gastrointestinal distress if they consume too much fluid. Carbohydrates become a highly significant fuel when the workout or event lasts more than 2 hours (Asker E. Jeukendrup, 2011).

2.17 After a Run

The after-run competition food guidelines are the same regardless of age, gender or sport. (Thomas, Erdman and Burke, 2016) While sustaining a carbohydrate-rich diet is critical for marathon training, other factors such as recuperation become increasingly vital, especially if training occurs on consecutive days. When possible, snacks that contain both protein and carbohydrates should be consumed, ideally during the first half-hour following the long run or cross-training activity to aid in muscle repair and glycogen replenishment. According to Jennifer Sygo (2011), a nutritionist/ dietitian with Cleveland Clinic Canada, chocolate milk is a popular choice. This possesses more sugar than other beverages, but studies Sygo (2011) suggest that it aids in recovery. However, fruit-flavoured yoghurt, banana and berry protein shakes, or indeed a lean meat sandwich are also viable possibilities. In general, monitoring fat consumption during recovery is vital, since it can hinder digestion and healing. To this end, items such as nuts, cheese, peanut butter or nuts are best temporarily avoided.

The purpose of Table 2 is to direct athletes towards their ideal nutritional intake of carbs, protein and fat measured per 1 kilo of body weight and water before, during, and after exercise in order to maintain optimal performance and outcomes.

Table 2: Nutritional Intake Pre, During and Post Exercise

Nutrient	Pre-Exercise	During Exercise	Post-Exercise
Carbs	8–10g per 1 kg of body weight/day (1–4 h prior to event)	30–60 g run more than 90min	1.0-1.2g per 1kg body weight within 30min after training finish
Protein	0.3 g per 1kg prior (or post–exercise)	0.25 g per1 kg body weight (if high intensity/eccentric exercise)	0.3 g/kg within 0–2 h
Fat	20% total caloric energy Avoid Fat during pre-exercise and carb loading		
Water	2Lt- 3lt Daily, adapt to changes among individual athletes (body temperature, sweat, body weight, urine colour, and climate)		

Adapted by the Author(Vitale and Getzin, 2019)

2.18 Cooking Methods and Special Diets

The way in which food is cooked has a significant impact on the number of nutrients contained within it. However, the choice of diet by an athlete in order to maintain health and perform well during training and competitions appears to be irrelevant. While certain foods can be consumed raw, others must be cooked to eliminate bacteria that might cause food-borne illnesses.(Yong, Amin and Dongpo, 2019) Healthy cooking methods include the following:

- Poaching, which refers to the process of cooking a food item in a tiny amount of hot water just below the boiling point. While this method takes significantly longer, it is an excellent method for gently cooking delicate goods such as fish, eggs or fruit.

- Grilling is an excellent approach towards obtaining maximal nutrition without losing flavour. It requires little additional fat and offers a smoky taste while maintaining the juices and tenderness of meat and vegetables.

- Boiling is a simple process that requires only water and a pinch of salt. However, in addition to the high temperatures, the significant amount of water dissolves and washes away water-soluble vitamins and between 60% and 70% of food minerals. While this method is effective in dissolving vitamins and minerals in some foods, many antioxidants are more readily available when heated. It is critical to avoid overcooking the food, especially vegetables.

- Steaming vegetables, fruit and fish fillets allows them to cook in their own juices and maintain their natural goodness. It's always a good idea to start with a sprinkling of salt or a squeeze of lemon juice. Steaming protects nutrients, such as water-soluble vitamins, from the effects of water and heat.

- Microwaving is an effective method for fast and efficiently cooking food if microwave-safe containers are used. Due to the short cooking time and minimal water used, just a small amount of nutrients is lost.

2.19 Special Diets

Keto dieters derive around 80 percent of their energy from fat and nearly none from carbohydrates, the source of fuel that the body and brain like to use first since it is the quickest and easiest to reach. The keto diet's staples include fish, meat, eggs, dairy, fats and green vegetables. Even nutritious complex carbohydrates such as whole-wheat pasta, rice, potatoes and fruit are prohibited (Heather Mayer Irvine, 2020).

The effect of a ketogenic diet on sports performance has inspired considerable curiosity and consciousness during the last three to four years. A keto diet is defined by a low carbohydrate (20–50 g/d), average protein and high fat (>75–80% energy) intake, with a suggested and demonstrated preference for both saturated and monounsaturated fatty acids (Cao *et al.*, 2021).

Many athletes want to increase their capacity to use stored fat to generate energy throughout training, especially in long-distance running. Furthermore, studies by Klement et al (2013) indicate that KDs at submaximal training intensities drastically switch the substrate utilisation from glucose to fat. The ability to maintain exercise performance at these intensities while allowing for a few weeks of KD adaptation was further demonstrated. Reduced dietary carbohydrate intake does not appear to constitute a performance barrier for runners. Additionally, there was a change in body composition, as seen by noticeably increased phase angles and a reduction of fat mass. Unfortunately, there is little research on how KDs affect healthy, athletic people (Heather Mayer Irvine, 2020).

Vegan and vegetarian diets have grown in popularity over the last few decades for a variety of reasons, including health, performance, ethical and environmental concerns. While it has been observed that vegan/vegetarian diets have a lower bioavailability of some nutrients than mixed/Western diets, it is generally established that plant foods often include larger levels of carbohydrates and antioxidants, which benefit endurance performance. While most vegetarian athletes reach recommended daily intakes of total protein, their diets frequently contain less protein than those of nonvegetarians. As a result, studies such as that by Wirnitzer et al (2021) demonstrate that some individuals may require additional protein to meet training and competition requirements. Protein content in plant-based diets should be sufficient if a variety of meals with sufficient energy are consumed. Individuals who abstain from all animal proteins, such as milk and meat, may have concerns about protein quality. Vegetarian athletes should consume around 1.3 to 1.8 g of protein per kilograms of body weight each day. According to Wirnitzer et al (2021) in a recent survey, around 10% of marathon runners consume vegan or vegetarian foods, and data suggests that

vegan/vegetarian diets are more prevalent among marathon runners. However, it has been noted that while there is no difference in diet quality ratings amongst runners of various race distances, vegan and vegetarian runners had higher diet quality scores than their omnivore counterparts. Given the well-documented relationship between diet types and distance running, it appears that endurance runners' training and racing habits may be influenced by their diet types of choice. Therefore, vegetarian runners may be at danger of deficiency in energy, lipids, vitamins B-12, D, riboflavin, calcium, zinc and iron - all of which are abundant in animal proteins - if they do not consume the proper nutrition(Boldt et al., 2018).

The Mediterranean diet (MD) is largely recognised as a healthful eating pattern by the scientific community for active and non-active people. Ancel Keys, an American biologist and nutritionist, was the first to define the MD as a collection of eating habits traditionally practised by residents of olive-growing regions bordering the Mediterranean Sea, characterised by a low saturated lipid diet that provided protection against coronary heart disease by lowering plasma cholesterol levels. Its beneficial health and preventative effects are likely due in part to a high intake of bioactive chemicals found mostly in vegetables, fruits, nuts, whole grains and legumes, which may have anti-inflammatory properties due to their antioxidant profile. Additionally, the MD often minimises meat and animal products and regular consumption of fish may help reduce hazards (Bifulco, Cerullo and Abate, 2019).

2.20 Allergies and Intolerances

Runners who have been identified with food intolerances or allergies may need to make dietary adjustments to prevent risk of foods or allergens that cause symptoms. According to Lis, Kings and Larson-Meyer (2019), recent observations indicate that food intolerances in runners seems to be on the rise. However, shellfish, peanuts, tree nuts, fish, mustard seeds, cow's milk, eggs, wheat, and soy are the most prevalent food allergens. In addition to gluten sensitivity, fructose and lactose malabsorption caused by inadequate enzyme and transporter functionality are the most frequently reported food intolerances.

Athletes with food intolerances or allergies prefer to omit particular meals to limit the chance of an allergic response or prevent the onset of gastrointestinal issues (vomiting, bloating, diarrhoea, nausea, cramps and heartburn) during exercise. Up to between 30 and 50 percent of endurance athletes suffer from gastrointestinal issues that affect their performance or subsequent recuperation. To replace wheat with carbohydrate loading, ideal foods are quinoa, chickpeas, rice, lentils, beans, gluten-free pasta and bread. Given that the intensity of gastrointestinal distress influences performance and overall competitive success, post-exercise mesenteric blood flow plays a crucial role in meal selection both before and during competition. Nutrition should promote quick stomach emptying, absorption of water and nutrients and sufficient intravascular circulation. Before a competition, athletes typically alter their diet and food preferences to minimise stomach pain (Malsagova et al., 2021).

2.21 East African Marathon Athletes Vs Western Marathon Athletes

African runners have achieved some of the most astounding performances in world-class sporting events over the last four decades, as evidenced in tables 3 and 4, which display the top performing winners in the marathon and half marathon grouped by gender and country.

During the last four decades, Africans' dominance has grown increasingly strong. Kenyan runners are the best long-distance runners. According to one particular study by Larsen and Sheel (2015), athletes from a single ethnic group, the Kalenjin clan, who live at a high altitude, have won around 40% of all important national middle- and long-distance running championships. Kenyan runners are overall the world’s best in road races. Kenyan athletes in general eat a limited variety of foods. Most of their nutrients come from vegetables, bread, boiled rice and porridge, poached potatoes, cabbage and kidney beans. These

provided the bulk of their calories, accounting for 23% of the daily intake. Ugali is the Kenyan Staple dish made from maize flour (cornmeal) and water. Kenyan athletes eat this nearly every night for dinner. It's usually served with vegetables and a chicken or beef stew.

Kenyans consume meat, particularly beef, in tiny quantities. Daily, a large volume of tea with milk and sugar is also enjoyed. Mursik, a spicy fermented milk akin to kefir, is the most popular drink. Kenyans enjoy their tea (tea consumption resulted as higher than water consumption – 1.243 litres per day on average), and love to drink it with a great deal of milk and sugar. Kenyan endurance athletes absorb significantly less fluid and energy than the recommended amount. Fruit provides a substantial portion of this sugar. Kenyans eat fruit immediately after most runs, most commonly cantaloupe, honeydew, and watermelon. The fruit's simple sugar and water expedites glycogen delivery to their muscles after an exercise routine. While a Kenyan runner's diet may appear harmful at first glance due to the sugar involved, Kenyans actually follow a nutritious diet with no supplements. Vegetables were seen to provide 86 percent of daily calories, whereas animal items provided 14 percent. Furthermore, the runners lacked access to junk food. Their diet closely resembles that of a prominent sports nutritionist and consists primarily of natural, whole foods with a high carbohydrate consumption, enough protein intake and excellent meal timing (Louise M Burke *et al.*, 2019).

Ethiopian runners have a recent international distance running success record that is second only to Kenya's. Excellent Ethiopian athletes, like Kenyan ones, hail from a single ethnic group in the Ethiopian province of Arsi (Hawley *et al.*, 1995).

Arsi is located at a high altitude and is home to about 5% of the country's population.

Ethiopian athletes consume a diet similar to that of Kenyan athletes, consisting of plant-based whole foods. The athletes' protein consumption is relatively modest. However, athletes appear to consume meat more frequently than their Kenyan counterparts. Their diet was also generally found to be more flavourful, with chilli and other spices infusing the food. Ethiopian staples include injera, a cereal prepared from teff flour that is rich in protein and fibre, low in carbohydrates and calories, thus providing an excellent source of calcium, iron, manganese, vitamin C and amino acids. Shiro, a chickpea or wide bean stew prepared with tomatoes and spices and Beyanetu, a combination of numerous spicy lentil meals, some of which include potatoes, beets, and cabbage, are examples of popular meals. Tibs-style slices of meat, typically goat or beef, are also commonly consumed. Snacks consist of apples, mangos and bananas. Coffee, often black and tea with a great deal of sugar are consumed, together with fruit juices made from papaya, mango, and avocado. The diet is exceptionally rich in unprocessed complex carbohydrates, fibre, vitamins and macronutrients (Beis *et al.*, 2011).

The composition of the Kenyan diet fulfilled most recommendations for endurance athletes for CHO, fat and protein intake. The diet was evidenced as very high in carbohydrates

(76.5%, 10.4 g/kg BM per day and, correspondingly, very low in fat at 13.4%). This is in stark contrast to the macronutrient content of distance runners from industrialised countries (Beis *et al.*, 2011).

For example, the CHO intake of élite distance runners in the United States, the Netherlands, Australia and Southern Africa was 49%, 50%, 52, and 50% respectively. This difference in carbohydrate and fat intake between industrialised and non-industrialised countries has been attributed to the greater availability of foods in industrialised countries.

The highest percentage of men's long-distance world-class athletes hail from Kenya, which is ranked first in the world for marathons, followed by Ethiopia and Japan, as seen in table 3 below.

Table 3: Male - World ranking for marathon and half-marathon runner winners.

Country	%
Kenya	33%
Ethiopia	28%
Japan	17%
Eritrea	7%
Spain	2%
Israel	2%
Marocco	2%
Tanzania	2%
Belgium	1%
Brasil	1%
Germany	1%
Italy	1%
Netherlands	1%
Russia	1%
USA	1%

(World Athletics | World Rankings | Men's Marathon (Half Marathon-25km-30km), 2022)

Ethiopia also places top in the global woman marathon rankings, followed by Kenya and Japan, as seen in Table 4.

Table 4: Female - World ranking long-distance runners' winners

Country	%
Ethiopia	35%
Kenya	22%
Japan	16%
USA	6%
Great Britain	2%
Germany	2%
Poland	2%
Romania	2%
Austria	1%
Bahrain	1%
China	1%
Eritrea	1%
Ireland	1%
Israel	1%
Italy	1%
Namibia	1%
Netherlands	1%
Peru	1%
South Africa	1%
Russia	1%
Switzerland	1%

(World Athletics | World Rankings | Women's Marathon (Half Marathon-25km-30km), 2022)

Kenyans are known to be ranked as the best athletes in the world in general in the male categories. In the female ones, however, they are outranked by the Ethiopians. Japan places third in both the male and female groups.

2.22 Conclusion

This chapter has considered a selection of the pertinent literature on nutrition for long-distance runners, particularly delving into how nourishment relates to performance, as well as the nutrients needed by athletes. This includes carbohydrates, low and high glycogen,

fat, protein, fluids, dietary supplements, vitamins and minerals. The author also perused further literature about the timing of food consumption in competitions and training, in addition to the cooking methods and special diets adopted by world leading athletes, such as East African runners. The study is being carried out to undertand Maltese athletes' food and hydration consumption. The author embarked on primary research to establish this knowledge and publish it as part of this dissertation. It is, however, assumed by the author that the predominant diet utilised by Maltese athletes tends to be the Mediterranean one.

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3. Methodology

3.1 Introduction

This study has been guided by the following research methodologies and procedures. The author believes that the combination of qualitative and quantitative approaches resulted in the best strategy to collect the necessary data for this research. According to Navarro Sada and Maldonado (2007), combining qualitative and quantitative data can enhance an evaluation by ensuring that the constraints of one form of data are balanced by the advantages of another. While quantitative procedures are useful due to consistency, objectives and comparisons, qualitative methods provide an assessment of the participant's perceptions of reality and can be utilised to learn about their actual experiences in life (Petrovic, Koprivica and Bokan, 2017).

3.2 Research Question

The author aims to investigate the nutritional habits of long-distance runners in the Maltese environment, thus shedding more light on the topic in question, given the fact that there is very limited information on the subject.

3.3 Quantitative (Survey)

This study's primary research instrument consisted of a questionnaire which was sent to the target population comprising long-distance runners. The survey instrument (questionnaire) was designed to investigate the diets, eating behaviours and nutrition-related views of athletes to address the key components of the research hypothesis:

“The author wants to test if Maltese runners follow a diet based on research and/or recommendations from coaches or specialists.

This study also aims to understand athletes' awareness of how nutrition affects their performance. It is assumed that runners who have a strong understanding of nutrition and follow a healthy diet will perform better and achieve better outcomes.”

The researcher conducted an online survey. This was distributed either directly to the athlete or shared via running clubs and/or posted on social media.

The sample comprises a mixture of athletes ranging from professional to leisure long-distance runners with various demographic backgrounds.

The questionnaire was designed to appear straightforward, unconvoluted and interesting. A brief statement describing the goal of the study and the researcher's name and surname was included at the top of the document. The questionnaire contained a total of 42 questions organised into two sections. The first concerned food and fuel consumption before, during and after training or competition, as well as meal planning, special diets, supplements and cooking methods. The last section included demographic information such as gender, age, height, weight, occupation, etc.
The questions included a combination of multiple-choice, single-response and Likert scale formats.

3.4 Study

The study will seek the insights from the following:

3.4.1 Runners

3.4.1.1 Selective runner

The first runner interviewed for the in-depth interviews is Malta's current best long-distance runner. She has won numerous medals, including 2 gold ones in the 5000 and 10000m races at the Small Nations Games in Montenegro.

3.4.1.2 Selective runner

The second runner was chosen because of his victory in various full- and half-marathons in Malta. He has also represented Malta on various occasions during such events.

3.4.2 Coaches

3.4.2.1 Selective coach

The first coach interviewed is Mr Fabio Spiteri. He is a well-renowned ironman and athlete who is now one of Malta's leading coaches for triathlon and general running competitions. He is able to attract a wide variety of athletes, ranging from well-seasoned performers to beginners and parathletes.

3.4.2.2 Selective Coach

The second coach interviewed is Mr Has Kesra. He has been a coach since 1993 and counts some of Malta's top athletes under his guidance. To date, he has coached over 233 athletes.

3.4.3 Nutritionists

3.4.3.1 Selective Nutritionist

The first nutritionist is a registered nutritionist and supports one of the athletic clubs in Malta. She is also an athlete herself and is regularly consulted by other coaches.

3.4.3.2 Selective Nutritionist

The second nutritionist supports some of Malta's leading athletes in their nutritional programmes.

3.5 Qualitative (In-Depth) Interviews

For the qualitive component of this research, a semi-structured questionnaire was designed. The in-depth interviews targeted long-distance runners, coaches and nutritionists. A balance of gender was maintained in this part of the study. The study's primary research instrument consisted of questionnaires. The in-depth interviews were also designed to investigate the diets, eating behaviours and nutrition-related views of long-distance running athletes. The selection of participants in in-depth interviews is purposeful, 'in the sense that a sample from which one may get the maximum knowledge is selected'. (Petrovic, Koprivica and Bokan, 2017)

The in-depth interviews included two of Malta's leading long-distance runners, two coaches and two nutritionists.

All face-to-face interviews were scheduled and conducted at the convenience of the athletes, trainers and nutritionists either before or after training sessions. The questions were posed in English, but the respondents were free to reply in either English or Maltese. The duration of the interviews varied, but the average duration of each interview was approximately 30 minutes. All respondents gave permission for the interview to be recorded using a voice recorder for post-analysis and transcription. A summary of the transcripts is provided in the results section and full transcripts are provided as an annex. The recordings were kept confidential and the participants gave the author permission to use their names.

3.6 Limitations

Since there is no official public database of long-distance runners in Malta, the author had to make some assumptions about the total population. Another limitation was the outreach for the quantitative survey. Since no athlete directory is available, the author was obliged to limit the search to acquaintances, friends and public running groups on social media and participating running clubs in order to enlist athletes for the survey.

3.7 Conclusion

This chapter has provided an overview of the research methodologies used in this investigation. The following chapter will provide a comprehensive analysis of the gathered quantitative and qualitative data.

4. Data Analysis

4.1 Introduction

This chapter provides an examination and discussion of the study's findings. The main objective of the study was to investigate the nutritional habits of long-distance runners in the Maltese environment. The chapter is split into two sections. In the first , a table has been provided summarising the opinions of the six participants about the in-depth interviews comprising two athletes, two coaches and two nutritionists. Full transcripts are provided as an annex.

The second section is a visual depiction of the quantitative data extracted from the survey findings.

4.2 Interviews Analysis

In total the qualitative study delved into the six key questions listed below.

Q1. What is your opinion of nutrition vs athletic performance? (Refer to Table 5)

Q2. Recommended special diets to long-distance runners (Refer to Table 6)

Q3. Preferred diet? (Refer to Table 7)

Q4. Value given to carbohydrates, protein, fat, supplements and fluid when it comes to nutrition (Refer to Table 8)

Q5. Sources of information regarding nutrition (Refer to Table 9)

Q6. Working with coaches and/or nutritionists in supporting athletes (Refer to Table 10)

Q7. Preparation before and after an intensive training session (Refer to Table 11)

The analysis of the above questions has been summarised by the author (the full transcript is provided as an annex) and presented as a matrix in seven tables with summaries according to the respondent, with a collective summary at the end of each table.

Table 5: Nutrition vs athletic performance

Athlete 1 Mrs Lisa Bezzina	Nutrition is vital for athlete 1's performance. Athlete 1 has a sports nutritionist who instructs what she should eat, including the amount of carbohydrates, fats and protein in grammes to consume before and after exercise depending on her training sessions and the race she is preparing for. For instance, her diet plan for a 10,000-meter race differs from that for a full marathon.
Athlete 2 Mr Jonathan Balzan	Athlete 2 maintained that finding the proper balance between carbs, proteins and lipids is essential for body function during running. Vitamins can be used to compensate for a lack of natural meals or a dislike for certain foods. Athletes require water for health and performance reasons, in addition to preventing dehydration.
Coach 1 Mr Fabio Spiteri	Nutrition is crucial to maintain a good performance, because the body needs energy, especially from carbohydrates. It is important to consume enough food and fluid before, during and after training.
Coach 2 Mr Has Kesra	The relationship between nutrition and performance must be balanced and parallel. Diet should be tailored to the exercise programme. The nutrition must correspond to the intensity of the workout.
Nutritionist 1	Nutrition is crucial to athletic performance. Hydration, nutrition, and recovery are the three major elements for Nutritionist 1. Thinking about what you consume prior to, during, and after an event is vital. Mealtimes are also key. Performance-enhancing ergogenic aids can be consumed in moderation and with nutritional guidance.
Nutritionist 2	Glycogen is essential for muscle and fat metabolism. Glutamine supplements are essential. Three days before a competition, athletes must load up on carbohydrates, often known as carb loading. Additionally, hydration is essential, therefore consuming sufficient fluids, water and electrolytes is not only critical to restore sweat loss, but also prevent cramps and dizziness.
Collective Summary	There are clearly common traits mentioned by all athletes, coaches and nutritionists particularly when it comes to the hydration/ diet regime. Some go as far as to say that diet can vary based on the type of race, e.g. meals when preparing for a 10Km race are different to those for full marathons. However, nutritionist 1 suggests ergogenic aids to help performance, whereas nutritionist

	2 prefers glutamine supplements. All participants concur that proper nutrition is essential for optimal running performance.

Source: Research Findings

Table 6: Recommended special diets for long-distance runners

Athlete 1 Mrs Lisa Bezzina	Athlete 1 believes that no particular diet can truly be proposed to another person. Everyone has unique dietary requirements which vary depending on their chosen sport. She once attempted to reduce weight by adopting a vegetarian diet but ended up losing strength and gaining weight. As a consequence, she decided to follow a carb loading diet. Indeed, the majority of diets adopted by long-distance runners consist of carbs.
Athlete 2 Mr Jonathan Balzan	The respondent focuses on a carbs intake. Athlete 2 does not recommend any specific diet as long as it is healthy.
Coach 1 Mr Fabio Spiteri	Coach 1 always reminds athletes to maintain a healthy diet. They are, however, free to follow any diet they choose as long as it is beneficial for them. For instance, athletes should try to eat more vegetables, pasta during the day and protein in the evening.
Coach 2 Mr Has Kesra	Coach 2 does not recommend any specific diets. However, he maintains that people must eat natural foods because there is no need to consume supplements. Athletes can be vegetarian or vegan but must consume enough carbohydrates, fat and protein. The most important thing is to eat a healthy,balanced diet.
Nutritionist 1	Nutritionist 1 recommends the overall Mediterranean diet based on grains, vegetables, fruit and fish. However, the days to be dedicated to training, resting and competing to keep a person well fuelled must also be considered.
Nutritionist 2	Nutritionist 2 commented that because we live in Malta the Mediterranean diet is recommended. This is rather varied, with a lot of fresh vegetables and fruit, leading to a wide variety of food with diverse properties. Nutritionist 2 recommends vegetables, full

	grains and avoiding processed food. All vegetables are important, and the professional's recommendation for the latter is very simple; the more colour on a person's plate, the better.
Collective Summary	Athletes 1 and 2 both chose a carbohydrate-loading diet, but the coaches' advice is to eat healthily, regardless of the type of diet selected . Nutritionists recommend the MD for its health benefits. Athletes and coaches did not mention the MD, but after analysing their food intake, it shows that MD is the basis for their eating habits.

Source: Research Findings

Table 7: Preferred diet

Athlete 1 Lisa Bezzina	Carb loading, gluten and lactose-free diet. Eating vegetables, eggs, avocado, rice, oats, fish, coconut water, water, salts but nothing with sugar.
Athlete 2 Jonathan Balzan	Athlete 2 does not have a preferred diet. Pizza and spaghetti are the preferred sources of carbohydrates, and porridge occasionally takes the place of the daily banana. Fish and meat products are consumed once a week.
Coach 1 Mr Fabio Spiteri	Coach 1 does not have a preferred diet, just eating healthily.
Coach 2 Mr Has Kesra	Coach 2 doesn't have a preferred diet and simply chooses healthy and natural foods. Athletes can be vegetarian or vegan as long as their daily requirements are fulfilled. .
Nutritionist 1	The Mediterranean diet because it contains a variety of vegetables, fruit, fish, pasta and rice which are ideal for an athlete's diet. The keto diet is not recommended for athletes because it is low in carbs.
Nutritionist 2	Definitely the MD because it covers all the macro- and micronutrients that athletes need. Nutritionist disagree with the ketogenic diet. Numerous publications and scientific studies propose that 60 to 70% of total calories come from carbs.
Collective Summary	Despite the fact that athlete 1 is a coeliac and lactose-intolerant, she agrees with Athlete 2 that carb loading is essential before long runs/races, however the two do consume different items. Coach 1 and Coach 2 agree that no specific diet is of particular importance as long as it is healthy and varied. Both nutritionists favour the Mediterranean Diet and concur that the keto diet is not beneficial for athletes due to its low carbohydrate content.

Source: Research Findings

Table 8: Value given to carbohydrates, protein, fat, supplements andfFluid when it comes to nutrition.

Athlete 1 Mrs Lisa Bezzina	These are all very important but, once again, everything depends on the athletes' goals and season. When preparing for a full marathon, nutritionist plans 2 months in advance, and starts building her diet according to that. The nutritional plan includes the previously mentioned carbohydrates, protein, fat, supplements and fluid intake. Beetroot juice is not included..
Athlete 2 Mr Jonathan Balzan	It is essential to strike a balance between carbohydrates, proteins and lipids. Fluids are vital for preventing dehydration. The athlete uses a particluar gel before starting the marathon Supplements are also used to compensate for any lack of natural foods or a dislike for certain foods.
Coach 1 Mr Fabio Spiteri	According to Coach 1, carbohydrates are essential, particularly for carbohydrate loading before a race and during a typical week. Around 100 gr of protein are required to aid in the restoration of damaged muscular tissue. Healthy fats should also comprise around 10% of the relevant diet. Supplements are also unnecessary if the diet is mostly healthy. Fluids are also vital for replenishing. A gel is used after a 90-minute race, whereas beetroot juice is good for recovery.
Coach 2 Mr Has Kesra	Coach 2 believes all the above are essential, apart from supplements. Micronutrients are obtained from food. If an athlete has a vitamin deficit, they should always have a blood test done and visit a doctor. Regarding fluid, water is essential and there is just one natural gel brand the coach trusts (Maurten) during a marathon. Beetroot juice contains numerous nitrates, while alcohol consumption must be stopped 5 days before a race.
Nutritionist 1	Carbohydrates, protein, and fats are important, but fluid is crucial. Without water and electrolytes, competitors might easily give up before the end of the race. Supplements are also needed for certain athletes with micronutrient deficiencie. Gels or electrolytes should be consumed after 90 minutes of running. Additionally, athletes are urged to consume beetroot juice owing to its multiple health benefits. This tends, however, to be disliked due to its peculiar flavour.

Nutritionist 2	Carbohydrates and fat are essential for energy, whereas protein is necessary for muscular tissue repair. Some athletes have a fear of fat, but an appropriate quantity of this property every day from the right source is recommended. Both fluids and supplements are essential; the respondent proposes 60g of glutaminergic every hour after 1.5hr of running. However, this respondent doesn't suggest beetroot juice because of the high percentage of nitrates
Collective Summary	All six individuals provided figures for these components: carbohydrates, protein, fats and fuel. However, only athlete 2 consumed the abovementioned gel before the race. The first athlete does not do so, nor was it recommended by the coaches or nutritionists. Athlete 1 and both nutritionists concur that athletes should take supplements, in contrast to coaches 1 and 2, who stated that supplements are unnecessary unless prescribed by a doctor. As a result of its nitrate content, it is debatable whether beetroot juice should be consumed before or after exercise, if at all.

Source: Research Findings

Table 9. Sources of information regarding nutrition

Athlete 1 Mrs Lisa Bezzina	Athlete 1 visits a nutritionist, who keeps her updated with regard to nutrition. The nutritionist asks many questions and assigns different nutritional plans according to how athletes feel, such as those used to mitigate tiredness .
Athlete 2 Mr Jonathan Balzan	Information is gained via articles perused, his former coach's advice, friends and the internet.
Coach 1 Mr Fabio Spiteri	The respondent declares that he enjoys reading, but that it is usually material of an extremely elementary sort, which only tends to cover the bare fundamentals of nutrition.
Coach 2 Mr Has Kesra	By attending seminars and staying abreast with what is happening (articles, blogs, etc)
Nutritionist 1	It is a topic that is always changing. The respondent subscribes to several journals and organisations around Europe and receives information about new studies, data, etc. regularly.
Nutritionist 2	Nutritionist 2 stays updated by reading books and taking courses about nutrition relating to sports. The professional in question maintains that there haven't recently been any drastic changes relating to the theory and how it is applied.
Collective Summary	Both nutritionists stay updated regarding nutrition, as it is an integral part of their profession. Coaches also stay abreast of the subject, because it is fundamental to gain appropriate knowledge.

Source: Research Findings

Table 10. Working with coaches and/or nutritionists in supporting athletes

Coach 1 Mr Fabio Spiteri	When one of the athletes requests the services of a nutritionist, a trusted professional is recommended and a training plan provided so that the nutritionist concerned can tailor a meal plan to their nutritional needs.
Coach 2 Mr Has Kesra	It is crucial for the coach to collaborate with the nutritionist, physiotherapist and sports doctors. It is essential to interact with the nutritionist in order to provide the best possible diet and training for the athletes.
Nutritionist 1	Yes, undoubtedly.The coach communicates with the nutritionist and athlete to design meals based on the athlete's needs, such as weight loss, increased energy, etc., and the intensity of the training sessions.
Nutritionist 2	Yes, with élite athletes there should be communication with the coach to ensure that there is alignment, to avoid confusing the athlete. Specifically, when a meal plan is created, nutritionists request the training schedule to examine the training load in order to develop a food plan for the athlete. Communication with coaches is of paramount importance.
Collective Summary	Both nutritionists and coaches agree to work closely together in supporting their athletes, especially in the case of top athletes who need to prepare themselves for an important race.

Source: Research Findings

Table 11. Preparation before and after an intensive training session

Athlete 1 Mrs Lisa Bezzina	3 days before the race athletes consume double the amount of carbs (200g),100g protein, 200g vegetables (normally spinach), coffee, toast with peanut butter or oats with coconut water and coffee in the morning. Within 30 mins after a run oats, fruit, nuts, protein powder and coconut water are consumed.
Athlete 2 Mr Jonathan Balzan	A dish of pasta or pizza the day before the race, a banana before training and, if there is time, toast with jam or egg and tea on the morning of the race. After a workout or competition, a cookie or croissant and possibly a beer are eaten. A gel is also consumed before the race.
Coach 1 Mr Fabio Spiteri	The respondent recommends increasing pasta consumption four days before the marathon. Pizza is beneficial the day before a race. An hour before the race, a yoghurt, fruit, Weetabix, cereal, or an energy bar are consumed. New products should never be tried just before a race. After the race the athlete must wait 1 to 1.5 hours before eating, then consume some vegetables and protein. 2-3 gels are sufficient throughout a marathon.
Coach 2 Mr Has Kesra	Coach 2 maintains that workouts can be performed on an empty stomach in the morning. Before a competition, athletes should consume bananas, toast with jam or oats. After a workout, athletes should either eat a banana or apple (provided that they do not experience any digestive issues). An evening meal could consist of an avocado and Greek yoghurt. A day before the race, fish or chicken should be consumed with an abundance of vegetables. He also recommends using only one natural gel throughout a marathon.
Nutritionist 1	The day before the race, pasta with vegetables and proteins consisting of meat or lentils should be consumed. In the morning, a yoghurt, banana or toast with water should be eaten 1 to 1.5 hours before a run. During the race, athletes should refuel with electrolytes and consume a protein shake with banana or banana an hour after the race, followed by a meal consisting of protein, vegetables and carbohydrates.

Nutritionist 2	If the race is in the morning, cereal, oats, fruit, toast, or an avocado should be consumed. If, on the other hand, it is an evening competition, spaghetti or rice should be eaten with a light protein such as egg whites. There are benefits to training on an empty stomach, but not for more than 90 minutes. After the race, a mixture of carbohydrates, protein, and electrolytes should be taken within 30 minutes. Between 40 and 60 grammes of gels should be consumed every hour. Bananas should not be consumed by those with low blood pressure.
Collective Summary	Timing before and after ingesting meals differs, but most aspects of the pre-race diet are essentially identical. Only the second athlete consumes cookies, croissants, and an occasional beer after the session.

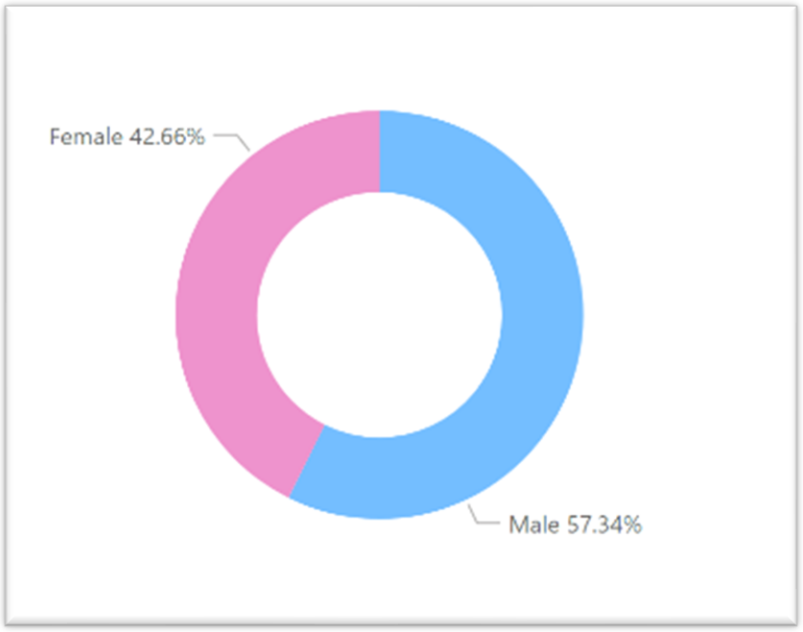
Source: Research Findings

4.3 Introduction (Quantitative) Questionnaire

The findings were largely expressed in the form of percentages, which greatly facilitated the comparison across variables and questions. The data are shown using graphs, tables and charts for better understanding.

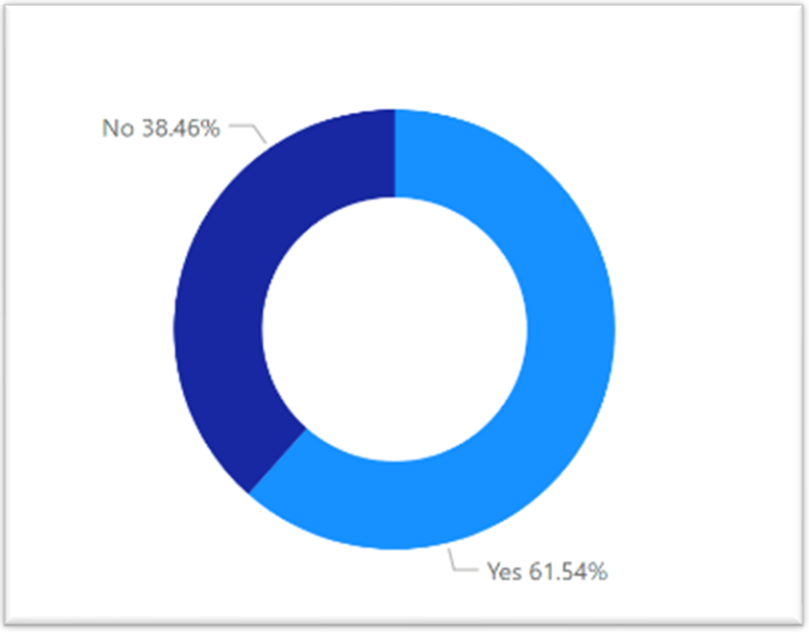
A total of 143 long-distance runners participated in the survey as part of the methodology for this dissertation ; 57 percent (82) were male and 43 percent (61) female.. As seen in the figures below, the runners belong to a distinct gender, age groups, educational levels and motivational categories. Throughout the questionnaire, the Likert scales used ranged from one (1) Strongly Disagree to five (5) Strongly Agree. All results of Likert scales were computed and reported as mean scores.

Figure 4. Shows the demographics by gender.



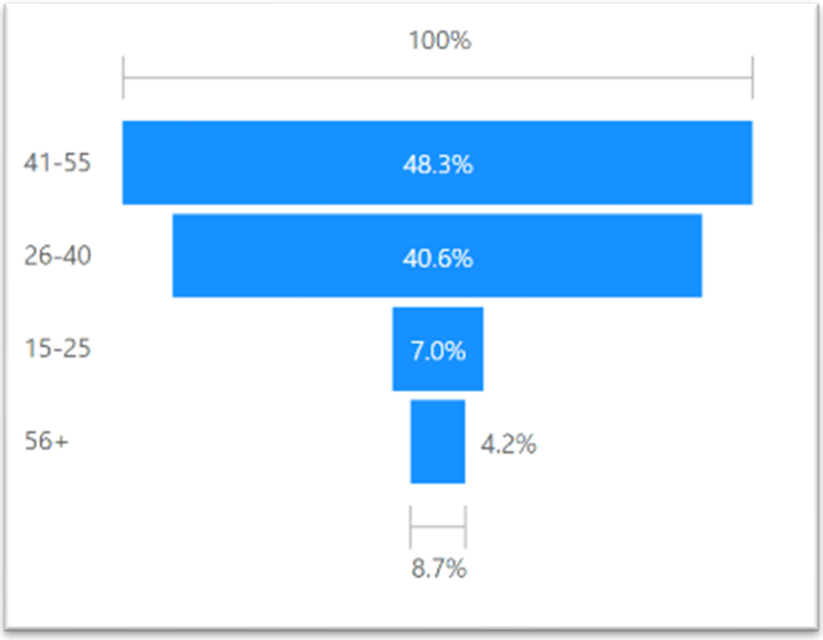
Source: Research Findings

Figure 5. Shows that three out of every five respondents form part of a running club



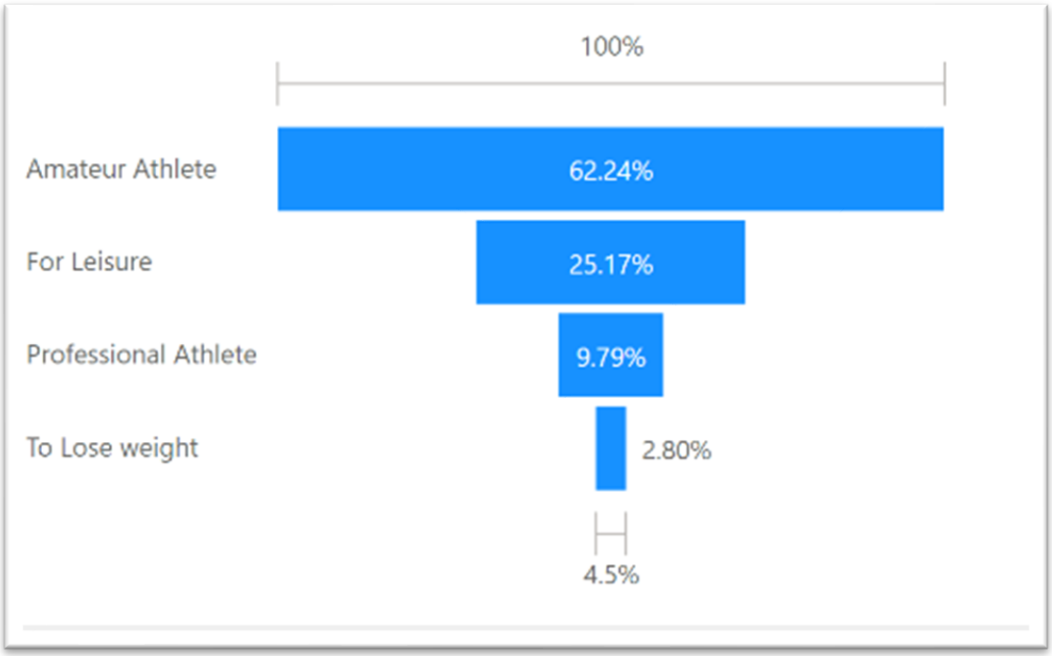
Source: Research Findings

Figure 6. Shows the demographics by age



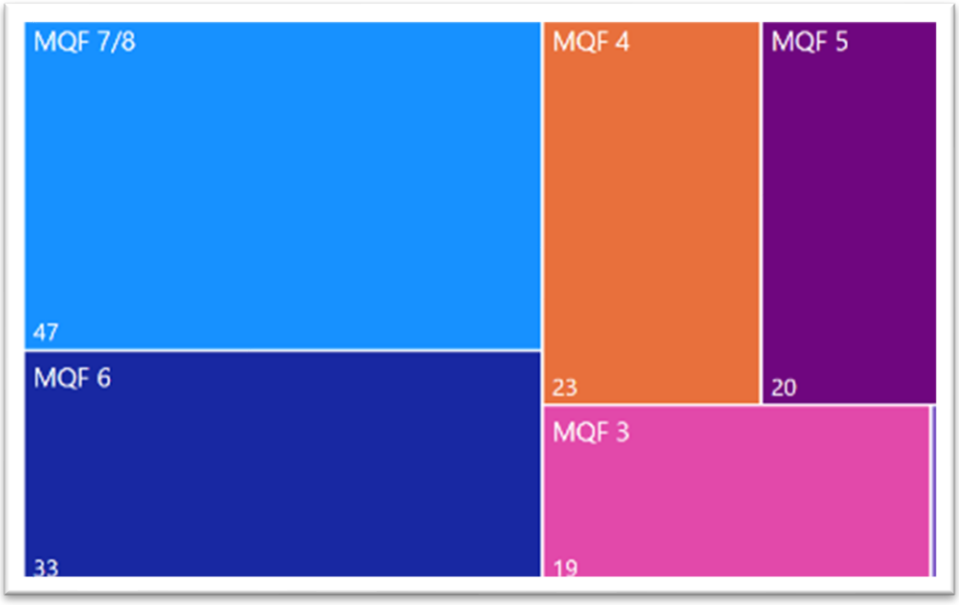
Source: Research Findings

Figure 7. Indicates the athletes' reason for running.



Source: Research Findings

Figure 8. Level of education response



Source: Research Findings

4.3.1 Food Choices Athletes Should Make According to The Sports Practised

Respondents were asked whether their choice of food depends on the sports they practise. This resulted in a mean score of 3.6, therefore indicating that respondents concur that physical exercise influences eating choices. There were few differences in age, gender, and running motivation. The score was constantly more than 3.

Figure 9. Choices of food based on sport

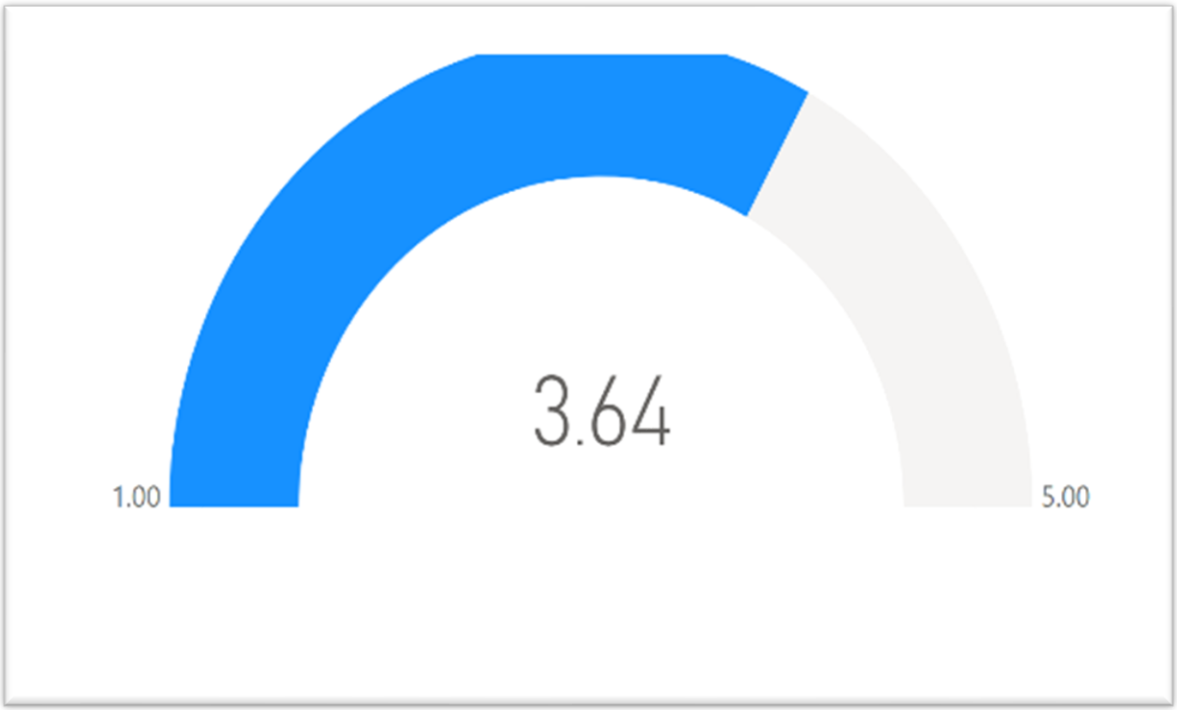


Table 12. Choices about the food athletes should eat depending on the sports they practise by age, gender, whether they are members of a club, reason for running and employment

Age	Mean
15-25	3.60
26-40	3.57
41-55	3.70
56+	3.67
Total	**3.64**

Gender	Mean
Female	3.77
Male	3.54
Total	**3.64**

Member of a Club	Mean
No	3.55
Yes	3.69
Total	**3.64**

Employment Situation	Mean
Armed forces	4.14
Associate professions	3.80
Clerical and administration workers	3.86
Full-time Student	3.60
Management	3.43
Primary level occupations	4.00
Professionals	3.64
Retired	3.50
Self Employed	3.54
Service and sales workers	3.75
Skilled crafts and trades	3.00
Taking care of the home	3.67
Technicians	4.00
Total	**3.64**

Reason for running	Mean
Amateur Athlete	3.76
For Leisure	3.31
Professional Athlete	3.71
To Lose weight	3.50
Total	**3.64**

Source: Research Findings

4.3.2 Nutritional Properties Considered to Be The Greatest Contributor to Top Performance

Most respondents agree that carbohydrates (64%) have the greatest nutritional benefit for an athlete seeking peak performance. Fluids were mentioned by 14% of the respondents, followed by protein - 8%, fibre - 7% and fats, 6%. It appears that professional athletes place a high value on carbs, while those running to lose weight place the least value on them (25%).

Figure 10. Nutritional properties considered as the greatest contributor to reaching top performance

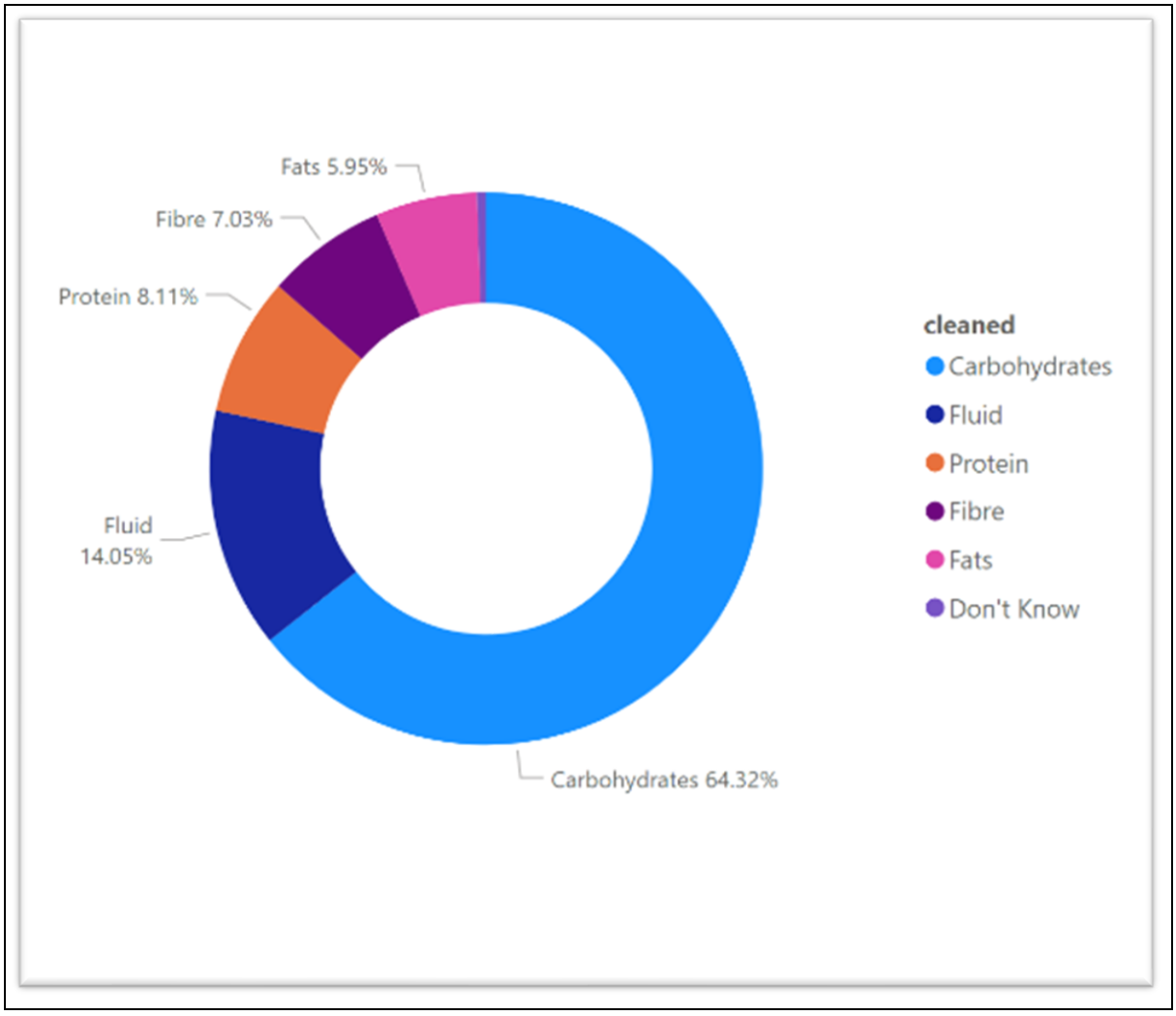


Table 13. Nutritional properties considered to be the greatest contributor to top performance by age, gender and reason for running

Age	Carbohydrates	Don't Know	Fats	Fibre	Fluid	Protein
15-25	5.41%		0.54%	0.54%	1.08%	1.08%
26-40	23.24%		2.16%	1.62%	8.65%	2.16%
41-55	32.97%	0.54%	2.70%	4.32%	3.78%	4.32%
56+	2.70%		0.54%	0.54%	0.54%	0.54%
Total	**64.32%**	**0.54%**	**5.95%**	**7.03%**	**14.05%**	**8.11%**

Gender	Carbohydrates	Don't Know	Fats	Fibre	Fluid	Protein
Female	66.23%		6.49%	3.90%	15.58%	7.79%
Male	62.96%	0.93%	5.56%	9.26%	12.96%	8.33%
Total	**64.32%**	**0.54%**	**5.95%**	**7.03%**	**14.05%**	**8.11%**

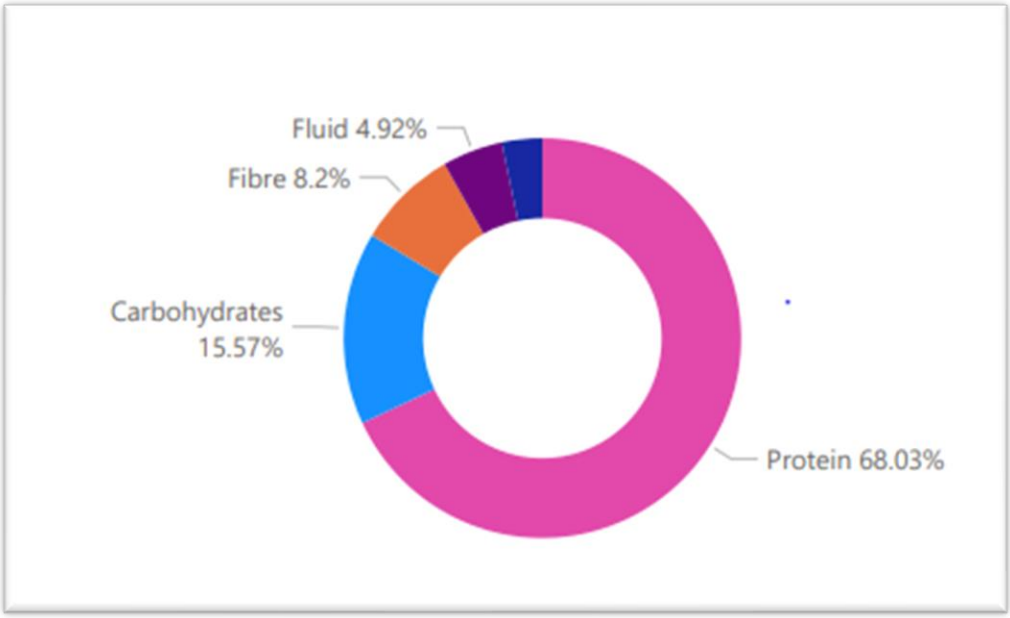
Reason for running	Carbohydrates	Don't Know	Fats	Fibre	Fluid	Protein
Amateur Athlete	61.86%		5.93%	6.78%	16.95%	8.47%
For Leisure	75.61%	2.44%	4.88%	2.44%	9.76%	4.88%
Professional Athlete	63.64%		9.09%	9.09%	4.55%	13.64%
To Lose weight	25.00%			50.00%	25.00%	
Total	**64.32%**	**0.54%**	**5.95%**	**7.03%**	**14.05%**	**8.11%**

Source: Research Findings

4.3.3 Other Nutritional Contributors to Athletic Performance

Subsequently, athletes were asked to mention the other foods they consider as important to achieve athletic performance. Athletes clearly believe that protein is also important, as this was mentioned by 68% of respondents. This is followed by carbohydrates (16%), fibre (8%), fluid (5%) and fats, with 3%.

Figure 11. Other foods considered to be important contributors to athletic performance



Athletes were then probed about the type of food that enhanced athletic performance. The results are presented in figure 12 below.

4.3.4 Foods Contributing to Enhanced Athletic Performance

Respondents were asked to select from meat, green vegetables, fruit, fish, or all them combined, as regards which foods they believe to be the most effective in terms of enhancing athletic performance. The chart in Figure 12 clearly indicates that half of the participants (52%) believe that all foods enhance performance, with a slightly more predominant statistic amongst females and professional athletes.

Figure 12. Foods that contribute to enhanced athletic performance

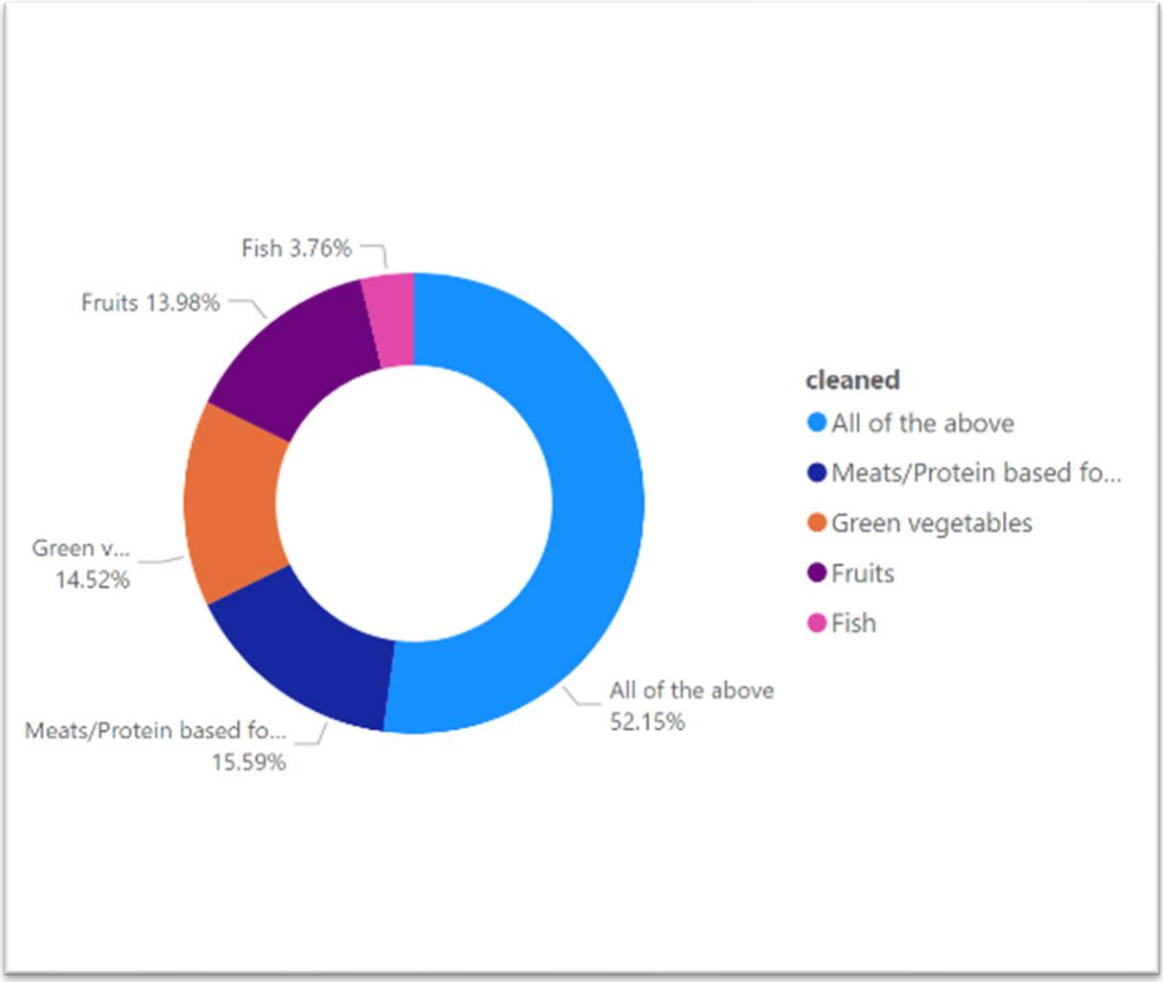


Table 14. Foods that contribute to enhanced athletic performance by age, gender and reason for running

Age	All of the above	Fish	Fruits	Green vegetables	Meats/Protein based food
15-25	54.55%		9.09%	9.09%	27.27%
26-40	51.25%	5.00%	13.75%	16.25%	13.75%
41-55	51.76%	2.35%	15.29%	14.12%	16.47%
56+	60.00%	10.00%	10.00%	10.00%	10.00%
Total	**52.15%**	**3.76%**	**13.98%**	**14.52%**	**15.59%**

Gender	All of the above	Fish	Fruits	Green vegetables	Meats/Protein based food
Female	55.00%	5.00%	12.50%	13.75%	13.75%
Male	50.00%	2.83%	15.09%	15.09%	16.98%
Total	**52.15%**	**3.76%**	**13.98%**	**14.52%**	**15.59%**

Reason for running	All of the above	Fish	Fruits	Green vegetables	Meats/Protein based food
Amateur Athlete	45.76%	3.39%	16.10%	17.80%	16.95%
For Leisure	64.29%	2.38%	9.52%	9.52%	14.29%
Professional Athlete	59.09%	9.09%	9.09%	9.09%	13.64%
To Lose weight	75.00%		25.00%		
Total	**52.15%**	**3.76%**	**13.98%**	**14.52%**	**15.59%**

Source: Research Findings

4.3.5 Foods Limiting Athletic Performance

Respondents were asked to select which food they believe limits their performance. Results reveal that processed food (37%), followed by fatty foods (28%), and sugary food (23%). were considered as the main restriction to athletic performance. Salty food was only mentioned by 8% of the athletes and grains by 4%.

Figure 13 demonstrates that none of the professional athletes, those aged 56 and those wanting to reduce weight, responded that grain restricted their performance

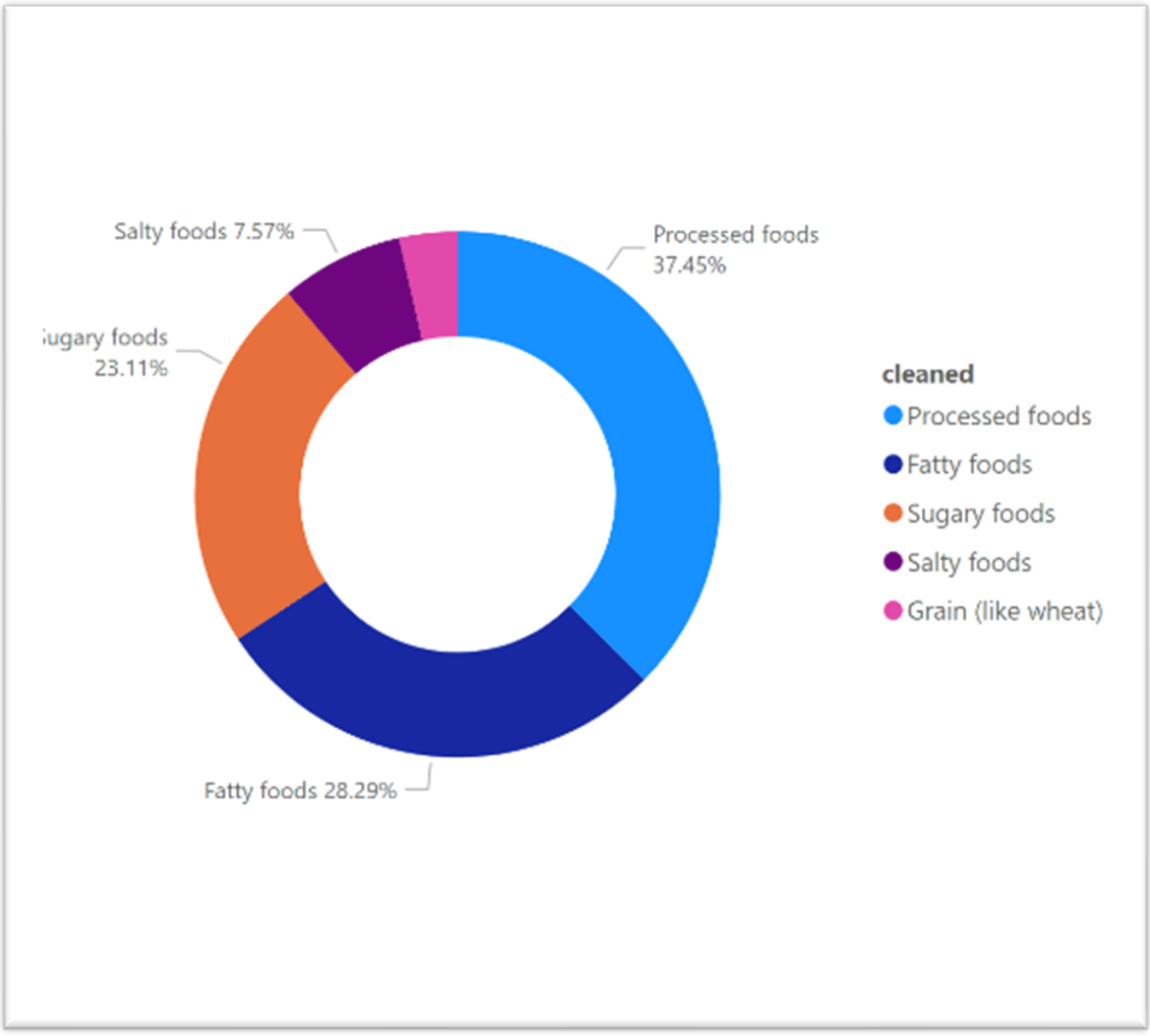


Table 15. Foods particularly limiting athletic performance by age, gender and reason for running

Age	Fatty foods	Grain (like wheat)	Processed foods	Salty foods	Sugary foods
15-25	30.00%	5.00%	40.00%	10.00%	15.00%
26-40	25.49%	3.92%	39.22%	5.88%	25.49%
41-55	30.00%	3.33%	35.00%	8.33%	23.33%
56+	33.33%		44.44%	11.11%	11.11%
Total	**28.29%**	**3.59%**	**37.45%**	**7.57%**	**23.11%**

Gender	Fatty foods	Grain (like wheat)	Processed foods	Salty foods	Sugary foods
Female	27.72%	3.96%	44.55%	4.95%	18.81%
Male	28.67%	3.33%	32.67%	9.33%	26.00%
Total	**28.29%**	**3.59%**	**37.45%**	**7.57%**	**23.11%**

Reason for running	Fatty foods	Grain (like wheat)	Processed foods	Salty foods	Sugary foods
Amateur Athlete	26.17%	3.36%	38.26%	5.37%	26.85%
For Leisure	26.76%	5.63%	39.44%	11.27%	16.90%
Professional Athlete	45.83%		25.00%	12.50%	16.67%
To Lose weight	28.57%		42.86%		28.57%
Total	**28.29%**	**3.59%**	**37.45%**	**7.57%**	**23.11%**

Source: Research Findings

4.3.6 Eating to Satisfy Hunger as Opposed to The Time Factor

Respondents were questioned about whether eating when you are hungry is crucial and the specific time irrelevant.The result was a mean score of 3.04, suggesting that most respondents are indifferent to these questions. The scores of nearly every athlete were similar, rendering the option irrelevant.

Figure 14. Eating when you are hungry is important and time does not matter

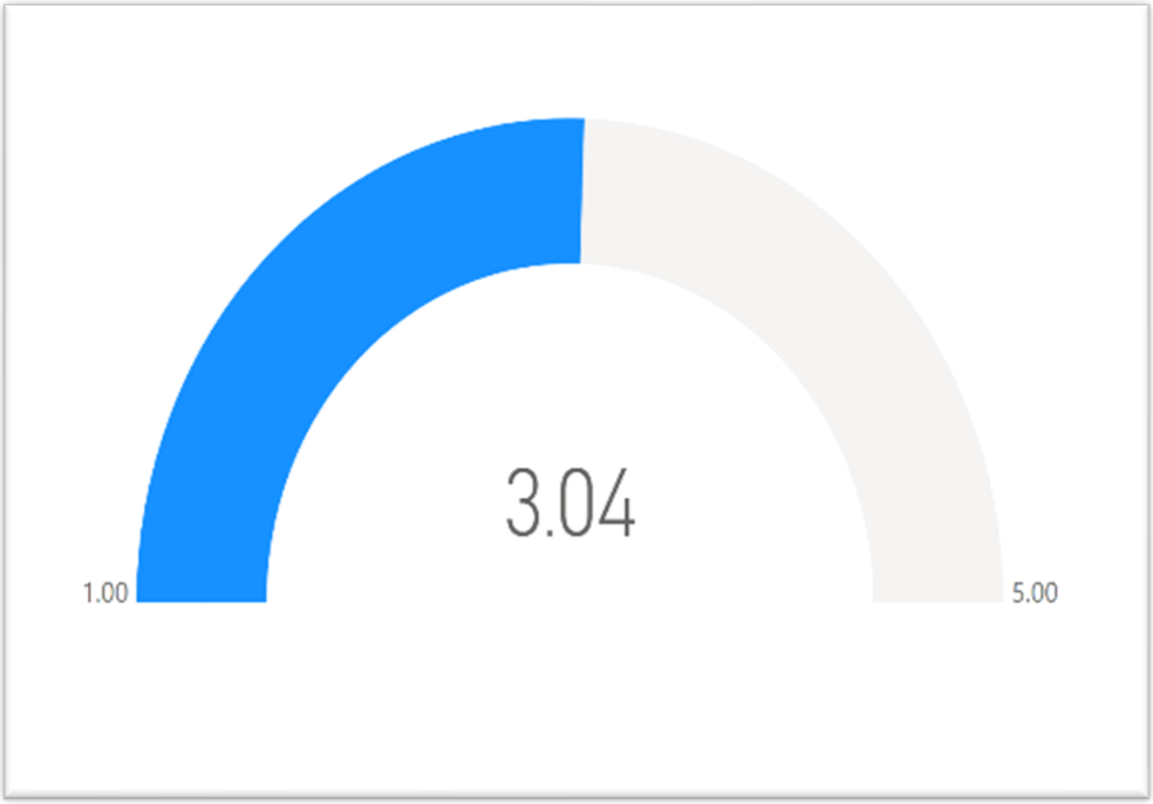


Table 16. Eating to satisfy hunger as opposed to the time factor by age, gender, employment category, reason for running and athletic club Members

Age	Mean
15-25	3.00
26-40	3.22
41-55	2.93
56+	2.67
Total	**3.04**

Gender	Mean
Female	2.97
Male	3.10
Total	**3.04**

Member of a Club	Mean
No	3.15
Yes	2.98
Total	**3.04**

Employment Situation	Mean
Armed forces	2.43
Associate professions	2.60
Clerical and administration workers	2.79
Full-time Student	3.20
Management	3.06
Primary level occupations	4.33
Professionals	3.11
Retired	1.50
Self Employed	3.23
Service and sales workers	3.50
Skilled crafts and trades	2.00
Taking care of the home	3.33
Technicians	3.00
Total	**3.04**

Reason for running	Mean
Amateur Athlete	2.98
For Leisure	3.08
Professional Athlete	3.36
To Lose weight	3.00
Total	**3.04**

Source: Research Findings

4.3.7 Supplements/ Vitamins as a Good Replacement for Deficiencies in The Consumption of Certain Food

Respondents were asked whether supplements and/or vitamins are a good replacement for deficiencies in the consumption of certain foods. This resulted in a mean score of 3.4, therefore indicating that respondents tend to concur that supplements and vitamins are an effective substitute for deficiencies. It is worth nothing that those aged 15 to 25 were more reluctant. In fact, this age group was the only band that tended to disagree that supplements are a good replacement, as indicated in figure 15.

Figure 15. Supplements/vitamins as a good replacement for deficiencies in the consumption of certain foods

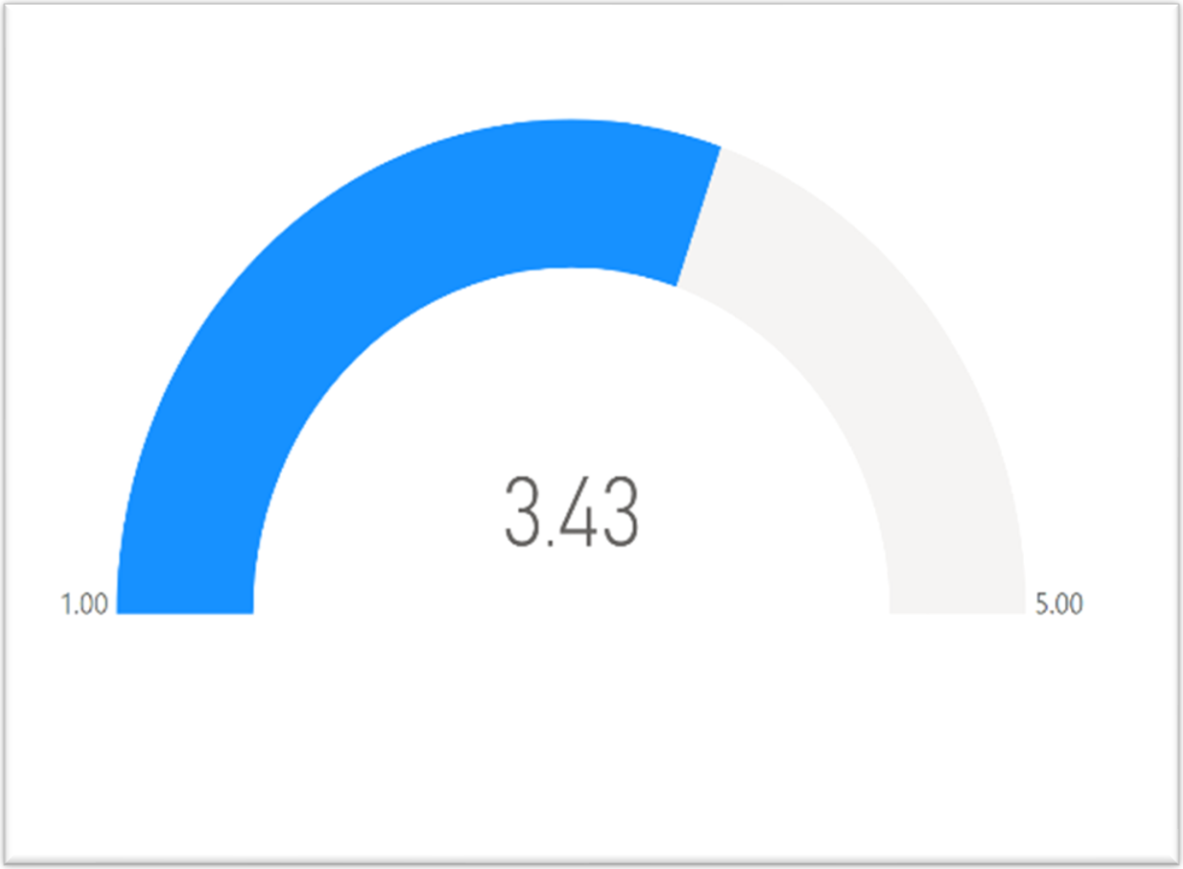


Table17. Supplements/vitamins as a good replacement for deficiencies in the consumption of certain foods by age, gender, club members and employment category

Age	Mean
15-25	2.80
26-40	3.34
41-55	3.61
56+	3.17
Total	**3.43**

Gender	Mean
Female	3.57
Male	3.32
Total	**3.43**

Member of a Club	Mean
No	3.65
Yes	3.28
Total	**3.43**

Employment Situation	Mean
Armed forces	3.14
Associate professions	3.20
Clerical and administration workers	3.79
Full-time Student	3.30
Management	3.49
Primary level occupations	3.67
Professionals	3.31
Retired	2.50
Self Employed	3.08
Service and sales workers	4.75
Skilled crafts and trades	2.00
Taking care of the home	4.33
Technicians	5.00
Total	**3.43**

Reason for running	Mean
Amateur Athlete	3.36
For Leisure	3.42
Professional Athlete	3.86
To Lose weight	3.50
Total	**3.43**

Source: Research Findings

4.3.8 Different Sports Requiring Different Food Intakes

Participants were asked whether different sports require intakes of different foods. The resulted in a mean score of 4.03, therefore indicating that participants agree that different sports require different food. Professional athletes and recreational runners alike agree that their scores are nearly identical.

Figure 16. Participants agree that different sports require intakes of different foods

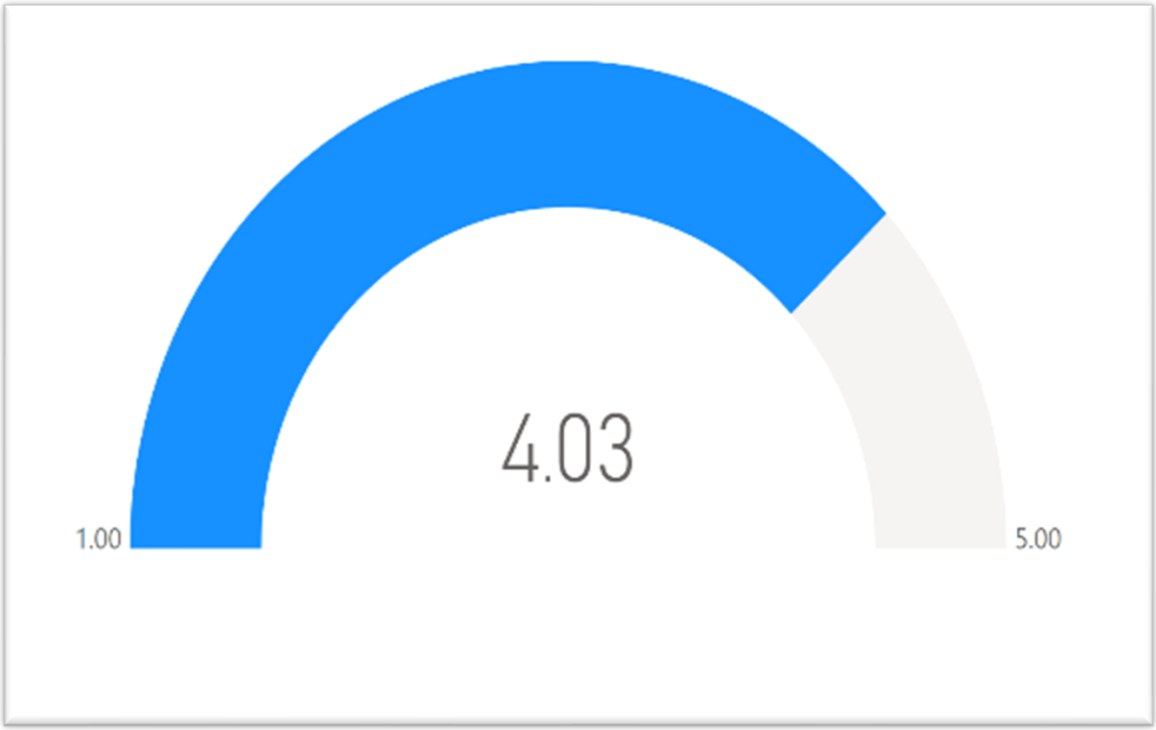


Table18. Participants agree that different sports require intakes of different foods by age, gender and employment situation

Age	Mean
15-25	4.60
26-40	4.12
41-55	3.99
56+	2.83
Total	**4.03**

Gender	Mean
Female	3.93
Male	4.11
Total	**4.03**

Member of a Club	Mean
No	4.13
Yes	3.98
Total	**4.03**

Employment Situation	Mean
Armed forces	4.57
Associate professions	4.40
Clerical and administration workers	3.93
Full-time Student	4.70
Management	3.97
Primary level occupations	3.33
Professionals	4.09
Retired	2.50
Self Employed	3.92
Service and sales workers	3.25
Skilled crafts and trades	4.00
Taking care of the home	4.00
Technicians	3.00
Total	**4.03**

Reason for running	Mean
Amateur Athlete	4.02
For Leisure	4.08
Professional Athlete	4.00
To Lose weight	4.00
Total	**4.03**

Source: Research Findings

4.3.9 The Importance of Eating Daily at Frequent Intervals

Respondents were asked whether it is important to eat at frequent intervals on a daily basis. In this case, every category registered a mean score over 3, with the final result being 3.82, indicating that the respondents agree with eating often throughout the day.

Figure 17. The importance of eating at frequent intervals on a daily basis

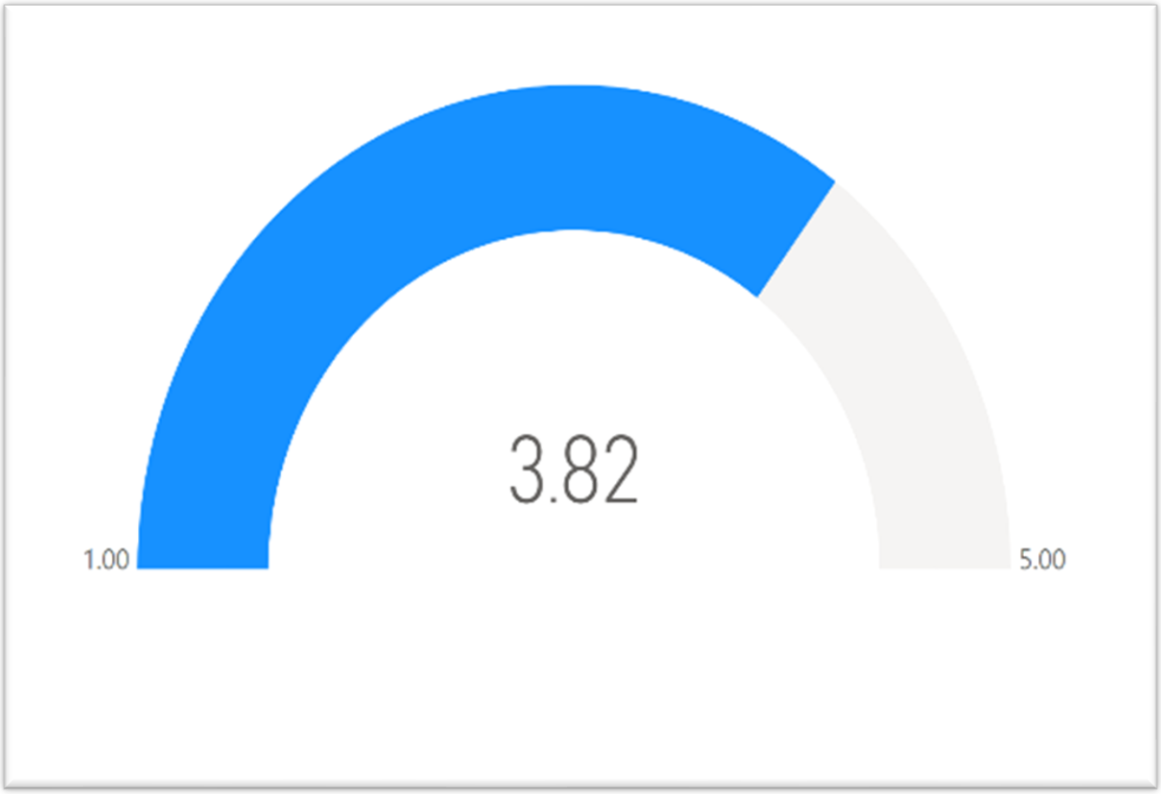


Table 19. The importance of eating at frequent intervals on a daily basis by age, gender, employment category, club members and reason for running

Age	Mean
15-25	3.80
26-40	3.83
41-55	3.77
56+	4.33
Total	**3.82**

Gender	Mean
Female	3.74
Male	3.88
Total	**3.82**

Member of a Club	Mean
No	3.87
Yes	3.78
Total	**3.82**

Employment Situation	Mean
Armed forces	4.00
Associate professions	4.20
Clerical and administration workers	4.00
Full-time Student	3.60
Management	3.51
Primary level occupations	4.67
Professionals	3.93
Retired	4.50
Self Employed	3.62
Service and sales workers	4.75
Skilled crafts and trades	3.00
Taking care of the home	3.00
Technicians	4.00
Total	**3.82**

Reason for running	Mean
Amateur Athlete	3.78
For Leisure	3.78
Professional Athlete	4.21
To Lose weight	3.75
Total	**3.82**

Source: Research Findings

4.3.10 The Importance of Cooking Methods Vs. Eating A Varied Diet In The Right Quantities

Respondents were asked whether cooking methods are less important than eating a varied diet. The results revealed a mean score of 3.03, indicating that the runners were indifferent to this, therefore in the employment category, those who work in service and sales, skilled crafts and trades as well as homemakers and technicians agreed.

Figure 18. The importance of cooking methods vs. eating a varied diet in the right quantities by age, gender, club members, employment and reason for running

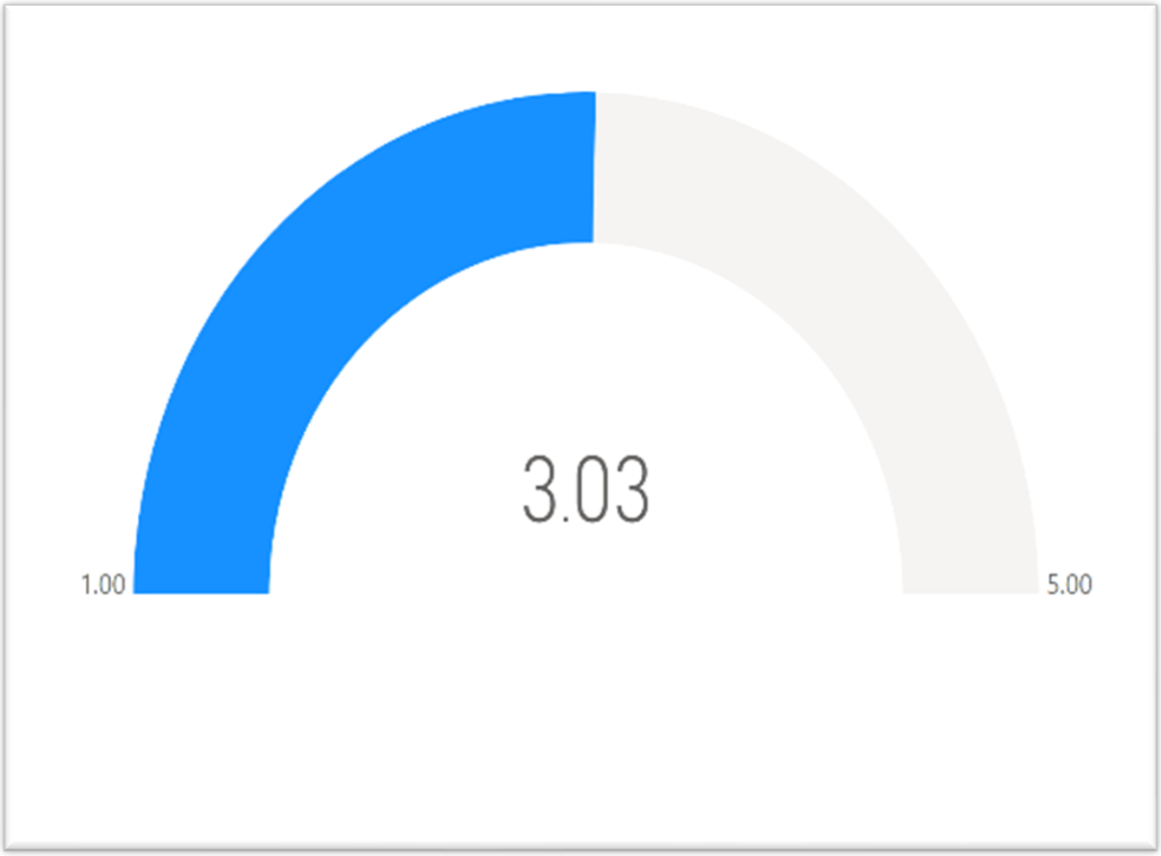


Table 20. Cooking methods are less important than eating a varied diet inh the right quantities by age, gender, club members, employment and reason for running

Age	Mean
15-25	3.10
26-40	2.98
41-55	3.09
56+	2.67
Total	**3.03**

Gender	Mean
Female	3.05
Male	3.01
Total	**3.03**

Member of a Club	Mean
No	3.00
Yes	3.05
Total	**3.03**

Employment Situation	Mean
Armed forces	2.14
Associate professions	3.80
Clerical and administration workers	3.00
Full-time Student	2.90
Management	3.34
Primary level occupations	2.67
Professionals	2.78
Retired	1.50
Self Employed	3.00
Service and sales workers	4.00
Skilled crafts and trades	4.00
Taking care of the home	4.00
Technicians	4.00
Total	**3.03**

Reason for running	Mean
Amateur Athlete	3.09
For Leisure	2.86
Professional Athlete	3.07
To Lose weight	3.00
Total	**3.03**

Source: Research Findings

4.3.11 The Choice of Food Impacting Physical Performance

Athletes were asked whether their choice of food impacts their performance. Essentially, all categories concur that diet affects physical performance. The overall mean score of 4.43 indicates that everyone is in complete agreement.

Figure 19. To what extent do you feel that the food you eat impacts your physical performance

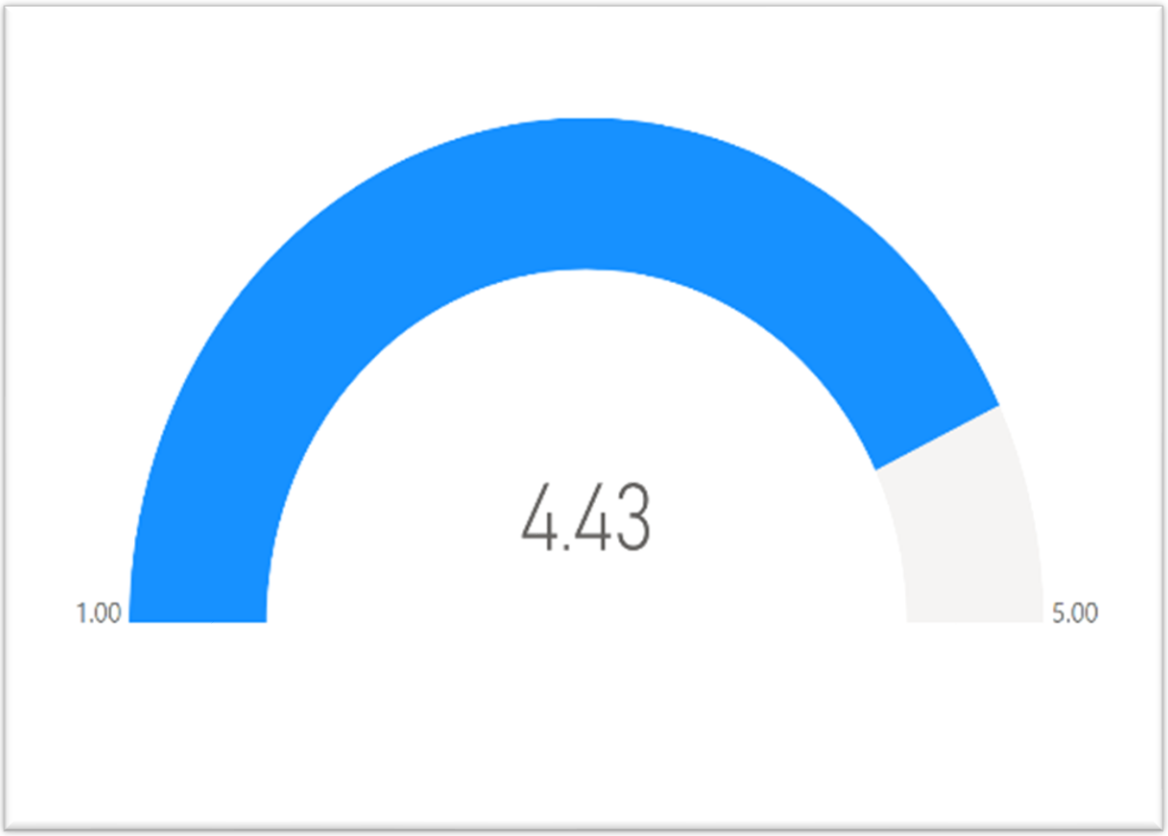


Table 21. To what extent do you feel that the food you eat impacts your physical performance by gender, club members, employment and reason for running

Age	Mean
15-25	4.10
26-40	4.40
41-55	4.49
56+	4.67
Total	**4.43**

Gender	Mean
Female	4.51
Male	4.38
Total	**4.43**

Member of a Club	Mean
No	4.42
Yes	4.44
Total	**4.43**

Employment Situation	Mean
Armed forces	4.43
Associate professions	4.80
Clerical and administration workers	4.57
Full-time Student	4.20
Management	4.37
Primary level occupations	4.00
Professionals	4.40
Retired	5.00
Self Employed	4.54
Service and sales workers	4.75
Skilled crafts and trades	5.00
Taking care of the home	4.00
Technicians	5.00
Total	**4.43**

Reason for running	Mean
Amateur Athlete	4.47
For Leisure	4.50
Professional Athlete	4.21
To Lose weight	3.75
Total	**4.43**

Source: Research Findings

4.3.12 The Frequency of Eating Out at a Restaurant

Respondents were asked how frequently they dine out at restaurants. Figure 20 reveals that the majority of respondents replied once per week, with 46% and 29% responding once per month, respectively. Very few respondents indicated never.

Figure 20. How often would you eat at a restaurant

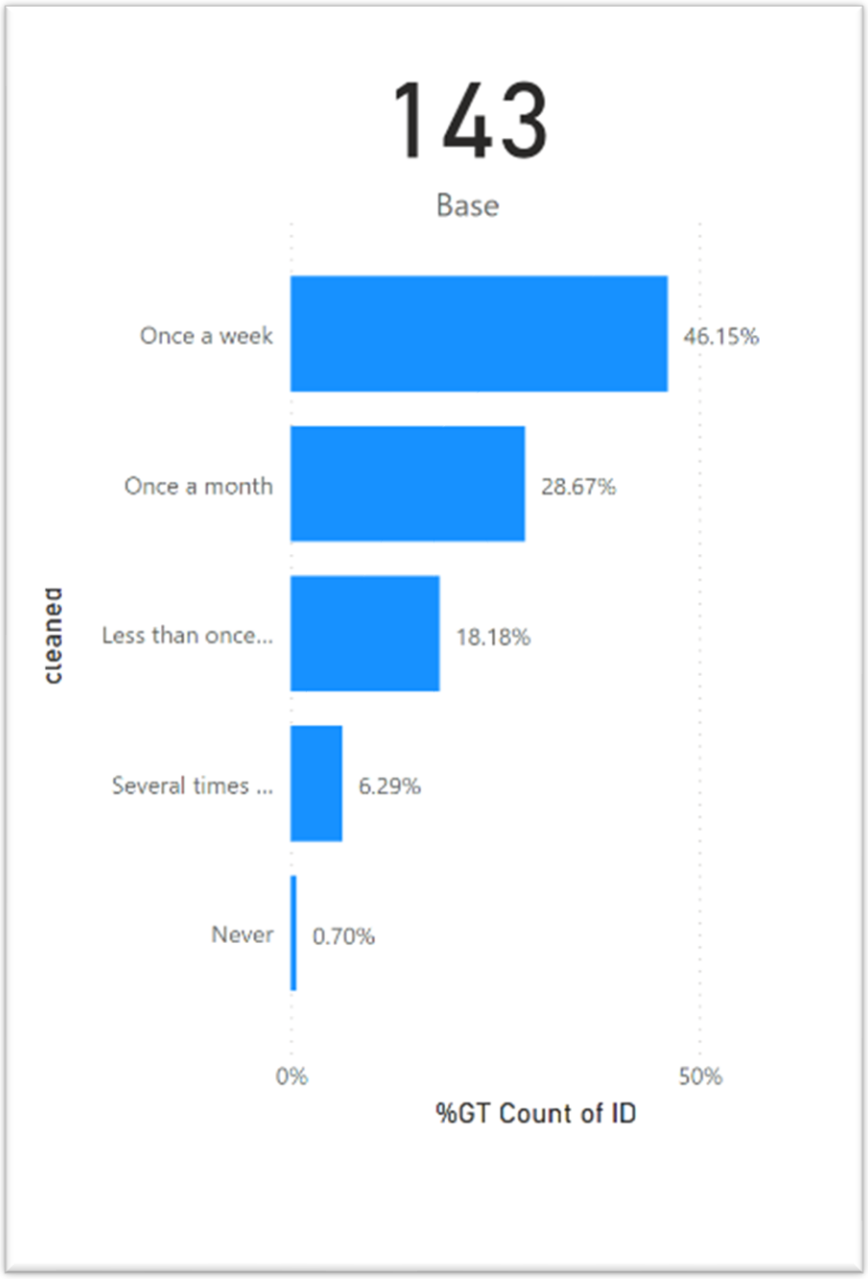


Table 22. How often would you eat at a restaurant by gender, age and reason for running

cleaned	Female	Male	**Total**
Once a week	40.98%	50.00%	**46.15%**
Once a month	31.15%	26.83%	**28.67%**
Less than once a month	22.95%	14.63%	**18.18%**
Several times a week	4.92%	7.32%	**6.29%**
Never		1.22%	**0.70%**

cleaned	15-25	26-40	41-55	56+	**Total**
Once a week	20.00%	46.55%	49.28%	50.00%	**46.15%**
Once a month	60.00%	27.59%	27.54%		**28.67%**
Less than once a month	20.00%	17.24%	15.94%	50.00%	**18.18%**
Several times a week		8.62%	5.80%		**6.29%**
Never			1.45%		**0.70%**

cleaned	Amateur Athlete	For Leisure	Professional Athlete	To Lose weight
Once a week	51.69%	41.67%	35.71%	
Once a month	26.97%	33.33%	21.43%	50.00%
Less than once a month	14.61%	16.67%	35.71%	50.00%
Several times a week	6.74%	5.56%	7.14%	
Never		2.78%		
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Source: Research Findings

4.3.13 Frequency of Using Food Delivery

Participants were asked how often they use food delivery services. It was noted that respondents aged 56+ reveal a high percentage - 83% - of ever having food delivered, with 17% indicating less than once a month. However, professional athletes and athletes seeking to lose weight both scored 50% in terms of never using a food delivery service, while 29% of professional athletes get food delivery once a week and 21% less than once a month. 25% of runners trying to lose weight have food delivered once a week and the other 25% once a month.

Figure 21. Frequency of food deliveries

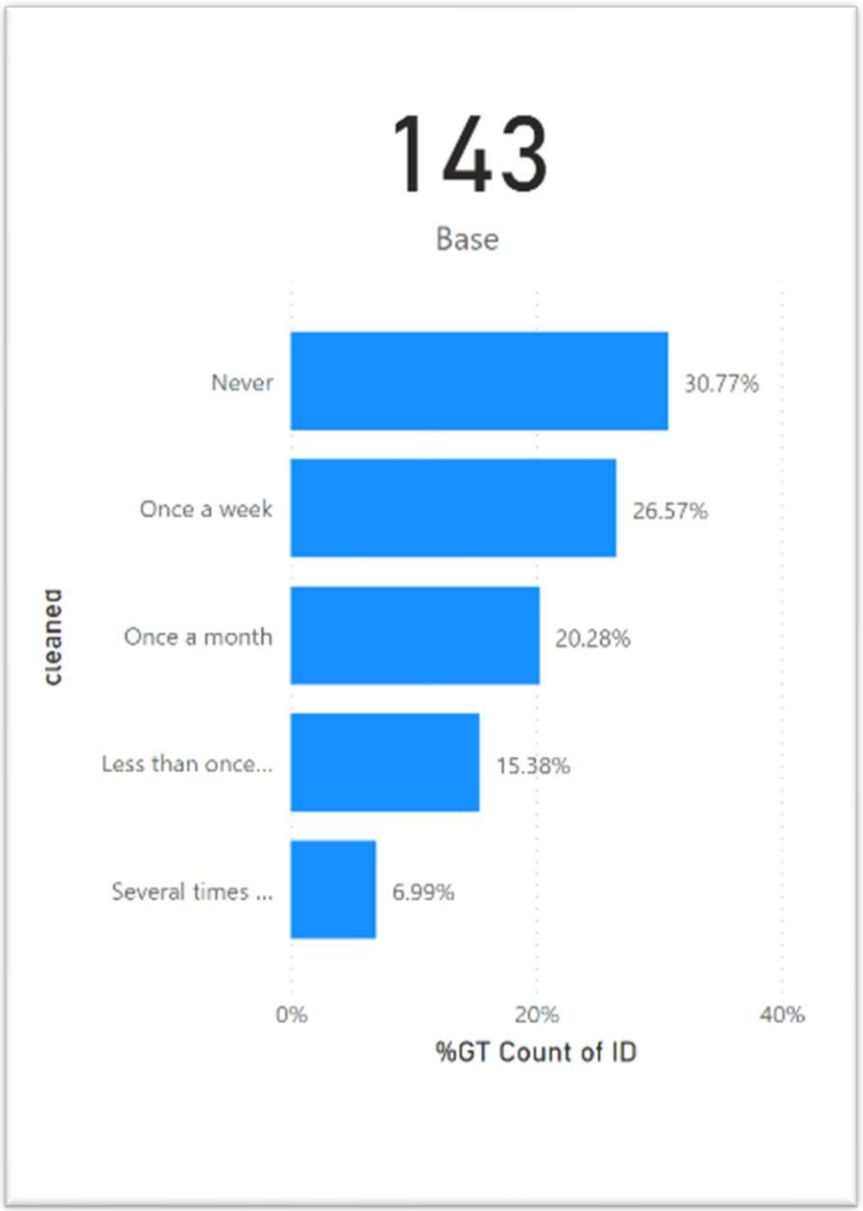


Table 23. Frequency of food deliveries by gender, age and reason for running

cleaned	Female	Male	**Total**
Never	36.07%	26.83%	**30.77%**
Once a week	27.87%	25.61%	**26.57%**
Once a month	14.75%	24.39%	**20.28%**
Less than once a month	14.75%	15.85%	**15.38%**
Several times a week	6.56%	7.32%	**6.99%**

cleaned	15-25	26-40	41-55	56+	**Total**
Never	50.00%	18.97%	33.33%	83.33%	**30.77%**
Once a week	40.00%	22.41%	30.43%		**26.57%**
Once a month		27.59%	18.84%		**20.28%**
Less than once a month	10.00%	18.97%	13.04%	16.67%	**15.38%**
Several times a week		12.07%	4.35%		**6.99%**

cleaned	Amateur Athlete	For Leisure	Professional Athlete	To Lose weight	**Total**
Never	31.46%	19.44%	50.00%	50.00%	**30.77%**
Once a week	23.60%	33.33%	28.57%	25.00%	**26.57%**
Once a month	23.60%	19.44%		25.00%	**20.28%**
Less than once a month	13.48%	19.44%	21.43%		**15.38%**
Several times a week	7.87%	8.33%			**6.99%**

Source: Research Findings

4.3.14 Getting Food Deliveries From Meal Plan Service Providers (Such As Fortify)

Athletes were asked whether they get food delivered from meal plan service providers. According to the responses, 87% of the participants had never utilised a meal plan service, including those aged 56 and beyond. 25% of runners who wished to reduce weight utilised this service once every month; the remaining percentages are distributed across the group.

Figure 22. Getting food deliveries from meal plan service providers (such as Fortify)

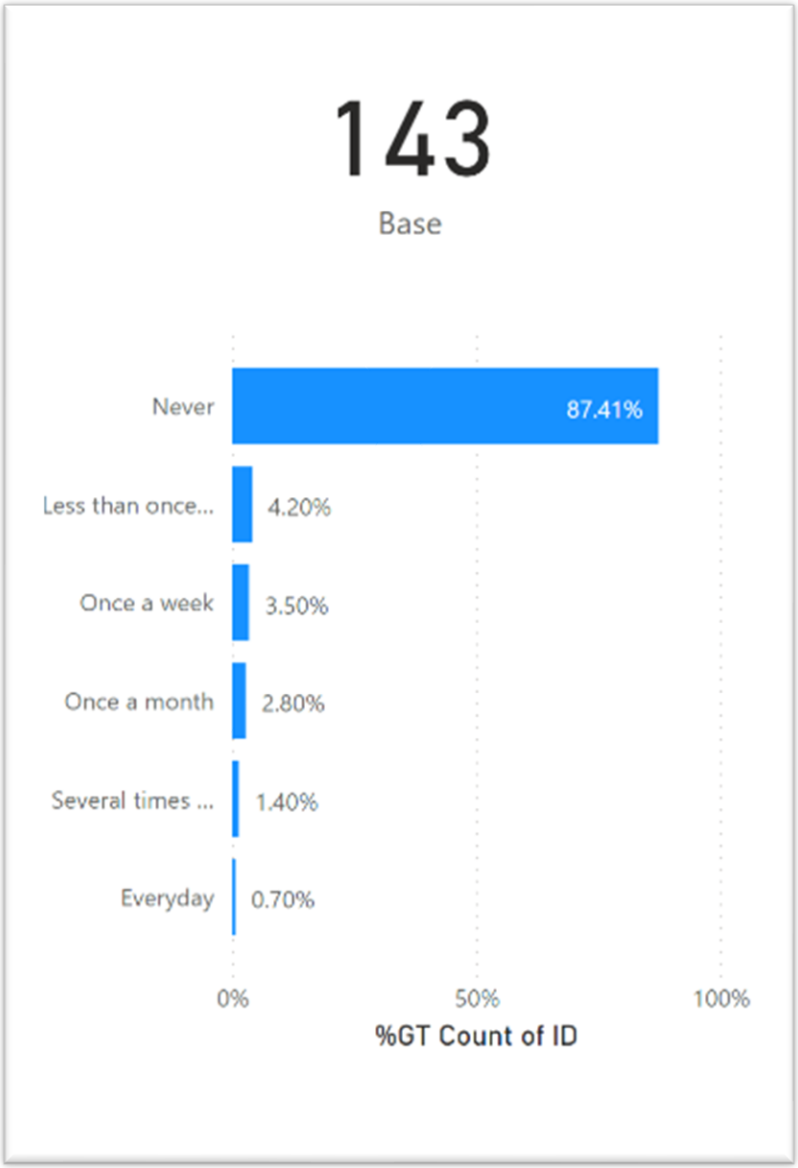


Table 24. Geting food deliveries from meal plan service providers (such asFortify) by geder, age and reason for running

cleaned	Female	Male	Total
Never	83.61%	90.24%	**87.41%**
Less than once a month	3.28%	4.88%	**4.20%**
Once a week	4.92%	2.44%	**3.50%**
Once a month	6.56%		**2.80%**
Several times a week	1.64%	1.22%	**1.40%**
Everyday		1.22%	**0.70%**

cleaned	15-25	26-40	41-55	56+	Total
Never	90.00%	89.66%	84.06%	100.00%	**87.41%**
Less than once a month	10.00%	1.72%	5.80%		**4.20%**
Once a week		5.17%	2.90%		**3.50%**
Once a month		1.72%	4.35%		**2.80%**
Several times a week		1.72%	1.45%		**1.40%**
Everyday			1.45%		**0.70%**

cleaned	Amateur Athlete	For Leisure	Professional Athlete	To Lose weight	Total
Never	88.76%	88.89%	78.57%	75.00%	**87.41%**
Less than once a month	2.25%	5.56%	14.29%		**4.20%**
Once a week	3.37%	2.78%	7.14%		**3.50%**
Once a month	3.37%			25.00%	**2.80%**
Several times a week	1.12%	2.78%			**1.40%**
Everyday	1.12%				**0.70%**

Source: Research Findings

4.3.15 Cooking Lunch/ Dinner At Home

Athletes were asked how often they prepare lunch/ dinner at home. Clearly, 62% percent of respondents prepare their lunch or supper at home every day, while 31% percent do it many times. Very few responses indicated no home cooking at all.
Professional athletes, amateur ones, athletes seeking to lose weight and recreational athletes are all conscientious about preparing their meals at home.

Figure 23. Frequency of cooking or meal-prep lunch/ dinner at home

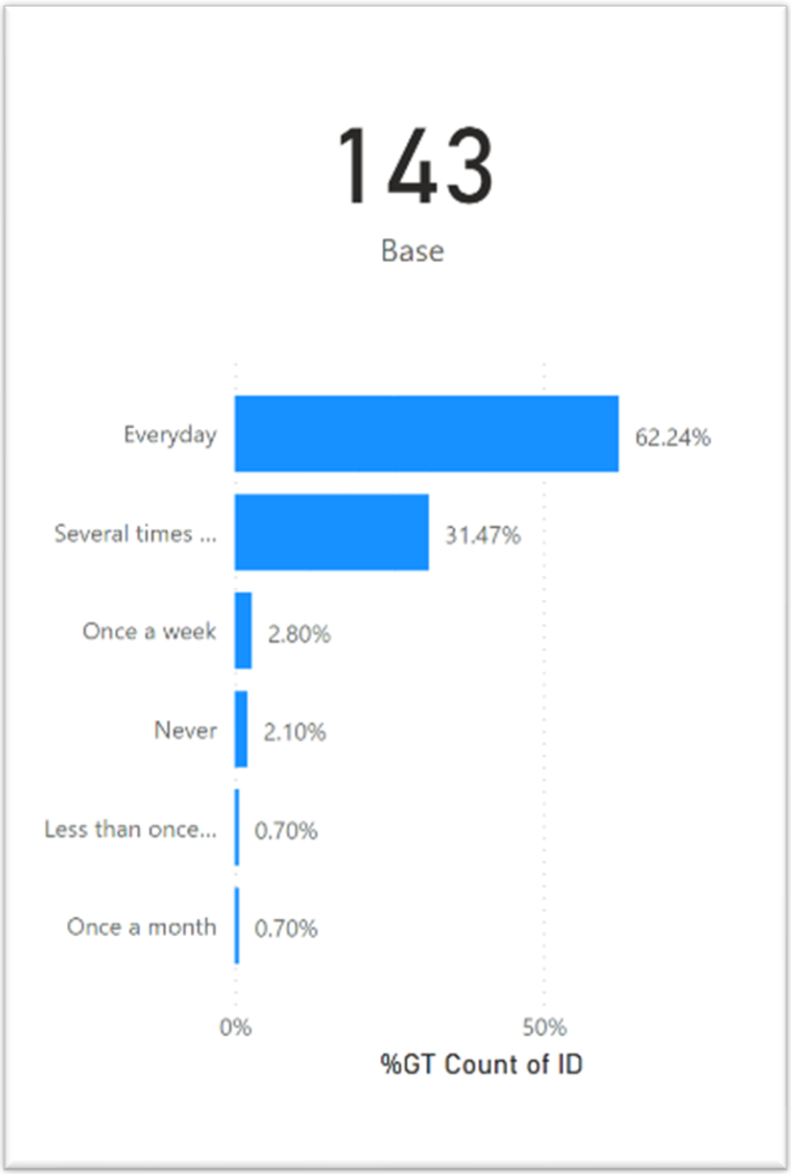


Table 25. Frequency of cooking or meal-prep lunch/ dinner at home by gender, age and reason for running

cleaned	Female	Male	**Total**
Everyday	73.77%	53.66%	**62.24%**
Several times a week	19.67%	40.24%	**31.47%**
Once a week	3.28%	2.44%	**2.80%**
Never	1.64%	2.44%	**2.10%**
Less than once a month	1.64%		**0.70%**
Once a month		1.22%	**0.70%**

cleaned	15-25	26-40	41-55	56+	**Total**
Everyday	70.00%	58.62%	62.32%	83.33%	**62.24%**
Several times a week	20.00%	32.76%	33.33%	16.67%	**31.47%**
Once a week		5.17%	1.45%		**2.80%**
Never	10.00%		2.90%		**2.10%**
Less than once a month		1.72%			**0.70%**
Once a month		1.72%			**0.70%**

cleaned	Amateur Athlete	For Leisure	Professional Athlete	To Lose weight	**Total**
Everyday	65.17%	50.00%	71.43%	75.00%	**62.24%**
Several times a week	31.46%	38.89%	14.29%	25.00%	**31.47%**
Once a week	2.25%	5.56%			**2.80%**
Never		5.56%	7.14%		**2.10%**
Less than once a month			7.14%		**0.70%**
Once a month	1.12%				**0.70%**

Source: Research Findings

4.3.16 Best Describing Food Planning Via A Nutritionist Vs. Their Own Diet

Participants were asked whether they consult a nutritionist or they create their own diet. As seen in figure 24, 85% of the respondents; that is, the runners, create their own diet plans, while just 15% use a nutritionist. Professional athletes and those who wish to lose weight are mostly guided by a nutritionist.

Figure 24. Which of the following best describes your food planning

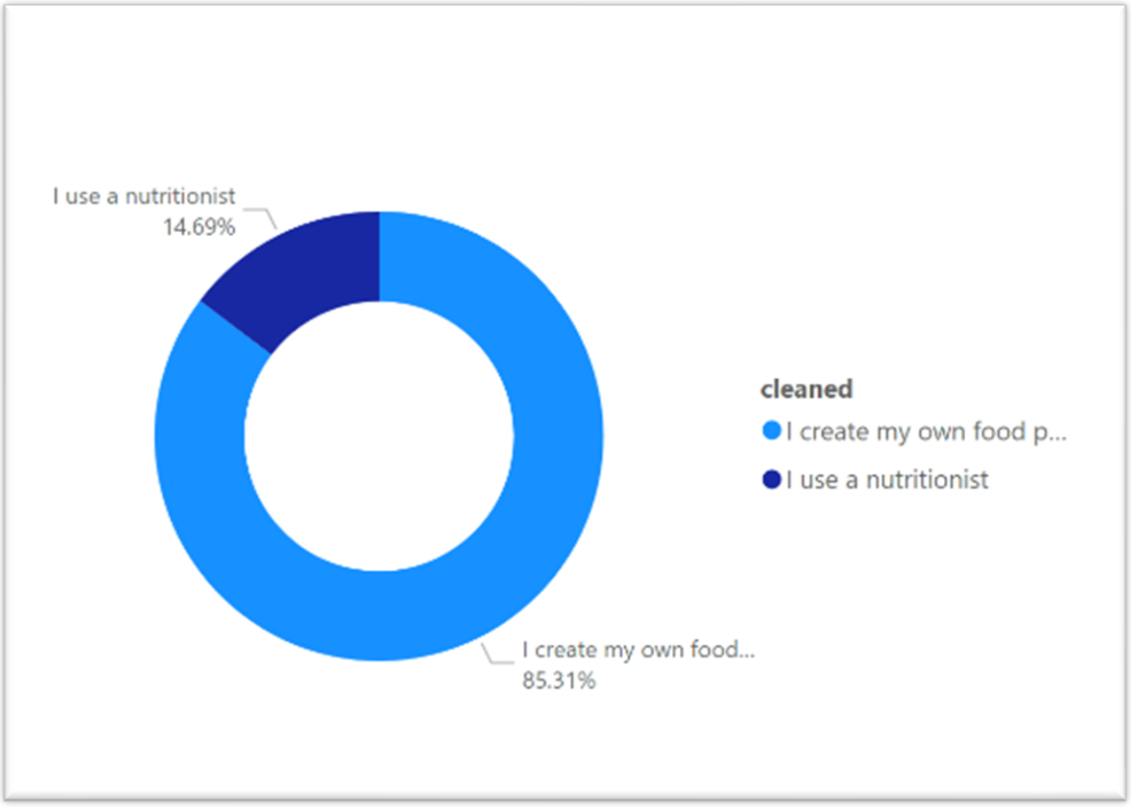


Table 26. Which of the following best describes your food planning by age, gender and reason for running

Age	I create my own food plan	I use a nutritionist
15-25	100.00%	
26-40	81.03%	18.97%
41-55	85.51%	14.49%
56+	100.00%	
Total	**85.31%**	**14.69%**

Gender	I create my own food plan	I use a nutritionist
Female	83.61%	16.39%
Male	86.59%	13.41%
Total	**85.31%**	**14.69%**

Reason for running	I create my own food plan	I use a nutritionist
Amateur Athlete	87.64%	12.36%
For Leisure	88.89%	11.11%
Professional Athlete	64.29%	35.71%
To Lose weight	75.00%	25.00%
Total	**85.31%**	**14.69%**

Source: Research Findings

4.3.17 Consuming a Meal Before A Long Run

The respondents were asked how long before a long run they usually eat. The results of consuming meals before a long run are 48% (2- 3hr before), 39% (more than 3 hours before) and13% (within an hour before).

The majority of runners consume meals two to three hours before a long run, but no élite athletes or athletes aged 56 or older report eating within the preceding hour.

Figure 25. How long before a long run do you consume a meal

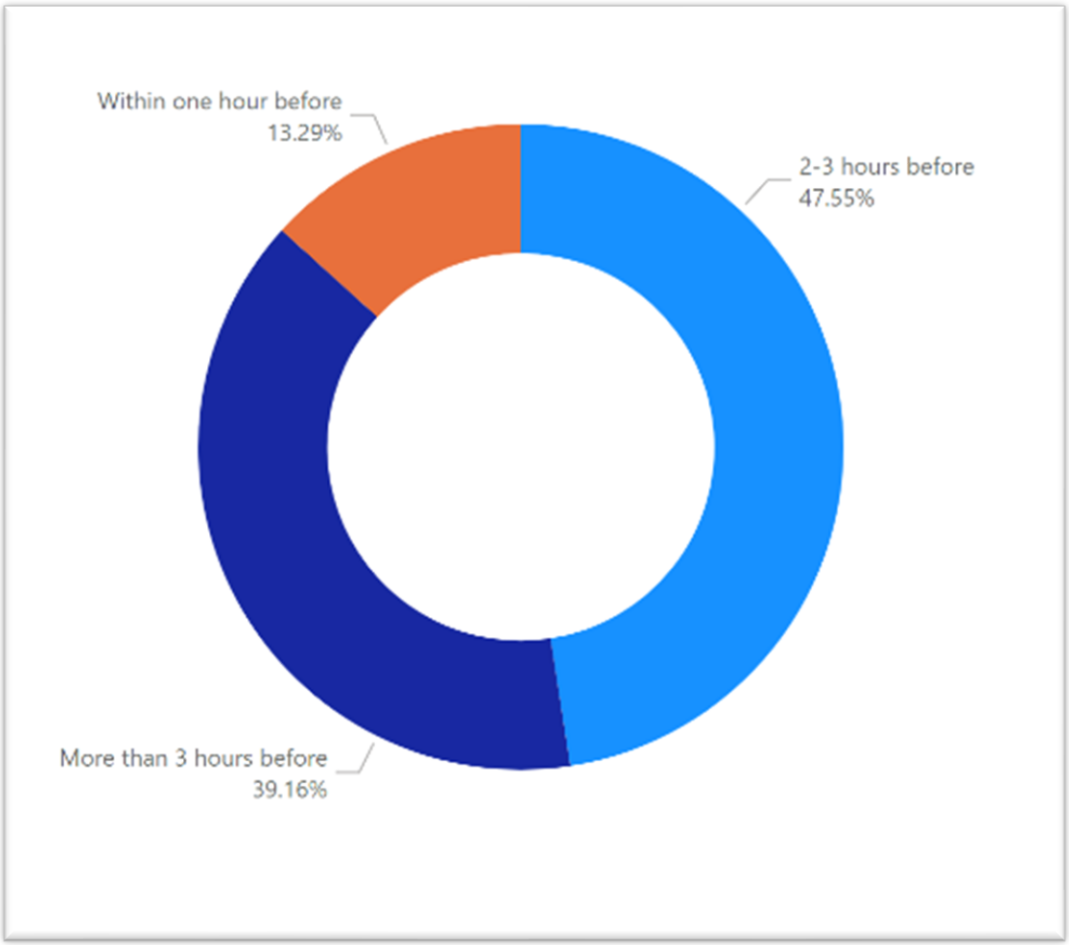


Table 27. How long before a long run do you consume a meal by age, gender and reason for running

Age	2-3 hours before	More than 3 hours before	Within one hour before
15-25	90.00%	10.00%	
26-40	44.83%	34.48%	20.69%
41-55	43.48%	46.38%	10.14%
56+	50.00%	50.00%	
Total	**47.55%**	**39.16%**	**13.29%**

Gender	2-3 hours before	More than 3 hours before	Within one hour before
Female	54.10%	27.87%	18.03%
Male	42.68%	47.56%	9.76%
Total	**47.55%**	**39.16%**	**13.29%**

Reason for running	2-3 hours before	More than 3 hours before	Within one hour before
Amateur Athlete	49.44%	38.20%	12.36%
For Leisure	33.33%	47.22%	19.44%
Professional Athlete	71.43%	28.57%	
To Lose weight	50.00%	25.00%	25.00%
Total	**47.55%**	**39.16%**	**13.29%**

Source: Research Findings

4.3.18 Starchy Foods That Should Be Eaten Before a Long Run

Athletes were asked whether they agree that starchy food should be eaten before a long run. A total of 80% percent of respondents believe that starchy meals should be consumed before a long run, while 20% percent disagree. Professional athletes and runners concur with a score of 100 percent.

Figure 26. Do you agree that starchy foods (e.g. bread, cold cereal, pasta, fruits, and vegetables) should be eaten before a long run

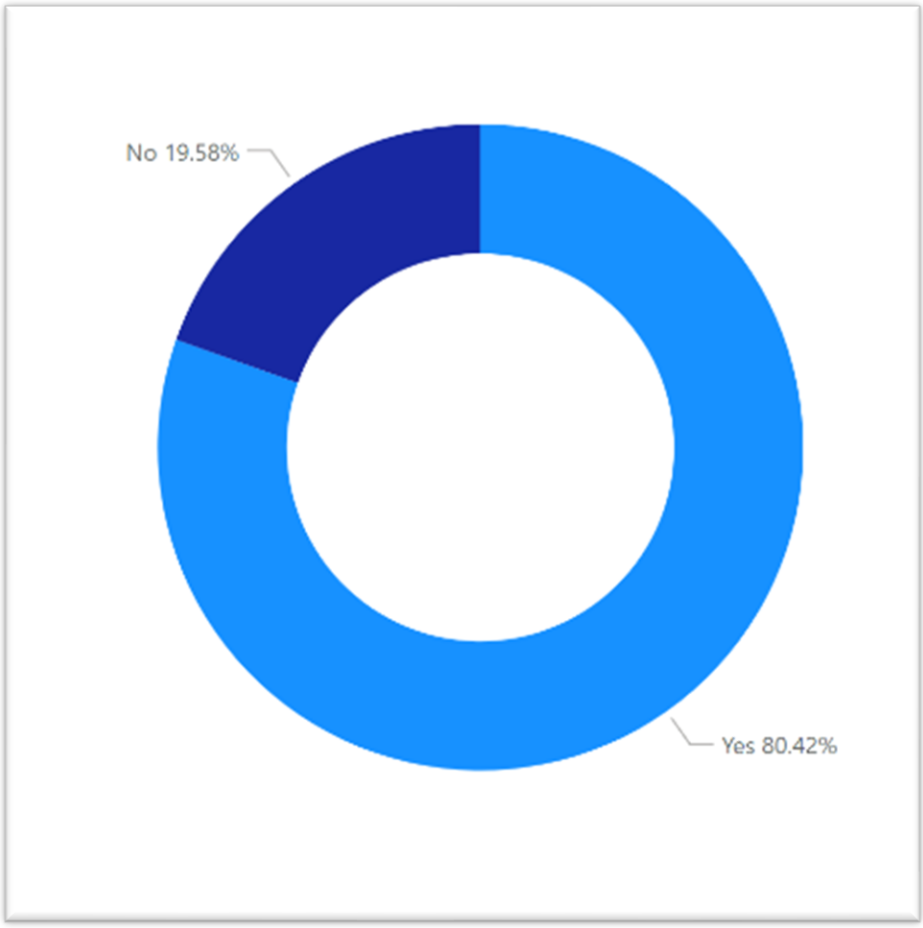


Table 28. Do you agree that starchy foods (e.g. bread, cold cereal, pasta, fruits, and vegetables) should be eaten before a long run by age, gende and reason for running

Age	No	Yes
15-25	10.00%	90.00%
26-40	17.24%	82.76%
41-55	23.19%	76.81%
56+	16.67%	83.33%
Total	**19.58%**	**80.42%**

Gender	No	Yes
Female	14.75%	85.25%
Male	23.17%	76.83%
Total	**19.58%**	**80.42%**

Reason for running	No	Yes
Amateur Athlete	23.60%	76.40%
For Leisure	19.44%	80.56%
Professional Athlete		100.00%
To Lose weight		100.00%
Total	**19.58%**	**80.42%**

Source: Research Findings

4.3.19 Drinking Before a Long Run

Participants were asked what they drink before a long run. According to the response, before a long run, athletes consume water at a rate of 42%, followed by electrolyte drinks at 36%, protein drinks at 21% and coffee and caffeine products at 1%. As seen in Figure 26, males consume more water than females while females consume more electrolytes, protein drinks and coffee.

Figure 27. What do you drink before a long run

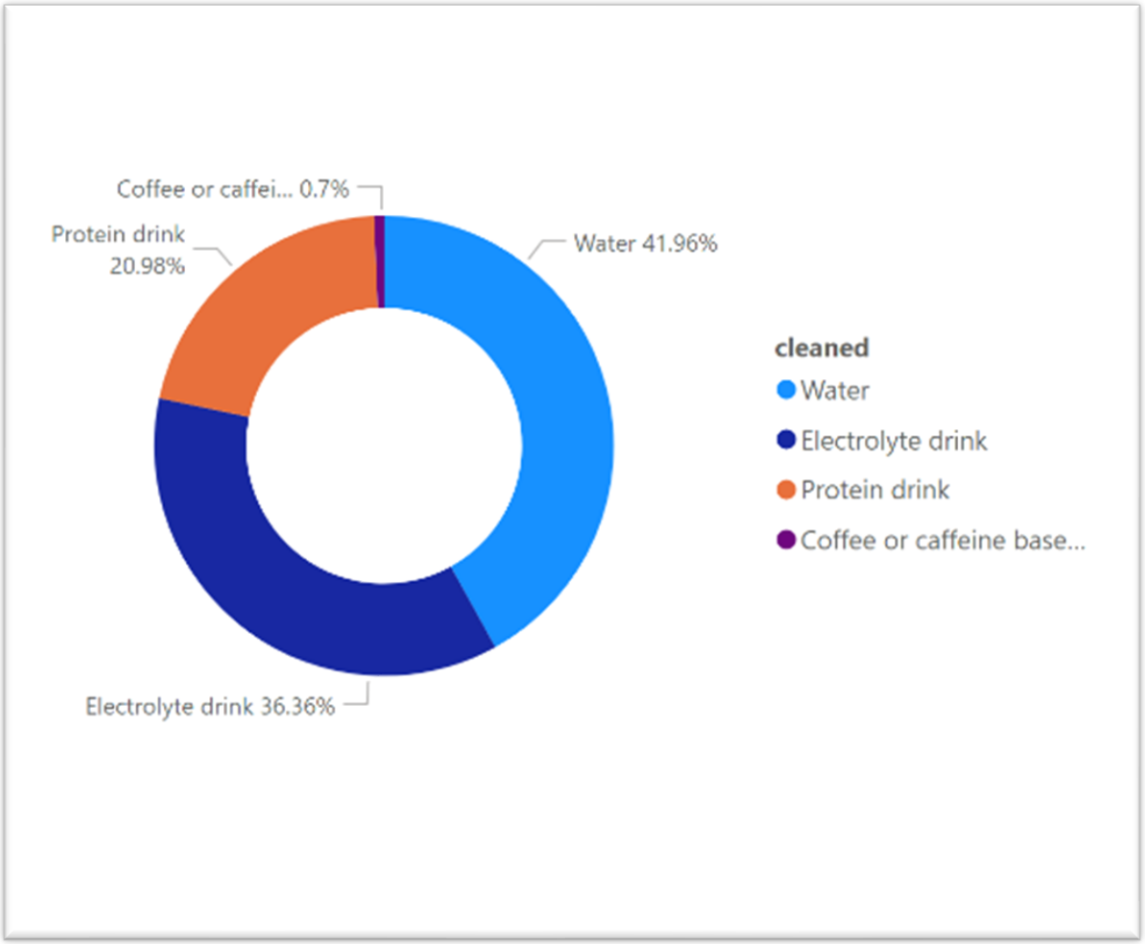


Table 29. Do you agree that starchy foods (e.g. bread, cold cereal, pasta, fruits, and vegetables) should be eaten before a long run by age, gender, and reason for running

Age	Coffee or caffeine based product	Electrolyte drink	Protein drink	Water
15-25		30.00%	20.00%	50.00%
26-40		36.21%	18.97%	44.83%
41-55	1.45%	36.23%	23.19%	39.13%
56+		50.00%	16.67%	33.33%
Total	**0.70%**	**36.36%**	**20.98%**	**41.96%**

Gender	Coffee or caffeine based product	Electrolyte drink	Protein drink	Water
Female	1.64%	40.98%	27.87%	29.51%
Male		32.93%	15.85%	51.22%
Total	**0.70%**	**36.36%**	**20.98%**	**41.96%**

Reason for running	Coffee or caffeine based product	Electrolyte drink	Protein drink	Water
Amateur Athlete	1.12%	38.20%	22.47%	38.20%
For Leisure		27.78%	19.44%	52.78%
Professional Athlete		50.00%	21.43%	28.57%
To Lose weight		25.00%		75.00%
Total	**0.70%**	**36.36%**	**20.98%**	**41.96%**

Source: Research Findings

4.3.20 Eating After a Long Run

Participants were asked how soon they eat after a long run. 59% of the outcomes occurred between 31 minutes and an hour, 23% within 30 minutes, 16% between 2 and 3 hours and 2% beyond 3 hours. Only 23% replied in terms of the actual timing of eating food after a long run.

Figure 28. How soon after a long run do you eat

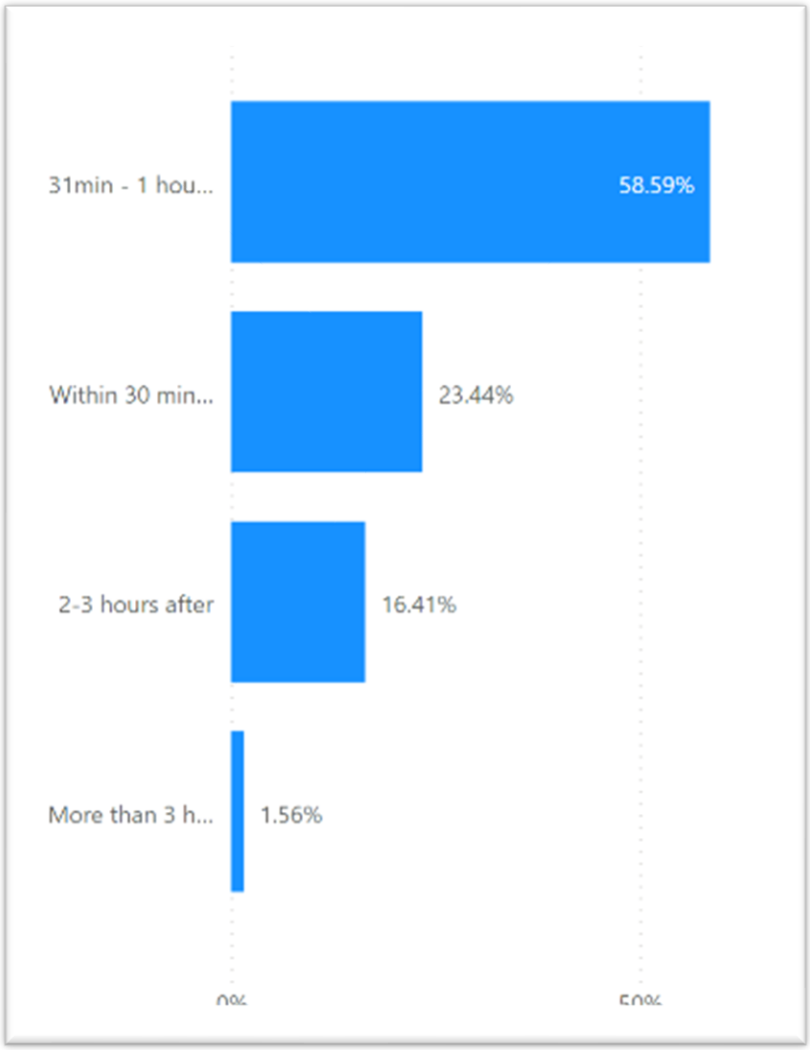


Table 30.How soon after a long run do you eat by gender, age, and reason for running

cleaned	Female	Male	**Total**
31min - 1 hour after	61.82%	56.16%	**58.59%**
Within 30 minutes	27.27%	20.55%	**23.44%**
2-3 hours after	10.91%	20.55%	**16.41%**
More than 3 hours after		2.74%	**1.56%**

cleaned	15-25	26-40	41-55	56+	**Total**
31min - 1 hour after	87.50%	60.00%	55.00%	40.00%	**58.59%**
Within 30 minutes	12.50%	25.45%	21.67%	40.00%	**23.44%**
2-3 hours after		14.55%	20.00%	20.00%	**16.41%**
More than 3 hours after			3.33%		**1.56%**

cleaned	Amateur Athlete	For Leisure	Professional Athlete	To Lose weight	**Total**
31min - 1 hour after	53.25%	66.67%	54.55%	100.00%	**58.59%**
Within 30 minutes	28.57%	16.67%	18.18%		**23.44%**
2-3 hours after	16.88%	13.89%	27.27%		**16.41%**
More than 3 hours after	1.30%	2.78%			**1.56%**

Source: Research Findings

4.3.21 Food / Fluid Consumed During Long-Distance Running

Respondents were asked about their use of electrolyte drinks, protein drinks, carbohydrate gels, chews, and protein bars while running or competing. The findings were as follows: 74% electrolytes, 12% protein beverages, 6% carb gel and chews and 3% protein bars. In figure 28, respondents between the ages of 15 and 25 who wish to reduce weight just consume electrolytes beverages.

Figure 29. Fluids/ food used while training/ racing for long-distance running by age, gender and reason for running

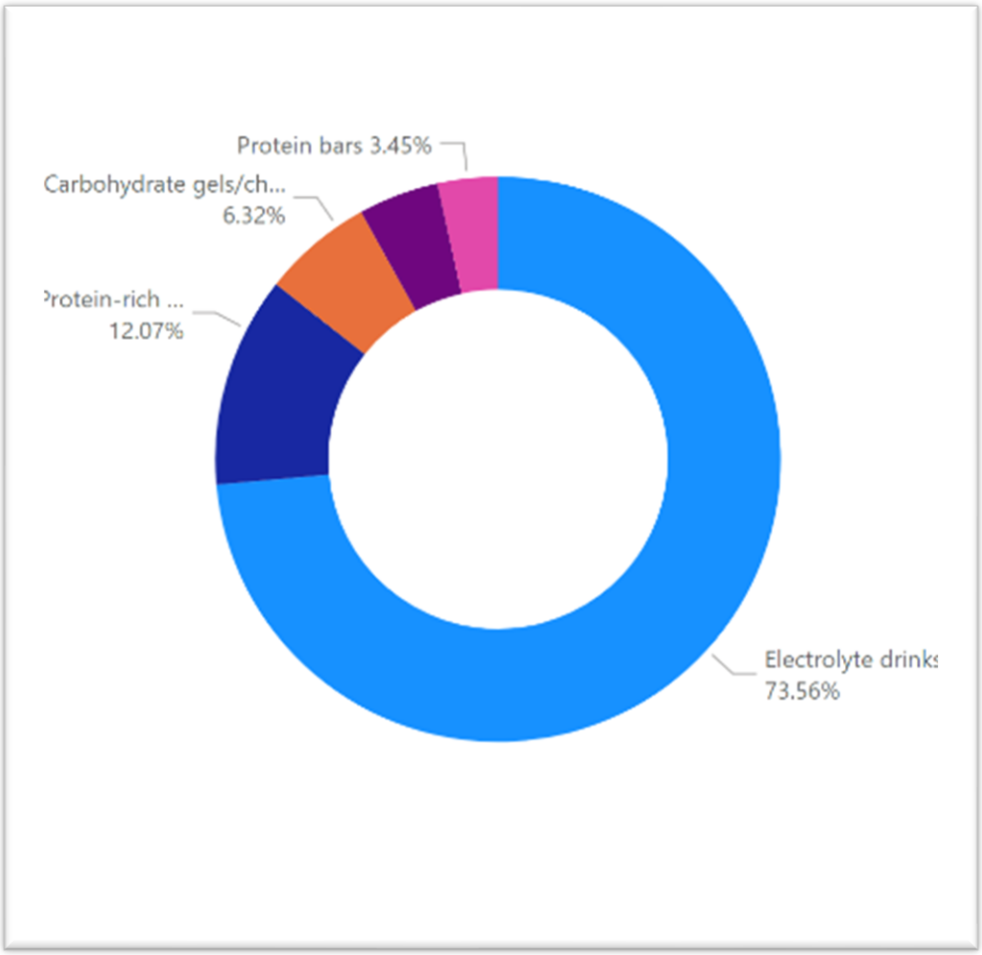


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Table 31. Fluids/ food used while training/ racing for long-distance running by age, gender and reason for running

Age	Carbohydrate gels/chews	Electrolyte drinks	Energy bars	Protein bars	Protein-rich drinks
15-25		80.00%			20.00%
26-40	8.11%	70.27%	6.76%	4.05%	10.81%
41-55	4.94%	77.78%	2.47%	2.47%	12.35%
56+	11.11%	55.56%	11.11%	11.11%	11.11%
Total	**6.32%**	**73.56%**	**4.60%**	**3.45%**	**12.07%**

Gender	Carbohydrate gels/chews	Electrolyte drinks	Energy bars	Protein bars	Protein-rich drinks
Female	7.23%	67.47%	6.02%	4.82%	14.46%
Male	5.49%	79.12%	3.30%	2.20%	9.89%
Total	**6.32%**	**73.56%**	**4.60%**	**3.45%**	**12.07%**

Reason for running	Carbohydrate gels/chews	Electrolyte drinks	Energy bars	Protein bars	Protein-rich drinks
Amateur Athlete	5.94%	77.23%	3.96%	2.97%	9.90%
For Leisure	7.55%	66.04%	5.66%	3.77%	16.98%
Professional Athlete	6.25%	68.75%	6.25%	6.25%	12.50%
To Lose weight		100.00%			
Total	**6.32%**	**73.56%**	**4.60%**	**3.45%**	**12.07%**

Source: Research Findings

4.3.22 Drinking After Running

Participants were asked what they drink after a long run. This survey showed that after a long run, 42% of participants consumed water, 36% electrolytes, 21% protein drinks and 1% coffee or caffeinated beverages.

This survey indicates that men consume more water than women: 52% vs 30%. However, women take more electrolytes, protein drinks and coffee after running than men. Professional runners and those aged 56 and older are more likely to drink electrolytes than weight-loss runners.

Figure 30. Drinking after a training run

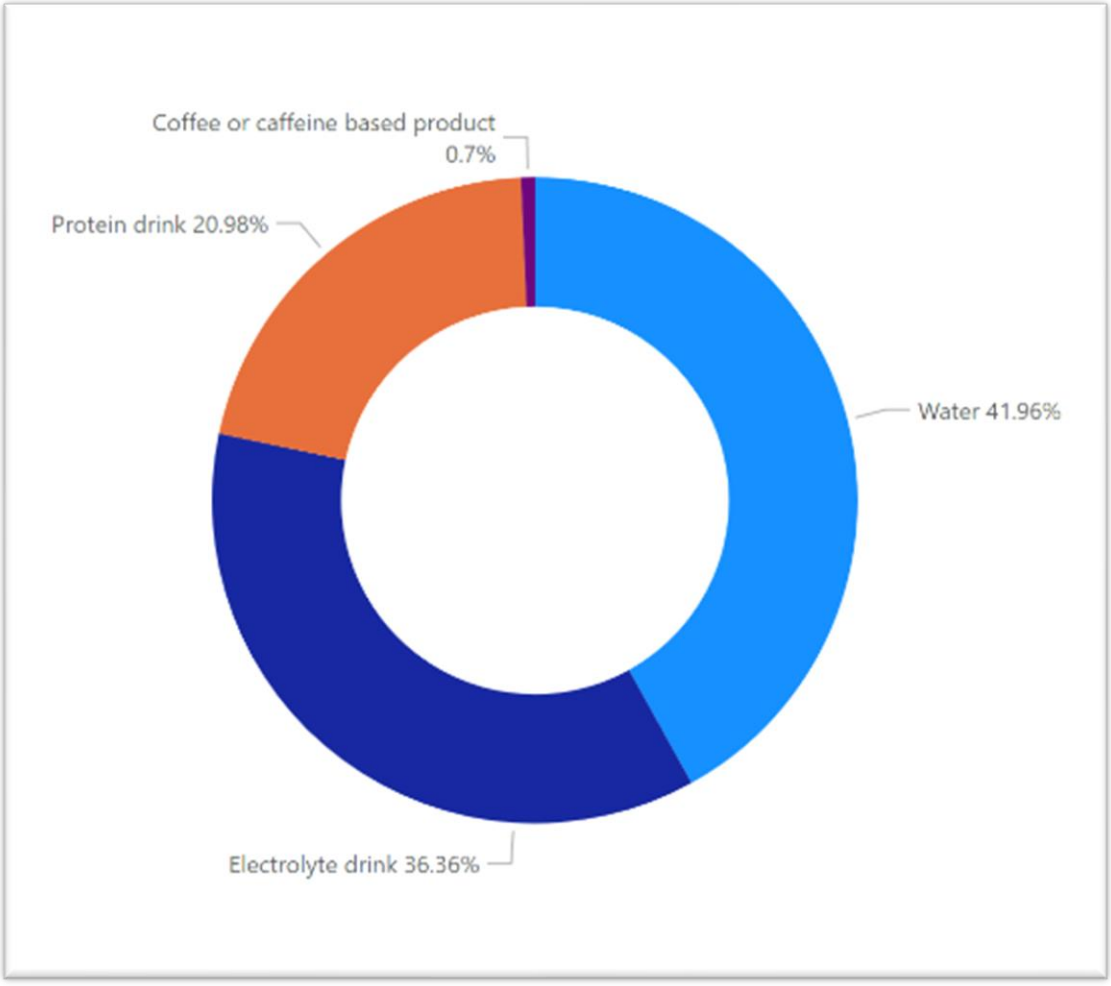

Table 32. Drinking after a training run by age, gender, and reason for running

Age	Coffee or caffeine based product	Electrolyte drink	Protein drink	Water
15-25		30.00%	20.00%	50.00%
26-40		36.21%	18.97%	44.83%
41-55	1.45%	36.23%	23.19%	39.13%
56+		50.00%	16.67%	33.33%
Total	**0.70%**	**36.36%**	**20.98%**	**41.96%**

Gender	Coffee or caffeine based product	Electrolyte drink	Protein drink	Water
Female	1.64%	40.98%	27.87%	29.51%
Male		32.93%	15.85%	51.22%
Total	**0.70%**	**36.36%**	**20.98%**	**41.96%**

Reason for running	Coffee or caffeine based product	Electrolyte drink	Protein drink	Water
Amateur Athlete	1.12%	38.20%	22.47%	38.20%
For Leisure		27.78%	19.44%	52.78%
Professional Athlete		50.00%	21.43%	28.57%
To Lose weight		25.00%		75.00%
Total	**0.70%**	**36.36%**	**20.98%**	**41.96%**

Source: Research Findings

4.3.23 Food To Eat After a Long Run

Athletes were asked what they should eat after a long run; whether carbohydrates, protein or both. The greatest proportion of respondents to this question was 61% (both), followed by 29% (protein) and 10% (carbohydrates) . Between the ages of 15 and 25, 100% of respondents replied that they consume both protein and carbohydrates. Professional athletes have the greatest reaction rate of 71%, ingesting both carbohydrates and protein, compared to 29 percent, who simply take protein. 50% responded (both) while 50% replied (protein) solely. This related to runners seeking to reduce their weight. Males scored 70% regarding the consumption of both protein and carbohydrates after exercise, while females scored 49%.

Figure 31. Which of the following should you eat after a long run

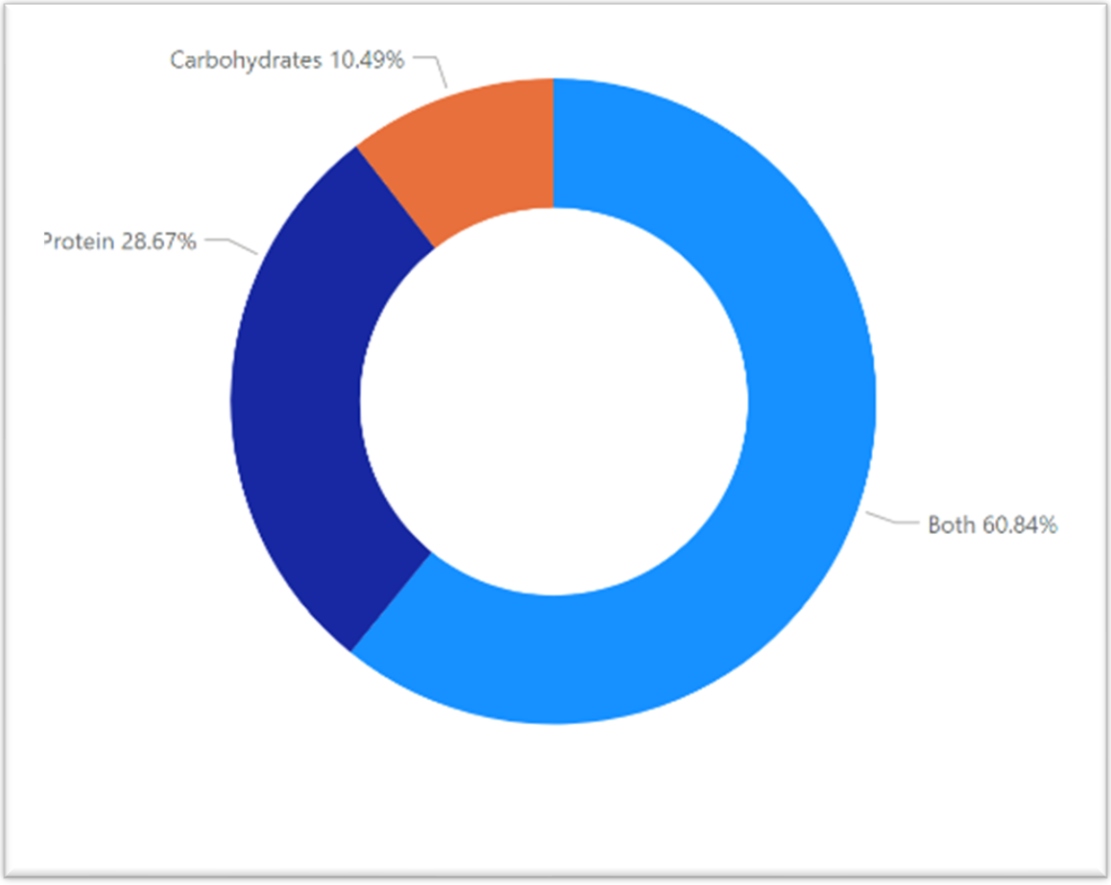

Table 33. Which of the following should you eat after a long run by age, gender and reason for running

Age	Both	Carbohydrates	Protein
15-25	100.00%		
26-40	62.07%	12.07%	25.86%
41-55	53.62%	10.14%	36.23%
56+	66.67%	16.67%	16.67%
Total	**60.84%**	**10.49%**	**28.67%**

Gender	Both	Carbohydrates	Protein
Female	49.18%	13.11%	37.70%
Male	69.51%	8.54%	21.95%
Total	**60.84%**	**10.49%**	**28.67%**

Reason for running	Both	Carbohydrates	Protein
Amateur Athlete	62.92%	12.36%	24.72%
For Leisure	52.78%	11.11%	36.11%
Professional Athlete	71.43%		28.57%
To Lose weight	50.00%		50.00%
Total	**60.84%**	**10.49%**	**28.67%**

Source: Research Findings

4.3.24 Breakfast Before a Long Run

Athletes were asked what breakfast they eat before running. 30% of participants like to have nothing before a morning run, 27% prefer peanut butter on toast and coffee, 18% toast with jam and coffee, 16% porridge with fruit and tea and 9% cereal with milk.
Male amateur athletes who run for recreation and runners between the ages of 15 and 25 are more likely to run in the morning without eating.

Figure 32. Before a long run/race in the morning, breakfast

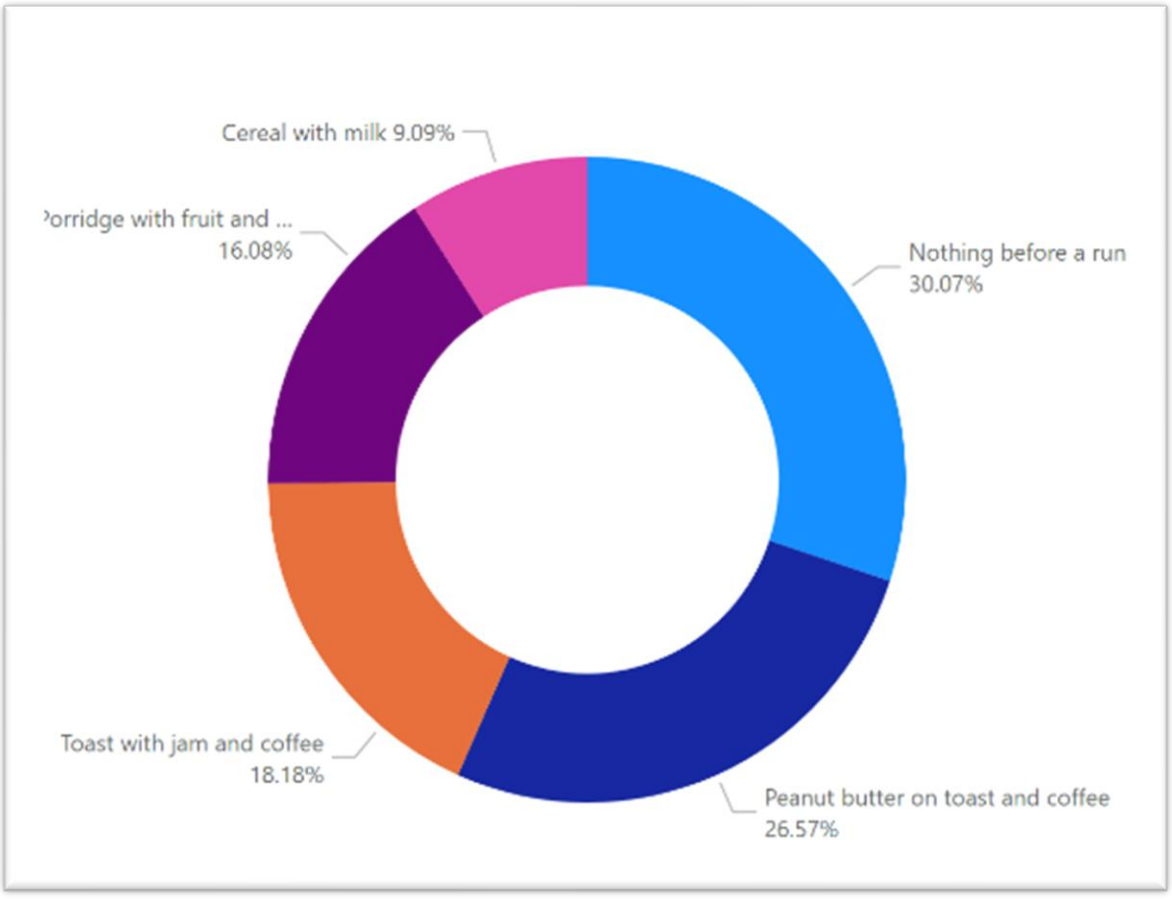

Table 34. Before a long run/race in the morning, breakfast by age, gender and reasons for running

Age	Cereal with milk	Nothing before a run	Peanut butter on toast and coffee	Porridge with fruit and tea	Toast with jam and coffee
15-25	30.00%	30.00%		30.00%	10.00%
26-40	8.62%	29.31%	25.86%	17.24%	18.97%
41-55	5.80%	31.88%	30.43%	14.49%	17.39%
56+	16.67%	16.67%	33.33%		33.33%
Total	**9.09%**	**30.07%**	**26.57%**	**16.08%**	**18.18%**

Gender	Cereal with milk	Nothing before a run	Peanut butter on toast and coffee	Porridge with fruit and tea	Toast with jam and coffee
Female	8.20%	19.67%	31.15%	26.23%	14.75%
Male	9.76%	37.80%	23.17%	8.54%	20.73%
Total	**9.09%**	**30.07%**	**26.57%**	**16.08%**	**18.18%**

Reason for running	Cereal with milk	Nothing before a run	Peanut butter on toast and coffee	Porridge with fruit and tea	Toast with jam and coffee
Amateur Athlete	12.36%	30.34%	28.09%	14.61%	14.61%
For Leisure		38.89%	22.22%	13.89%	25.00%
Professional Athlete	7.14%	14.29%	21.43%	28.57%	28.57%
To Lose weight	25.00%		50.00%	25.00%	
Total	**9.09%**	**30.07%**	**26.57%**	**16.08%**	**18.18%**

Source: Research Findings

4.3.25 Nutritional Supplements Intake

Participants were asked whether they take any nutritional supplements. The majority of individuals responded affirmatively, with 67% using nutritional supplements, while 33% do not do so. Professional athletes reported the greatest proportion of supplement used at 86%.

Figure33. Nutritional supplements taken

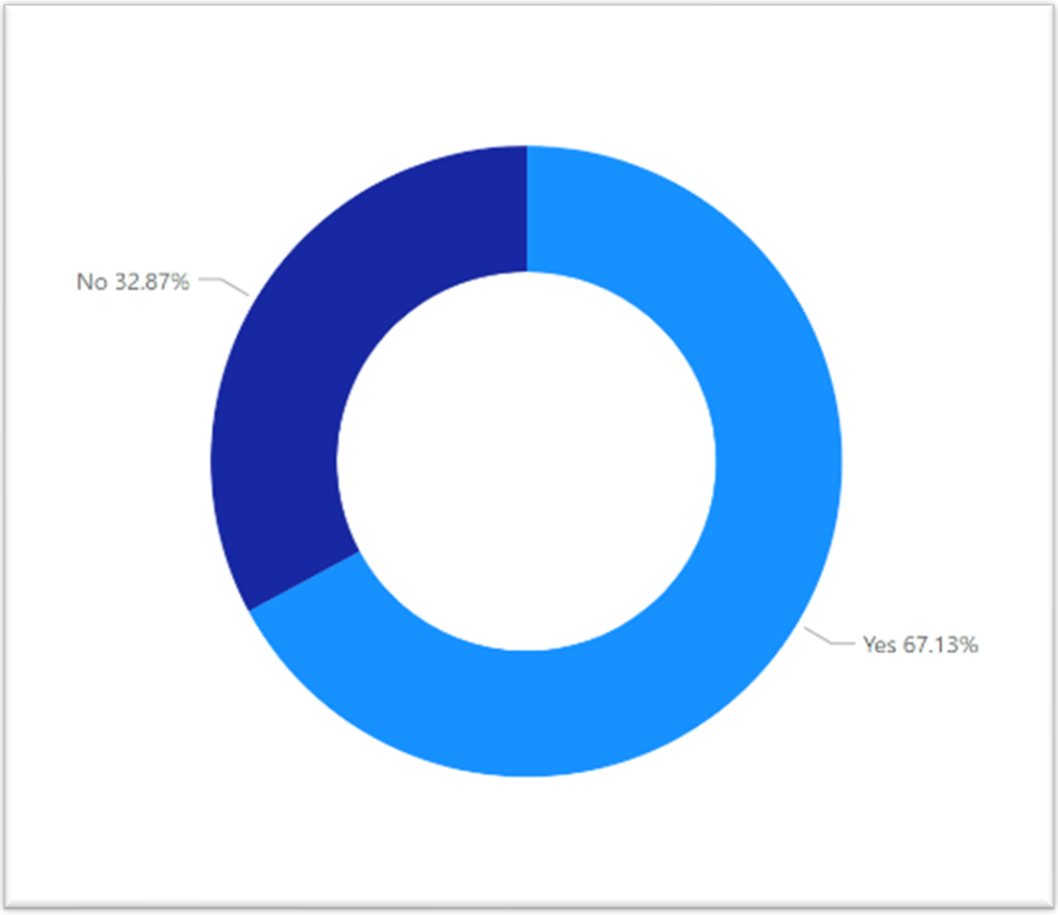

Table 35. Nutritional supplements taken by age, gender and reason for running

Age	No	Yes
15-25	50.00%	50.00%
26-40	27.59%	72.41%
41-55	33.33%	66.67%
56+	50.00%	50.00%
Total	**32.87%**	**67.13%**

Gender	No	Yes
Female	26.23%	73.77%
Male	37.80%	62.20%
Total	**32.87%**	**67.13%**

Reason for running	No	Yes
Amateur Athlete	29.21%	70.79%
For Leisure	47.22%	52.78%
Professional Athlete	14.29%	85.71%
To Lose weight	50.00%	50.00%
Total	**32.87%**	**67.13%**

Source: Research Findings

4.3.26 Types of Supplements

Respondents were asked which supplements they take from protein shakes, vitamins, minerals and energy drinks. The results were: 42% from protein shakse, 34% vitamins, 15% energy drinks and 9% minerals.

Figure 34. Supplements based

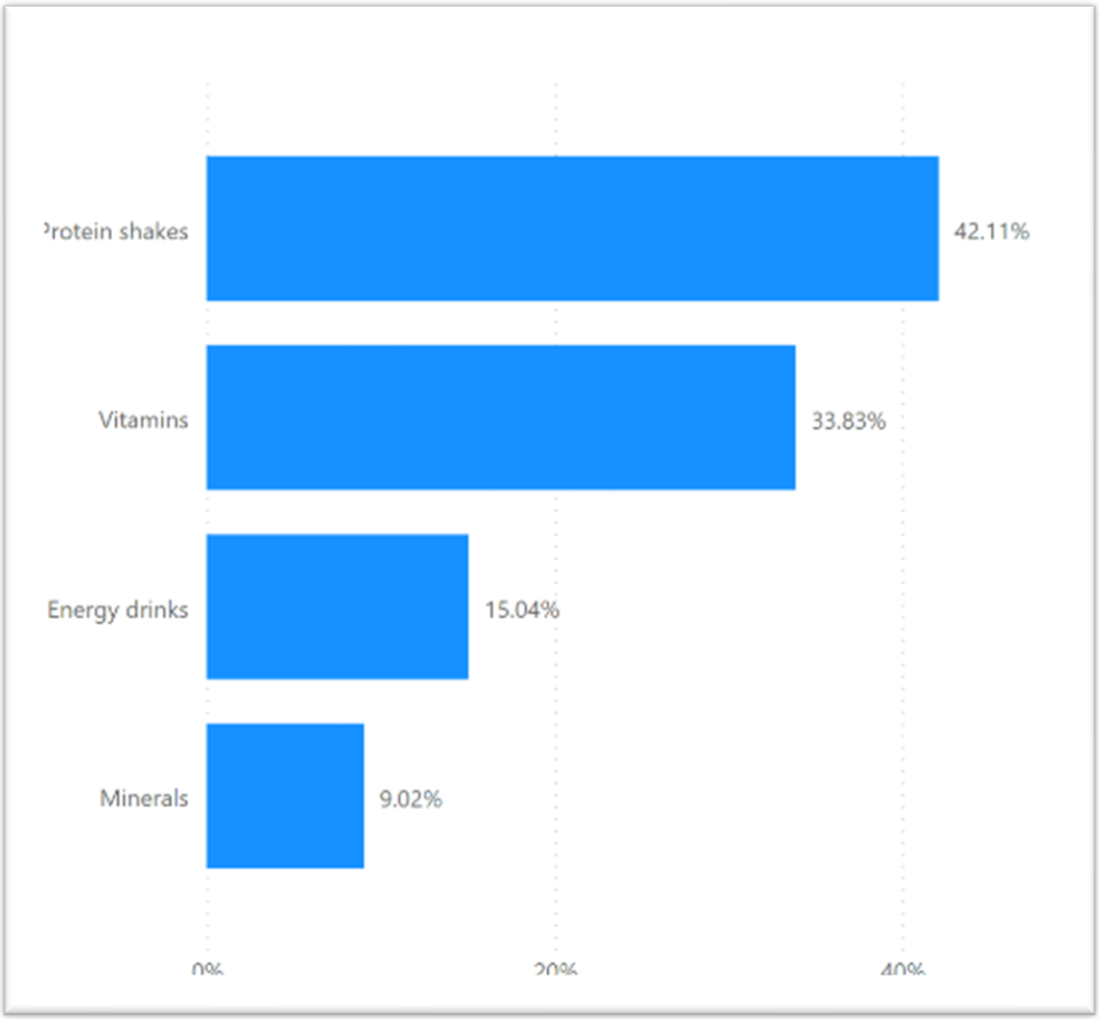

Table 36. Nutritional supplements taken by age, gender and reason for running

Age	Energy drinks	Minerals	Protein shakes	Vitamins
15-25	14.29%	14.29%	42.86%	28.57%
26-40	13.33%	10.00%	43.33%	33.33%
41-55	16.67%	6.67%	41.67%	35.00%
56+	16.67%	16.67%	33.33%	33.33%
Total	**15.04%**	**9.02%**	**42.11%**	**33.83%**

Gender	Energy drinks	Minerals	Protein shakes	Vitamins
Female	14.75%	4.92%	42.62%	37.70%
Male	15.28%	12.50%	41.67%	30.56%
Total	**15.04%**	**9.02%**	**42.11%**	**33.83%**

Reason for running	Energy drinks	Minerals	Protein shakes	Vitamins
Amateur Athlete	14.74%	9.47%	42.11%	33.68%
For Leisure	15.79%		47.37%	36.84%
Professional Athlete	18.75%	18.75%	31.25%	31.25%
To Lose weight			66.67%	33.33%
Total	**15.04%**	**9.02%**	**42.11%**	**33.83%**

Source: Research Findings

4.3.27 Nutritional Information Sources

Athletes were asked where they obtain information from regarding nutrition. As indicated in figure 35, the majority of nutritional information acquired by participants comes from websites (24%), followed by coaches (15%), scientific journals (10%), nutritionists (10%) and other sources (in smaller proportions)

Figure 35. source(s) to receive and use nutrition information from

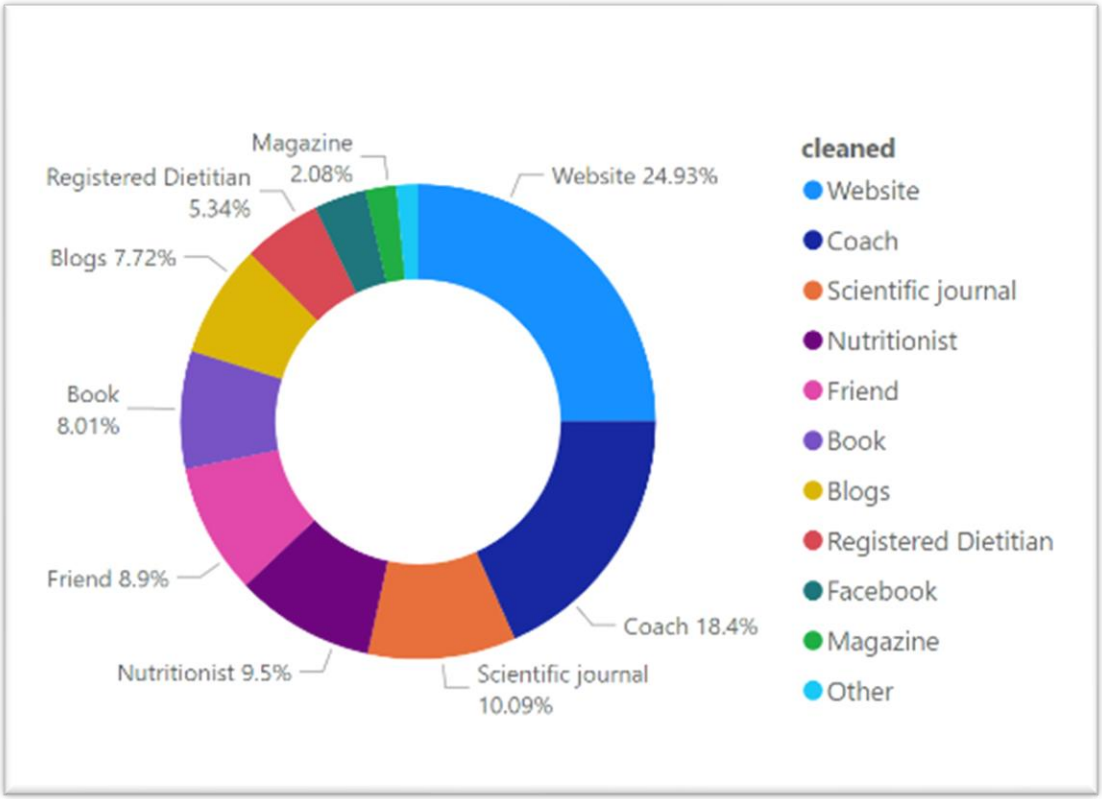

Table 36. Source(s) to receive and nutritional information to be used by gender and age

cleaned	Female	Male	Total
Website	20.53%	28.49%	**24.93%**
Coach	21.19%	16.13%	**18.40%**
Scientific journal	11.92%	8.60%	**10.09%**
Nutritionist	11.92%	7.53%	**9.50%**
Friend	7.28%	10.22%	**8.90%**
Book	7.28%	8.60%	**8.01%**
Blogs	8.61%	6.99%	**7.72%**
Registered Dietitian	4.64%	5.91%	**5.34%**
Facebook	4.64%	2.69%	**3.56%**
Magazine	1.32%	2.69%	**2.08%**
Other	0.66%	2.15%	**1.48%**

cleaned	15-25	26-40	41-55	56+	Total
Website	20.00%	24.63%	26.11%	27.27%	**24.93%**
Coach	20.00%	18.66%	17.20%	27.27%	**18.40%**
Scientific journal	14.29%	12.69%	6.37%	18.18%	**10.09%**
Nutritionist	8.57%	9.70%	10.19%		**9.50%**
Friend	17.14%	4.48%	11.46%		**8.90%**
Book	2.86%	6.72%	10.19%	9.09%	**8.01%**
Blogs	8.57%	8.21%	7.64%		**7.72%**
Registered Dietitian		8.21%	3.82%	9.09%	**5.34%**
Facebook	5.71%	5.22%	1.91%		**3.56%**
Magazine			3.82%	9.09%	**2.08%**
Other	2.86%	1.49%	1.27%		**1.48%**

Source: Research Findings

4.3.28 Methods of Cooking Used in Meal Preparation

Respondents were asked to select their preferred cooking method from the following options: roasting, boiling, steaming, frying, poaching, and microwaving. The results were 31% roasting, 27% boiling, 14% steamig, 11% friying, 11% poaching and 6% microwaving. Only the runners who prioritise weight loss do not use frying in their cooking methods.

Figure 36. Typical methods of cooking used in meal preparation

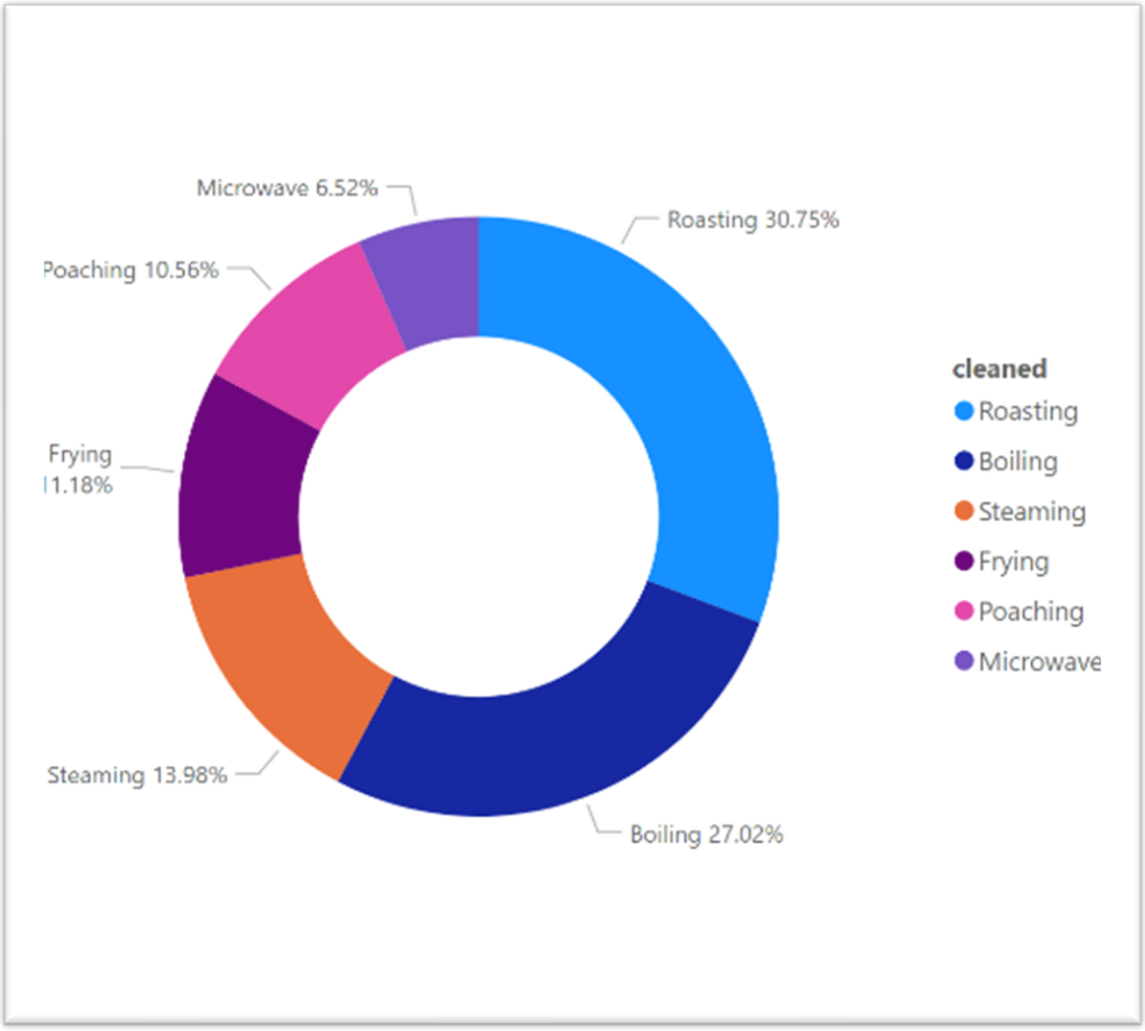

Table 37. Typical methods of cooking used in meal preparation by age, gender and reason for running

Age	Boiling	Frying	Microwave	Poaching	Roasting	Steaming
15-25	38.46%	11.54%	3.85%	11.54%	23.08%	11.54%
26-40	26.32%	11.28%	6.77%	10.53%	32.33%	12.78%
41-55	26.85%	10.74%	6.04%	10.07%	30.87%	15.44%
56+	14.29%	14.29%	14.29%	14.29%	28.57%	14.29%
Total	**27.02%**	**11.18%**	**6.52%**	**10.56%**	**30.75%**	**13.98%**

Gender	Boiling	Frying	Microwave	Poaching	Roasting	Steaming
Female	27.01%	9.49%	4.38%	8.76%	32.85%	17.52%
Male	27.03%	12.43%	8.11%	11.89%	29.19%	11.35%
Total	**27.02%**	**11.18%**	**6.52%**	**10.56%**	**30.75%**	**13.98%**

Reason for running	Boiling	Frying	Microwave	Poaching	Roasting	Steaming
Amateur Athlete	28.80%	11.52%	6.28%	12.04%	28.80%	12.57%
For Leisure	20.69%	10.34%	8.05%	8.05%	36.78%	16.09%
Professional Athlete	32.43%	13.51%	5.41%	8.11%	27.03%	13.51%
To Lose weight	28.57%			14.29%	28.57%	28.57%
Total	**27.02%**	**11.18%**	**6.52%**	**10.56%**	**30.75%**	**13.98%**

Source: Research Findings

4.3.29 Measuring Food Prior to Cooking

Athletes were asked whether they weigh their food before cooking. 66% of the participants indicate that they do not weigh their food prior to cooking, while 34% replied that they do. Professional athletes, runners who wish to lose weight and amateur athletes were the most likely to respond positively.

Figure 37. Weighing /measuring your food prior to cooking

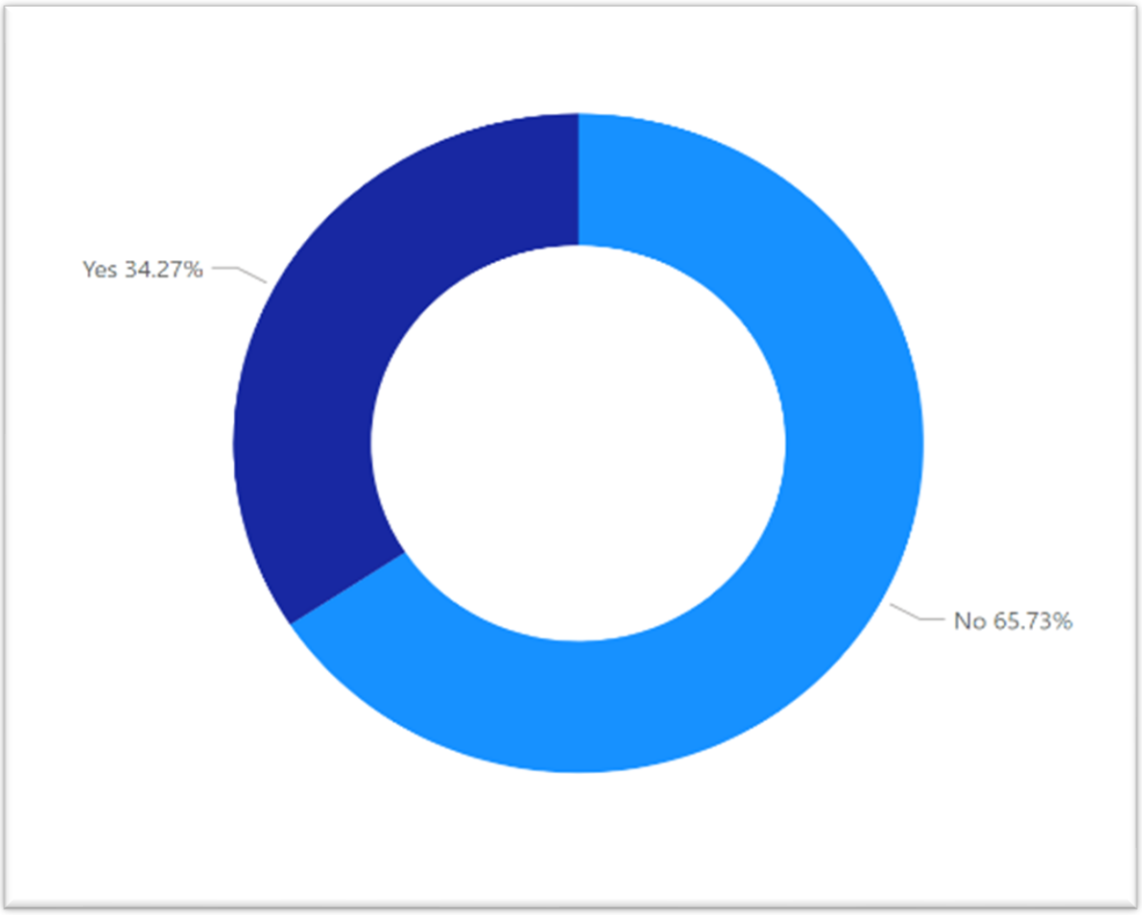

Table 38. Weighing/measuring food prior to cooking by age , gender and reason for running

Age	No	Yes
15-25	90.00%	10.00%
26-40	60.34%	39.66%
41-55	66.67%	33.33%
56+	66.67%	33.33%
Total	**65.73%**	**34.27%**

Gender	No	Yes
Female	62.30%	37.70%
Male	68.29%	31.71%
Total	**65.73%**	**34.27%**

Reason for running	No	Yes
Amateur Athlete	59.55%	40.45%
For Leisure	86.11%	13.89%
Professional Athlete	57.14%	42.86%
To Lose weight	50.00%	50.00%
Total	**65.73%**	**34.27%**

Source: Research Findings

4.3.30 Calories Consumed During a Typical Day

The respondents were asked about their daily caloric intake. The findings were 1501 to 2000 calories (36%), 2001 to 2500 calories (31%), 2501 to 3000 calories (17%), 1500 calories or fewer (8%) and 3001 to 3500 calories (4%). The bulk of daily caloric intake was between 1500 and 2500 calories.

Figure 38. Calories consumed during a typical day

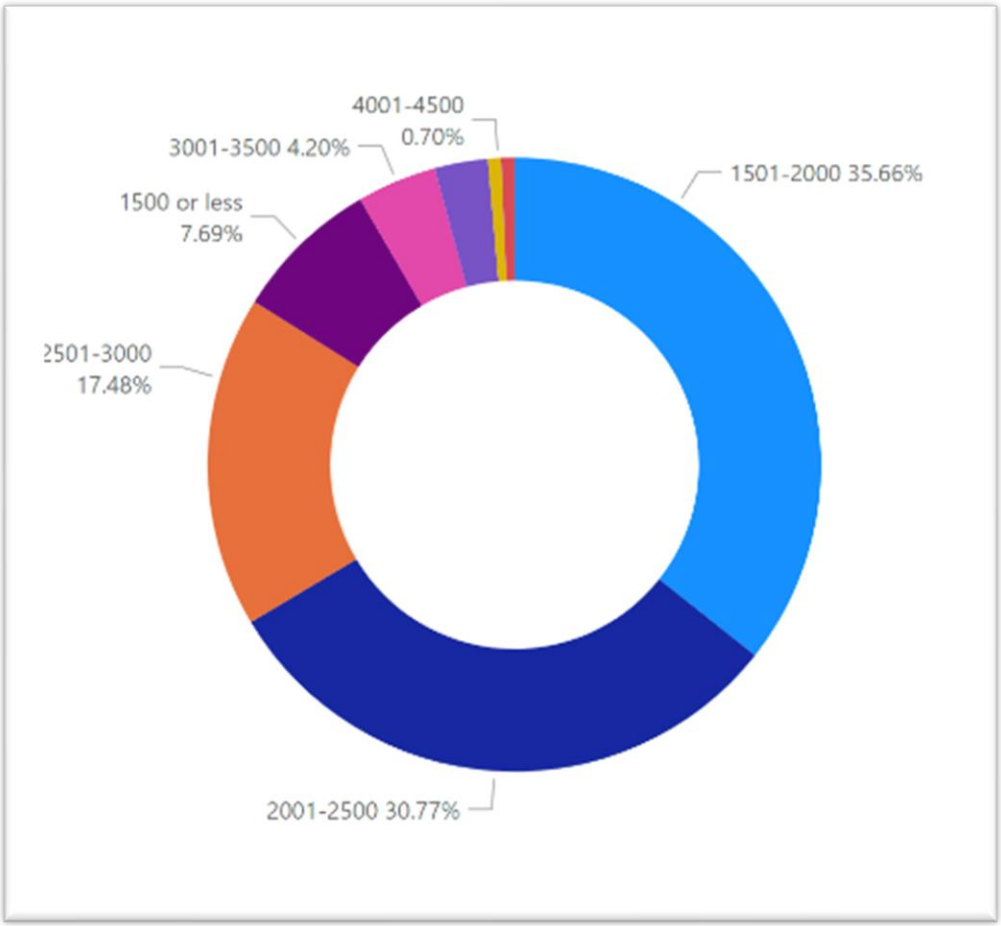

Table 39. Calories consumed during a typical day by age, gender and reason for running

Age	1500 or less	1501-2000	2001-2500	2501-3000	3001-3500	3501-4000	4001-4500	4501 or more
15-25	20.00%	20.00%	10.00%	20.00%	20.00%	10.00%		
26-40	5.17%	39.66%	29.31%	17.24%	5.17%	3.45%		
41-55	8.70%	36.23%	33.33%	17.39%	1.45%	1.45%		1.45%
56+		16.67%	50.00%	16.67%			16.67%	
Total	**7.69%**	**35.66%**	**30.77%**	**17.48%**	**4.20%**	**2.80%**	**0.70%**	**0.70%**

Gender	1500 or less	1501-2000	2001-2500	2501-3000	3001-3500	3501-4000	4001-4500	4501 or more
Female	8.20%	44.26%	37.70%	8.20%	1.64%			
Male	7.32%	29.27%	25.61%	24.39%	6.10%	4.88%	1.22%	1.22%
Total	**7.69%**	**35.66%**	**30.77%**	**17.48%**	**4.20%**	**2.80%**	**0.70%**	**0.70%**

Reason for running	1500 or less	1501-2000	2001-2500	2501-3000	3001-3500	3501-4000	4001-4500	4501 or more
Amateur Athlete	8.99%	29.21%	34.83%	19.10%	4.49%	3.37%		
For Leisure	2.78%	50.00%	27.78%	16.67%				2.78%
Professional Athlete	7.14%	28.57%	21.43%	14.29%	14.29%	7.14%	7.14%	
To Lose weight	25.00%	75.00%						
Total	**7.69%**	**35.66%**	**30.77%**	**17.48%**	**4.20%**	**2.80%**	**0.70%**	**0.70%**

Source: Research Findings

4.3.31 Consumption of Junk Food and Alcohol

Participants were asked how frequently they eat junk food and alcohol: whether once or twice a week, once a month, rarely or never. 38% responded once a week, 23% rarely, 20% monthly, 10% twice weekly and 9% never. 33% of those aged 56 and older never consumed junk food or alcohol, whereas 40% of runners aged 15 to 25 and 36% of élite athletes rarely consume junk food and alcohol.

Figure 39 the consumption of junk food and alcohol

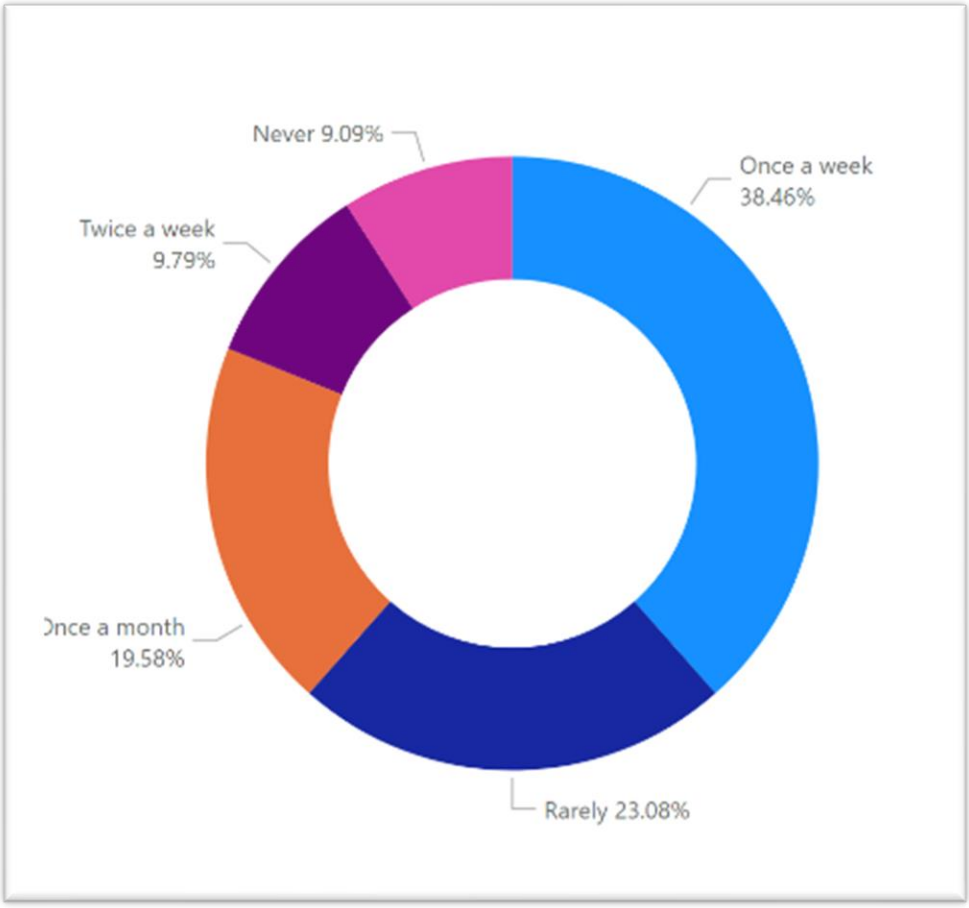

Table 40. The consumption of junk food and alcohol by age, gender and reason for running

Age	Never	Once a month	Once a week	Rarely	Twice a week
15-25	10.00%	40.00%	10.00%	40.00%	
26-40	5.17%	18.97%	46.55%	20.69%	8.62%
41-55	10.14%	18.84%	34.78%	23.19%	13.04%
56+	33.33%		50.00%	16.67%	
Total	**9.09%**	**19.58%**	**38.46%**	**23.08%**	**9.79%**

Gender	Never	Once a month	Once a week	Rarely	Twice a week
Female	16.39%	22.95%	36.07%	24.59%	
Male	3.66%	17.07%	40.24%	21.95%	17.07%
Total	**9.09%**	**19.58%**	**38.46%**	**23.08%**	**9.79%**

Reason for running	Never	Once a month	Once a week	Rarely	Twice a week
Amateur Athlete	13.48%	16.85%	39.33%	20.22%	10.11%
For Leisure		19.44%	41.67%	25.00%	13.89%
Professional Athlete	7.14%	28.57%	28.57%	35.71%	
To Lose weight		50.00%	25.00%	25.00%	
Total	**9.09%**	**19.58%**	**38.46%**	**23.08%**	**9.79%**

Source: Research Findings

4.3.32 Eating Home-Cooking Vs. Ready-Prepared Meals

Respondents were asked whether they cook their own meals or eat what the family prepares. 71% could be seen to prepare their own meals, while 29% consume those made by others. It indicates that the majority prefers to prepare their own meals, notably professional athletes, women and those aiming to reduce weight.

Figure 40. Do you cook for yourself or eat what is prepared for the whole family

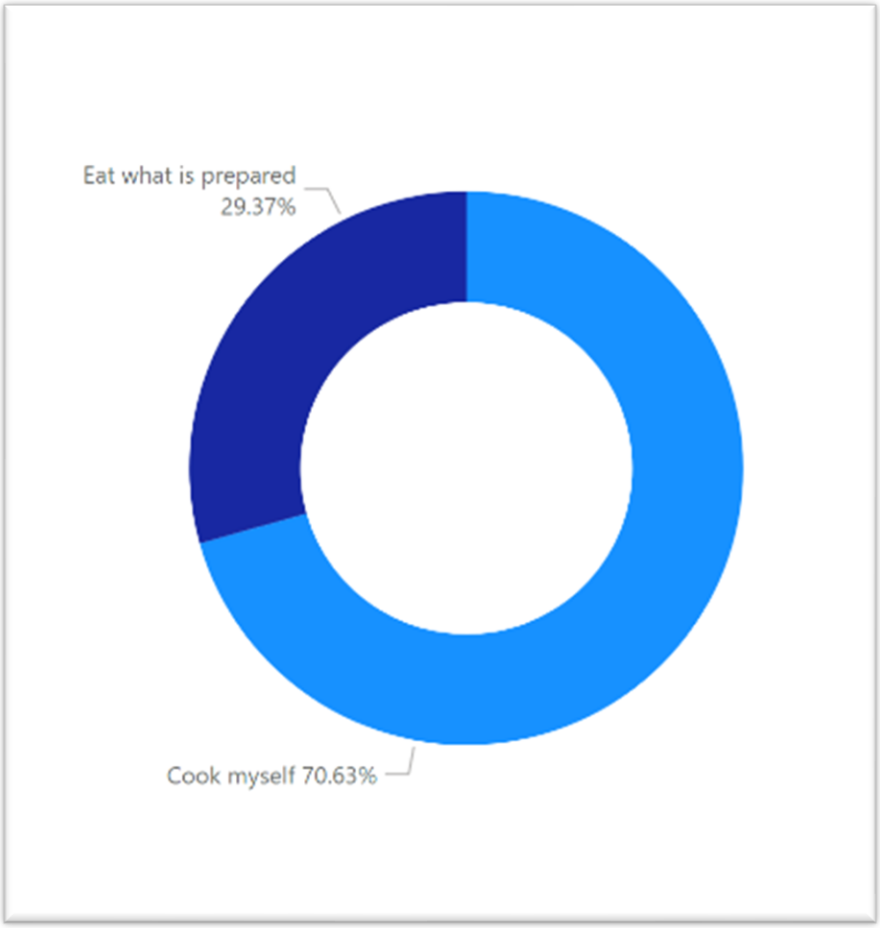

Table 41. Do you cook for yourself or eat what is prepared for the whole family by age, gender and eason for Running

Age	Cook myself	Eat what is prepared
15-25	40.00%	60.00%
26-40	79.31%	20.69%
41-55	68.12%	31.88%
56+	66.67%	33.33%
Total	**70.63%**	**29.37%**

Gender	Cook myself	Eat what is prepared
Female	83.61%	16.39%
Male	60.98%	39.02%
Total	**70.63%**	**29.37%**

Reason for running	Cook myself	Eat what is prepared
Amateur Athlete	73.03%	26.97%
For Leisure	63.89%	36.11%
Professional Athlete	71.43%	28.57%
To Lose weight	75.00%	25.00%
Total	**70.63%**	**29.37%**

Source: Research Findings

4.3.33 Conditions While Running

Participants were asked whether they had ever experienced issues during races such as dehydration, cramps, injuries, gastric problems, low blood pressure, heat stroke or none of the latter.

25% were found to have suffered from dehydration, 19% cramps, 19% injuries, 14% gastric issues, nothing at all 10%, low blood pressure 7% and heat stroke 6%. The age category of between 15 and 25 were found to suffer the most from all the above conditions, followed by those between the ages of 26 and 40. Males tended to suffer from cramps and dehydration more than females, while athletes aged 56+ mostly suffered from cramps, dehydration and gastric issues.

Figure 41. During your runs and races, have you ever had problems with these conditions

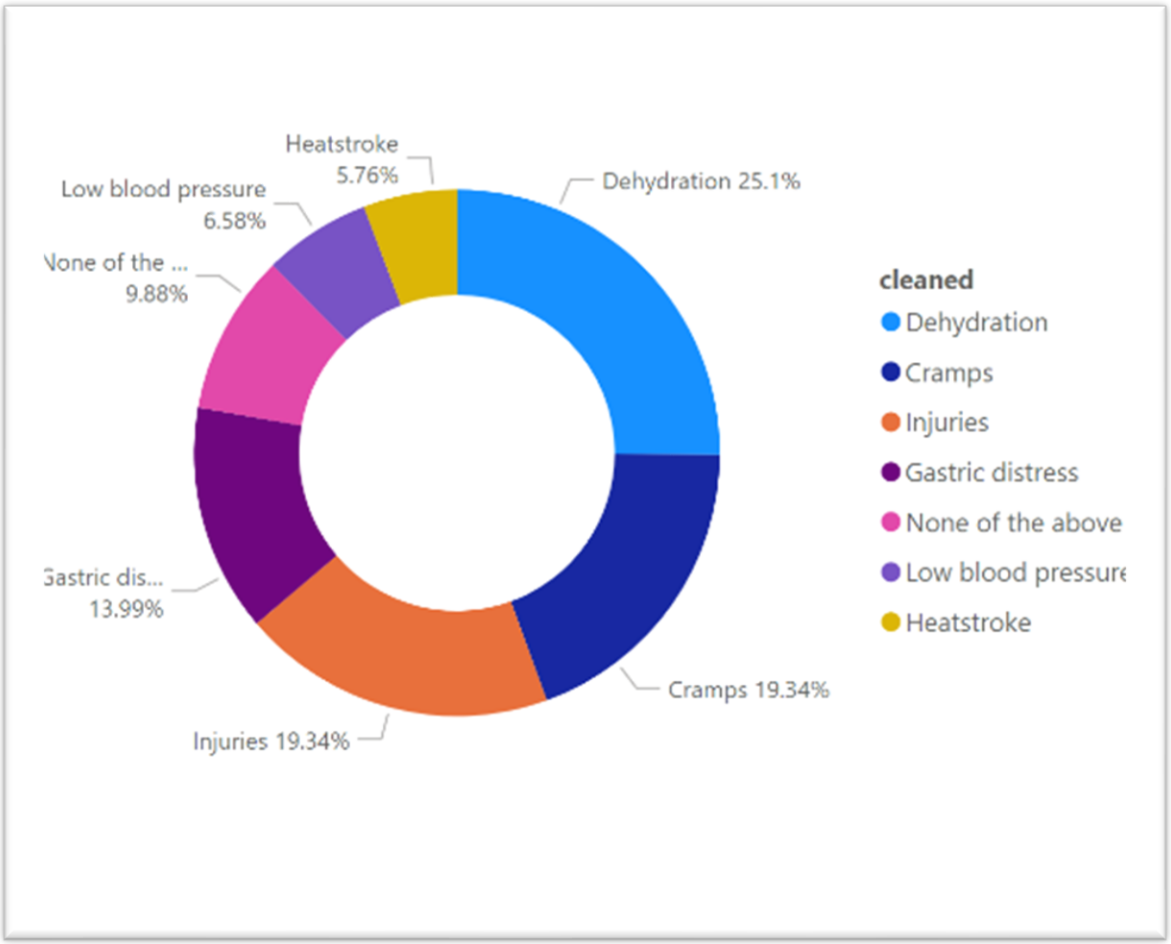

Table 42. During your runs and races, have you ever had problems with these conditions by age and gender

cleaned	15-25	26-40	41-55	56+	Total
Dehydration	31.82%	25.23%	23.81%	22.22%	**25.10%**
Cramps	18.18%	16.82%	20.95%	33.33%	**19.34%**
Injuries	27.27%	16.82%	21.90%		**19.34%**
Gastric distress	4.55%	15.89%	13.33%	22.22%	**13.99%**
None of the above	9.09%	8.41%	10.48%	22.22%	**9.88%**
Low blood pressure	4.55%	9.35%	4.76%		**6.58%**
Heatstroke	4.55%	7.48%	4.76%		**5.76%**

cleaned	Female	Male	Total
Dehydration	24.00%	25.87%	**25.10%**
Cramps	14.00%	23.08%	**19.34%**
Injuries	18.00%	20.28%	**19.34%**
Gastric distress	16.00%	12.59%	**13.99%**
None of the above	10.00%	9.79%	**9.88%**
Low blood pressure	12.00%	2.80%	**6.58%**
Heatstroke	6.00%	5.59%	**5.76%**

Source: Research Findings

4.3.34 Running Distance

Respondents were questioned about the type of race they run, uch as the distance (e.g. 10km, a half-marathon, a marathon or ultra-marathon). 39% were found to run up to 10km, 34 % half-marathon, 14% ultra-marathon and 12% full marathon. More women were found to run a full-marathon distance, while the half-marathon distance yielded more responses from males. Up to 10 km was, however, the most popular distance evidenced in the survey.

Figure 42. What type of races are run by age and gender

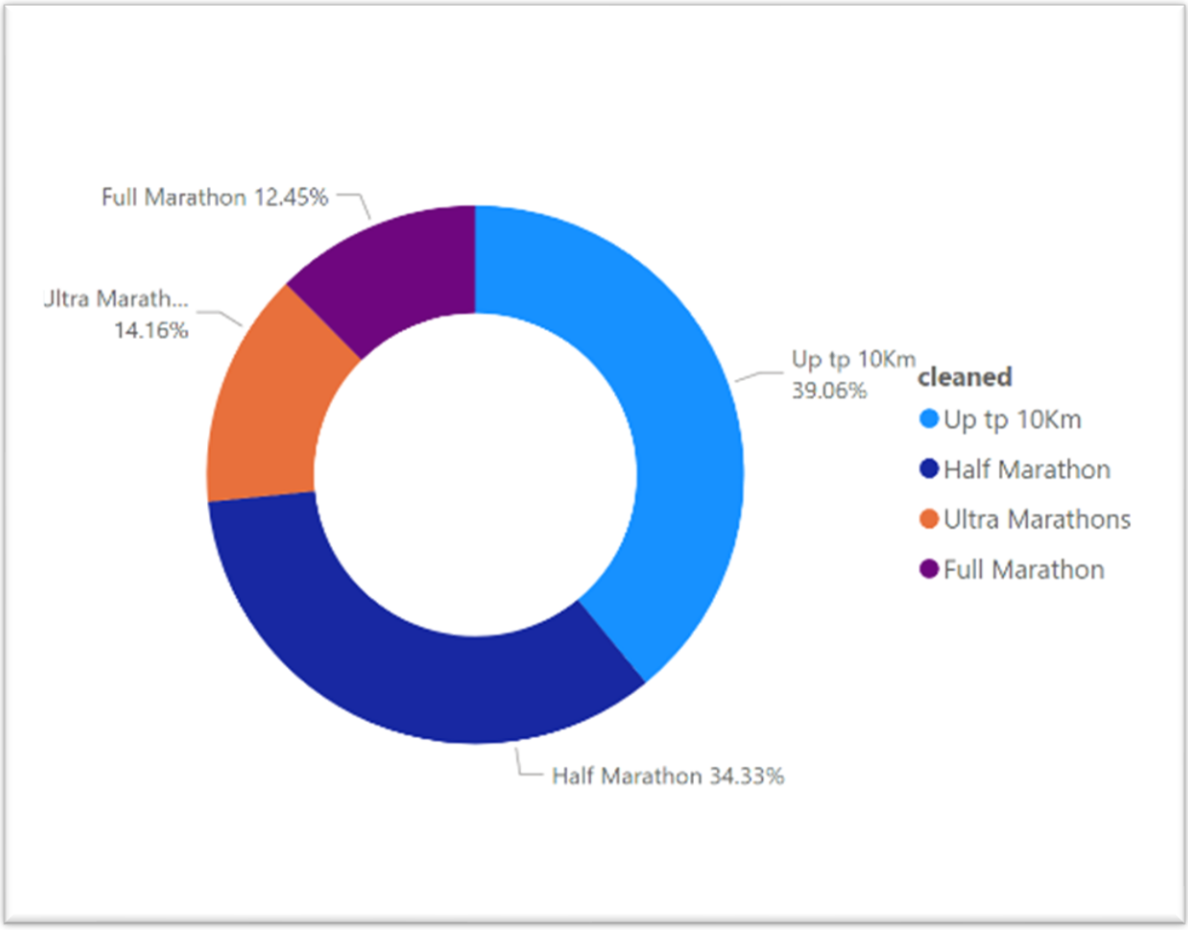

Table 43. What type of races are run by age and gender

cleaned	15-25	26-40	41-55	56+	**Total**
Up tp 10Km	80.00%	37.23%	38.14%	27.27%	**39.06%**
Half Marathon	10.00%	35.11%	34.75%	45.45%	**34.33%**
Ultra Marathons	10.00%	14.89%	14.41%	9.09%	**14.16%**
Full Marathon		12.77%	12.71%	18.18%	**12.45%**

cleaned	Female	Male	**Total**
Full Marathon	14.58%	10.95%	**12.45%**
Half Marathon	30.21%	37.23%	**34.33%**
Ultra Marathons	15.63%	13.14%	**14.16%**
Up tp 10Km	39.58%	38.69%	**39.06%**

Source: Research Findings

4.3.35 Athletes' Diet

Athletes were asked about whether they consume a particular diet. 63% were found to consume a Mediterranean diet, 15% vegetarian, 6% vegan, 6% keto, 4% fruit and 4% dairy.

Figure 43. Athletes' diet

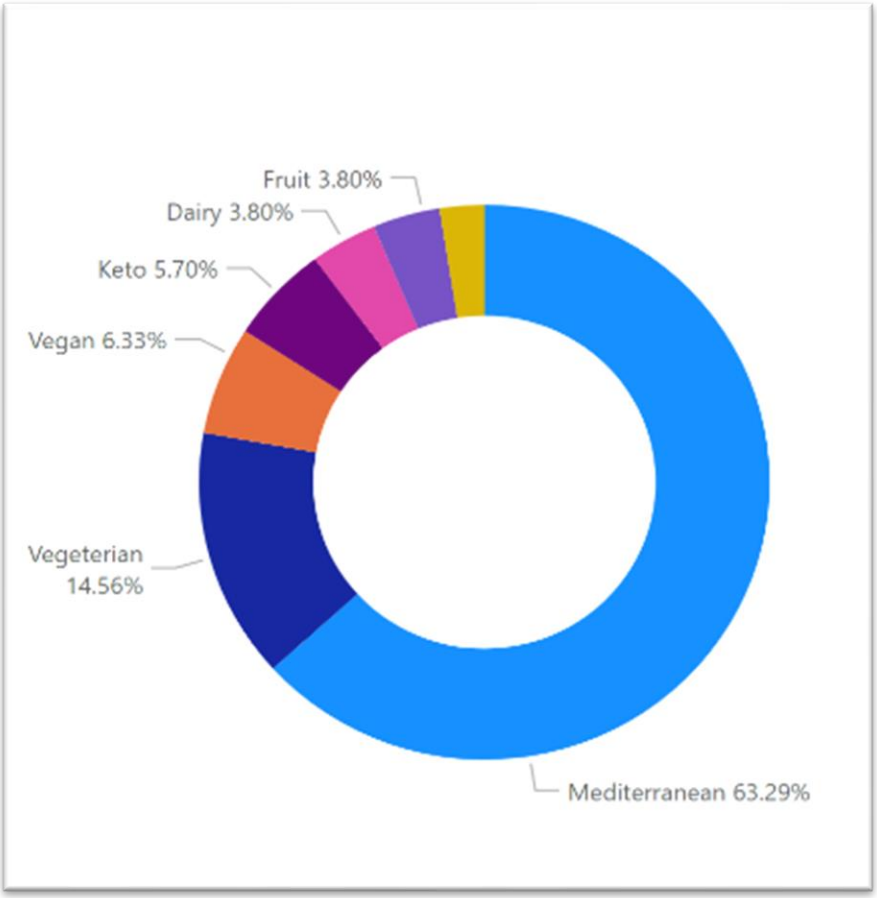

Table 44. What type of races are run by age and gender

Age	Dairy	Fruit	Keto	Mediterranean	Omnivorous	Vegan	Vegeterian
15-25				87.50%			12.50%
26-40	3.39%	3.39%	3.39%	67.80%	3.39%	3.39%	15.25%
41-55	3.95%	3.95%	6.58%	61.84%	2.63%	7.89%	13.16%
56+	6.67%	6.67%	13.33%	40.00%		13.33%	20.00%
Total	**3.80%**	**3.80%**	**5.70%**	**63.29%**	**2.53%**	**6.33%**	**14.56%**

Gender	Dairy	Fruit	Keto	Mediterranean	Omnivorous	Vegan	Vegeterian
Female	3.03%	3.03%	6.06%	57.58%	1.52%	7.58%	21.21%
Male	4.35%	4.35%	5.43%	67.39%	3.26%	5.43%	9.78%
Total	**3.80%**	**3.80%**	**5.70%**	**63.29%**	**2.53%**	**6.33%**	**14.56%**

Reason for running	Dairy	Fruit	Keto	Mediterranean	Omnivorous	Vegan	Vegeterian
Amateur Athlete	3.96%	3.96%	5.94%	60.40%	2.97%	6.93%	15.84%
For Leisure			3.13%	78.13%		3.13%	15.63%
Professional Athlete	9.09%	9.09%	9.09%	50.00%	4.55%	9.09%	9.09%
To Lose weight				100.00%			
Total	**3.80%**	**3.80%**	**5.70%**	**63.29%**	**2.53%**	**6.33%**	**14.56%**

Source: Research Findings

4.4 Conclusion and Limitations

The study was based on the survey replies of Maltese long-distance runners, as well as interviews with athletes, coaches and nutritionists with years of expertise in their respective fields in order to investigate ahtletes' nutritional habits.From both investigations, the researcher discovered facts that both support and contradict evidence gleaned from the literature review.

Because of the limited research available on the nutrition of Maltese runners, this research is innovative. Additional in-depth research comprising a longitudinal study would be fruitful to continue monitoring this vital subject.

Malta lacks a national statistic on Maltese runners, which is another constraint. This implies that the margin of error of the sample could not be computed, since the author could not determine the exact size of its population (that is, that of long-distance runners in Malta). Also, the collection of data was limited to social media. Better dissemination through clubs including pen and paper responses might have resulted in a more diverse sample base. The length of the questionnaire was long and might have had a bearing on successfully completed surveys. Incomplete surveys were excluded from the sample.

5. Conclusion and Recommendations

5.1 Introduction

This study's hypothesis has been to evaluate the dietary habits of long-distance runners in the Maltese environment. The discussion of the study's results has been represented by the findings provided in the chapter on the literature review. These will contribute to the development of a comprehensive understanding of the dietary habits of Maltese long-distance runners.

The findings of the author's study indicate that healthy eating plans are crucial for athletes. The literature evaluation demonstrates that nutrition, albeit not by itself, can increase ahtletes' performance. Other aspects, such as a diet rich in macro- and micronutrients, adequate hydration, timing of food consumption before, during and after training or competitions and cooking techniques can considerably increase athletes' performance .

The main point for this discussion is to combine the studies and results with the use of qualitative and quantitative modes to get answers for the research questions:

- What effect does nutrition have on an athlete's performance?
- What steps may be taken to help athletes improve their performance?
- Are athletes well-versed in the subject of nutrition?
- Do athletes possess culinary awareness in terms of how to prepare food to obtain the greatest nutritional value?

5.2 Effects of Nutrition on Athletes' Performance

In this study, nutrition, although not alone, is clearly considered as an important aspect of improvements in athletic performance for Maltese coaches, nutritionists and athletes. The interviewees from the qualitative study clearly determine the consensus that nutrition has an impact on athletic ability. Consequently, the results of this study reveal that runners feel that appropriate nutrition is vital for performance.

Athletes can benefit greatly from a well-balanced diet that includes carbohydrates, protein, fats, vitamins, minerals, fluids, fibre and supplements (if necessary) as well as from enough hydration, training and recuperation time between competitions.

The greatest nutritional value for an athlete aiming for peak performance is found in carbohydrates. The respondents agree that carbohydrates are the most important factor in determining endurance performance. These findings also corroborate the interview's discoveries.

Participants agree that protein is necessary after carbohydrates for high performance. Both protein and carbohydrates are needed for recovery after running.

In addition, coaches, nutritionists and athletes all agree in this study that consuming healthy fats as a source of energy is essential for optimal performance. In contrast, the participants from the research data are unaware of the need to consume the proper quantity of healthy fats to improve their training performance.

According to the coaches and nutritionists in question, a well-balanced diet makes it easy to absorb vitamins and minerals. Participants in this study were therefore aware of the need to consume vitamins and minerals.

This study revealed that hydration is essential for the performance of Maltese athletes, coaches, and nutritionists. Most Maltese athletes consume water and electrolytes before, during and after exercise. Depending on the weather, coaches urge athletes to consume between 2 and 3.5 litres of water per day, while nutritionists recommend that athletes weigh themselves before and after a run to calculate how much water they need to refill.

Most of the respondents agree that supplements are a good replacement for deficiencies. The vast majority of the athletes consume protein shakes, vitamins and minerals This is also supported by the interviews, though blood tests are recommended by the coach Mr. Has Kesra, both nutritionists and Ms. Lisa Bezzina. From the interview, coaches and nutritionist 1 do not recommend supplements unless necessary. Bezzina, for instance, takes iron and glutamine in response to a blood test; nevertheless, nutritionist 2's recommendation encouraged the use of glutamine supplements. Most of the athletes in this study consumed protein shakes, vitamins and minerals.

5.3 What Steps May Be Taken to Help Athletes Improve Their Performance?

According to this research, the timing of food consumed before during and after training is crucial. It is critical for the right number of calories to be combined with a suitable balance of macro- and micronutrients mingled with enough fluid to prevent dehydration. Finding the right diet that suits an athlete's body is, therefore, a priority Athletes should avoid eating junk food, processed food, alcohol and fatty, ready-made meals unless they are prepared specifically for the individual athlete's diet. Athletes should frequently prepare food at home with fresh ingredients and a variation of coloured vegetables, grains, fish and meat.

As seen in the results from participants, 48% of runners have a meal two to three hours before a run or race. 39% of respondents consume food more than three hours before a run or competition. However, according to (Maughan, 2010), a pre-run meal should be consumed 3-4 hours before a run or race so that the nutrients may be absorbed by the muscles from the circulation. Contradictory timing in transcripts of interviews demonstrate different opinions on this matter.

According to the findings of this study, a variety of breakfast foods are consumed; suggestions from the coaches and nutritionists include banana with yoghurt, toast with jam and coffee, orange juice with banana, oats with coconut water and porridge, which includes starch. Some Maltese athletes replied that they do not consume anything prior to training or competition, while others prefer peanut butter on toast with coffee, toast with jam and coffee or porridge with fruit, despite the literature review's recommendation that food should be fat-free.

More than half of Maltese athletes opt to eat after a long run of between 31 minutes and 1 hour, indicating that not all conclusions support the literature study. During the interview, the two nutritionists and athlete Ms. Lisa Bezzina agree that the optimum time is within 30 minutes; however, athlete Jonathan Balzan does not adhere to a precise time and coaches Fabio Spiteri and Has Kesra give different times ranging from 31 minutes to an hour and a half.

5.4 Are Athletes Well Informed About The Subject of Nutrition?

15% of Maltese athletes utilise a nutritionist, while 85% build their own diet, according to the findings of the survey. Maltese runners would rather obtain information about the food that should be consumed from alternative sources. The internet and coaches are the most popular sources of information for Maltese athletes.

The coaches interviewed for this study only possess a fundamental understanding of nutrition. Indeed, they both claimed to collaborate closely with nutritionists for the benefit of their athletes.

Alternativley, nutritional advice for marathon runners may be found in a variety of places, including websites, blogs, books, magazines, friends and sports journals. Nutritional advice from any of these places might be legitimate but can also run the risk of being less accurate or out-of-date.

5.5 Athletes' Diet and Culinary Awareness about How to Prepare Food in Order to Obtain the Greatest Nutritional Value.

The majority of Maltese long-distance runners follow a Mediterranean diet, as determined in the previous research (Geraldine Bartolo, 2020). Nutritionists promote the Mediterranean diet, according to the interviews, but coaches and athletes are indifferent as to the specificity of a diet as long as it is healthy and high in carbohydrates.

71% of respondents indicate that they cook their own meals to meet their nutritional needs. This is a game-changing finding since it demonstrates that these runners value food as a key component of their race preparation. It's worth emphasising that this does not imply that these athletes always follow optimal guidelines for portion control and cooking techniques.

This study also shows that Maltese athletes don't weigh their food before cooking. Those who want to lose weight or are professional athletes are the only ones who do. According to the respondents, the nutritionists and coaches suggest that top athletes and individuals seeking weight loss weigh their ingredients before cooking.

The results registered by the athletes with regard to cooking methods showed that the top three were roasting, boiling and steaming. They appear to employ a healthy cooking method; however a study of the literature by Yong, Amin and Dongpo (2019) suggests that

steaming and microwave cooking are best since they preserve nutrients, including water-soluble vitamins.

5.6 Conclusion

All the points mentioned in research sections 5.2 to 5.5 are the author's main findings supporting the outcome of the dissertation. The author is satisfied with the outcome of this research both for the knowledge gained on the subject and the information that can be utilisied by long-distance runners.

5.7 Recommendations

The study revealed that while some Maltese long-distance runners give adequate attention to nutrition, others need to know what foods are good for them before, during and after a race or training session, as well as the proper cooking method and nutritional sources from a nutritionist or coach qualified in nutrition. The author believes that every athlete should follow a personalised diet, because no one athlete's body is the same; differences can be due to age, gender, culture, genetics etc. Every athlete is required to speak with a trained nutritionist for guidance. Consequently, the recommendations that follow are suggested:

The Malta Olympic Committee and Athletic and Athletic Malta must integrate more nutrition-related conferences and courses for athletes, as well as invite expert nutritionists. The attendance should include all athletes, not only those regarded as élite.
.

A more precise approach would include a seven-day training camp to monitor nutritional data and accurate techniques to assess runners' caloric intake and nutritional principles, with research conducted using such parameters in order to identify the nutritional deficiency and energy imbalances of local athletes during their performance.

It is appropriate for an athlete's diet to be Mediterranean, vegan, or vegetarian, as long as they consume nutritious food with a variety of vegetables, fruits, and grains and eat at a suitable time using a healthy cooking method. Blood tests are also recommended in order for athletes who experience a shortage in particular vitamins and minerals to be able to regulate it, such as athlete 1, as shown in the transcript

Athletes should create a food diary (journal) over a span of time to monitor their performance based on the type of food being consumed and to be able to track any anomalies based on specific foods, so as to consult further with their coach/nutritionist.

Athletic clubs should also create podcasts or instructional webinars and disseminate more information to guide athletes on the best methods of cooking, types of diets and other important aspects of food and hydration benefits based on research and the best practices.

Menus based on the most common food consumption (Mediterranean) should, as a minimum, be provided to all athletes reflecting whether they are short-, middle- or long-distance runners. These menus should continue to expand to cover all types of diets.

5.8 Future Studies

Based on the findings of this research, the following recommendations for further research have been made:

The author believes that for future research the next step should be a longitudinal study to continue monitoring this important subject.

Additional studies can aim to demonstrate how adjusting calorie intake according to age might improve performance.

The differences in food intake could also be compared between long- distance and short-sprint activity, as the latter tend to be characterised by short bursts of energy.

Finally, an investigation could also be launched into how retired athletes' bodies have changed after years of rigorous training.

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Appendix 1 – Interview Transcripts

Date: 2/06/2022

Interviewee 1

Lisa Bezzina National Athlete

Female, 42 years old, Long-distance runner

What is your opinion of nutrition vs athletic performance?

As a long-distance runner, I go to my sport nutritionist, and he tells me that for example for a 10k race I need to have an X amount of carbohydrates. For example, for a 10K race, my nutritionist usually allows me 100grames carbs, which for me is usually rice, 200 grams of veg and 100 grams of protein. As veg I have a lot of spinach because it helps with haemoglobin and sometimes mixed veg, all veg is good. This is before a race. Whenever I have a half marathon, I start increasing the food intake from 3 days before. I follow the same pattern but not just the day before the race but from 3 days before whenever it is a half marathon. Not the same pattern, the carbs intake will be double, 200 grams. You build it up.

In the morning of the race, I usually have some oats, 50 grams and I mix it with coconut water. Sometimes instead of the oats I have a peanut butter toast. I also take a coffee before the race. During the race I have carbohydrate fuelled drinks. A carbohydrate drink is essential during a race. I also have supplements. I regularly take glutamine and various vitamin supplements. I also take iron supplements; these you need to make sure what is right for you and according to your necessities. As a national team athlete, we have our own doctor and according to the blood test results, I get prescribed supplements that are needed for my body. You must be careful with supplements, too much can make you feel bloated. In my case I have a pattern where I take supplements for a week and the week after I don't take any. As I said there is a difference between individuals and between the kind of runners. You cannot compare a sprinter to a long-distance runner.

It is not easy; I weigh my food all the time. As protein I usually go for meat or fish. I am not a big fan of chicken because once I read that it's not very good for my blood type. I also eat rabbit; the type of protein does not make a difference it's the amount that matters. I have 200 grams of protein a day. 100 grams in the morning which usually consists of a can of tuna and some rice.

Usually, I ran so early in the morning that I don't consume anything, then when I get back from my run, I eat. It is important that you consume food within the first half hour after the run because otherwise you will be losing muscle. I take food with me to Marsa because

afterwards I have a long drive home and I make it a point to eat within half an hour after my training. I mix the oats with one scoop protein powder, a handful of nuts and some blueberries.

Do you recommend any special diets to athletes? Why?
I would say we have already discussed this issue. You cannot really recommend a diet to someone. Everyone has their individual needs and diets also differ according to sport discipline. I use a carbo-loading kind of diet. Long distance is based on carbohydrate mainly.

Which is your preferred diet? Why?
As I have said, I am all for a carbohydrate centred diet. I once went vegetarian to try to lose some weight but ended up losing my strength. When I was dieting and consuming less, I gained weight. The nutritionist used to tell me that I need to fuel my body or else I gain weight.
My diet is also gluten free because I'm gluten intolerant. I also make sure to have two fruits a day, usually it's two apples but I do like to mix. If I'm not competing my daily dinner consists of 75 grams carbs which is less than the 100grams I'm allowed during the competition. It may sound little but together with the 200 grams of veg and the protein it is fulfilling. When weighing your food, you must do this when the food is raw.
With regards to drinks, this depends on the season. In summer I mix different salts with my water. I use one scoop with every 1 litre of water. This does not include any sugars unlike the ones you buy readymade. My coach does not allow us any sugars. It doesn't taste very good. I drink two litres of water per day mixed with these salts. For me 2 litres are enough, and I feel good.

What value do you give to the following when it comes to nutrition?

- Carbohydrates
- Protein
- Fat
- Supplements
- Fluid (including pre and post recovery drinks)

These are all very important but once again, everything depends on your goals and according to season. When I'm preparing for a full marathon, my nutritionist plans 2 months in advance, and I start building my diet according to that. For example, my next competition is a 5k run on the 11th of June. My training differs from that of a longer run and my nutrition. Now I'm training from half marathons and less, So the range now is from 5k to half marathon. My nutrition reflects this as well.

A very important thing I must say is that my coach and my nutritionist communicate a lot. The last say is always according to coach. The nutritional plan includes the mentioned carbohydrates, protein, fat, supplements, and fluid intake. If the nutritional plan includes 100grams of carbs, and you decide to have 100 grams of pasta, you can still have that pasta with sauce but then you need to weigh for example the minced beef for the Bolognese before you cook it. So, the diet must be well thought and planned.

Finally, it's your body that decides for you. Whenever I have my carbs in the form of pasta, this makes me feel heavy. However, I never had any problems with rice, so I usually stick to rice as my carb intake.

I roast and boil my food, never fry.

Once a week I usually have a 'cheat meal', this is usually a gluten free pizza. I love fish so usually when I treat myself it's still a healthy meal.

I also have two boiled eggs every day.

How do you keep yourself updated regarding nutrition?

I go to a nutritionist, and he keeps me updated with regards nutrition. He asks a lot of questions and depending on how I feel, for example tired or depleted, he assigns different nutritional plans.

How do you suggest runners prepare what to eat before and after an intensive training session?

Carbs carbs carbs. We call that a key session, which is usually in the morning, so we prepare as if we are going for a competitive run. I only have one coffee a day, I used to be addicted to coffee and it wasn't doing me any good. At one point I started having terrible migraines. I'm off it now but it was not easy, so I try to contain how much coffee I consume. I do not have sugars. I had a similar experience to coffee with my sugar intake. I used to consume a lot of sugar, especially before races then as soon as I finished a race I would completely stumble, no energy whatsoever. My body was getting used to the amounts of sugar I was consuming and as soon as it found itself with a lack of sugars after a race, my

body switched off. It took me a long time to realise what I was doing wrong, and it was my coach who noticed. Since then, I reduced sugars to almost none. I don’t even have cake for my birthday! Since then, I never had any problems after my races. I do consume natural sugars in the form of fruits. Banana I do not eat because I have low blood pressure.

Date: 8/06/2022

Interviewee 2: Fleur Bugeja

Nutritionist

What is your opinion of nutrition vs athletic performance?

As a result, there are three basic ways that nutrition affects athletes. You basically follow a typical person's diet, but you also need to spice it up a bit. You must think about what you ingest prior to an event, what you do during the event, and what you ingest afterwards. It is thus mostly about what you are eating and when you are eating since timing is crucial. Water is also a component, so it is all about fuelling and refuelling as well as recuperation through hydration. Sports nutrition is crucial for all three of these factors (hydration, nutrition, and recovery). What we refer to as ergogenic aids have attracted a lot of attention during the past 30 years. And ergogenic aids are any food supplements utilized by the food business. It has developed into a separate field of nutrition since there are producers and factories that focus solely on ergogenic aid. And we are aware that several of these compounds, such caffeine, carnitine, and keratin, can boost performance in various ways.

While nutrition is crucial, improper nutrition can potentially hinder performance. For instance, I occasionally receive requests from athletes for a certain diet, such the ketogenic diet, which has been shown to have negative effects on sports performance. Because we are aware that carbs are essential for fuelling both before and after an activity. There have been some studies on the ketogenic diet in straight training as opposed to endured training, thus there may be some benefits in strength training but not in endured training.

When compared to the recommendation of 50 to 55 percent of one's daily energy needs coming from carbohydrates, and the even higher requirement for athletes who use carbohydrates as their primary source of energy, the recommended ketogenic diet typically only allows 20 to 40 grams of carbohydrates per day. However, studies have shown, for instance, that following a ketogenic diet might be advantageous when engaging in straightforward exercise. Although there hasn't been a consensus, it is still up for debate. One must also consider the study's credibility because it may not be genuine if it was conducted on a small population or was financed by a corporation with a conflict of interest.

Do you recommend any special diets to athletes?

As a result, for athletes, I would still recommend the overall Mediterranean diet. However, one must consider the days for training, resting, and competing to keep a person well fuelled.

When it comes to proteins, I do occasionally have vegetarian and vegan clients who are still able to meet their nutritional demands. They may still obtain their protein from a variety of sources, including tofu, quinoa, nuts, lentils, seeds, and nuts.

As a result, they would need to take their iron with the green leaf vegetable. I believe that iron and vitamin B12 need to be supplemented in a vegetarian or vegan diet since iron from vegetables and vegan foods is not as bioavailable as iron from meat. You may still consume spinach, but you won't receive the same amount of iron from it as you would from meat, and since vitamin B12 can only be obtained from meat, it cannot be obtained from any other source, including plants or vegetables. In this case, they will need to take supplements, and one thing I wanted to suggest to my customers is to regularly check their ferritin and haemoglobin levels in the blood to see whether they are getting enough iron. They need their red blood cells to be functioning properly so that they are taking up oxygen so that it can give it to the mussels after all. If the iron levels are low, they will experience more weariness and their energy performance will be much more depleted.

Although I have advised my clients to drink beetroot juice because it has numerous advantages, many have stopped doing so due to the particular taste.

It is not advised to eat right before a run; therefore, we usually suggest giving yourself at least one and a half hours. As a result, we advise refuelling 24 to 48 hours before to the race, focusing on carbohydrate loading and stimulating the body's natural systems. Therefore, the amount of activity must be reduced, and they will subsequently, for example, have a morning snack. Taking anything like a banana or freshly squeezed orange juice will replenish their carbohydrate levels. Then they must notice that they are taking a supplement every half an hour and inform the person that they should be consuming between 30 and 60 grams of carbohydrates for every hour of exercise. Additionally, the amount of carbohydrates that the body can digest in an hour is limited, which is why we advise people to never consume more than 60 grams of carbohydrates in an hour. If they do, the excess will sit in their stomachs and make them feel heavy. The first thing I tell my customers is not to wait until they feel exhausted before consuming anything. Instead, they should start taking something after an hour, and I always suggest choosing a variety of carbohydrate sources. Why? Because we have several routes inside our small intestine for various types of carbohydrates. For instance, sucrose, maltose, and glucose are all types of sugars that are taken up in the small intestine through various channels as opposed to taking them all up as fructose. If you consume all of the fructose, you will have too much of it in your small

intestine and not enough channels to absorb it. The nutrient profile of your energy gel should be checked, I always advise.

Which is your preferred diet?

The Mediterranean Diet

What value do you give to the following when it comes to nutrition?

- Carbohydrates
- Protein
- Fat
- Supplements
- Fluid (including pre and post recovery drinks)

It all boils down to carbs and rehydration for athletes. Sometimes I encounter athletes who place a lot of focus on carbs but not enough on drinking water, hydration is incredibly crucial. The result is that they either stop before they finish the race, since their body is too exhausted from dehydration, or they don't drink any water at all before the race. Water is a very significant element. A person needs about 2 litres of water per day, but when training—especially in Malta, where it's hot and humid—you might need more. In fact, I advise athletes to run one, two, or three times under identical conditions to their regular training sessions if they want to know how much water they are losing during exercise. They can determine how much water they are losing by weighing themselves before and after a run if they go early in the morning to exercise. After undertaking long runs, a person may occasionally lose easily half a kilogram or a gram of water. The best predictor of hydration level is the colour of the urine, which is tested as well. The more straw-coloured and lighter the urine, the better; if the urine is black, the person is not drinking enough.

For Malta, electrolytes are essential. There is a condition called hyponatremia as well, and hyponatremia is when someone drinks a lot of water, say after a run. This causes the blood, which normally contains sodium as salt in our bodies, to become even more diluted because when you sweat, you lose both water and sodium. Once the blood becomes diluted, the blood pressure can drop, and the condition can be quite serious.

When there is an excessive amount of sugar in the blood, it is called hyperglycaemia, and it may be quite dangerous.

Carnitine, caffeine, creatine, and bicarbonate, these four ergogenic aids have received the most research and each has a unique impact on performance. Caffeine, for example, has a focus-improving effect on performance. There are many other supplements available. To

test the body's tolerance, one must begin using these ergogenic aids earlier than the day of the race. For example, males often respond to coffee less favourably than women. Man may therefore require greater caffeine dosages. Additionally, because the body has previously consumed a certain quantity of caffeine in the bloodstream, a person who drinks coffee may find that caffeine does not have the same effect on them as someone who does not.

How do you keep yourself updated regarding nutrition?

It is a topic that is always changing; therefore, I am a member of several journals and organisations around Europe, and we receive information about new studies, data, etc. nearly regularly. In addition to the conversations, we have among ourselves as colleagues, something this industry has taught me over the past 15 years is the knowledge I gain from my clients. Because clients keep you informed, you must learn more when anything is stated, and you need to check it up. But it also relies on how proactive a person is in staying current. In Malta, there are around 85 licensed nutritionists, however only 50 of them work.

Do you work closely with coaches and supporting athletes?

Yes, without a doubt, and frequently the coach would communicate with the player and with me. Runners will often come to me and say, "My coach recommended you because I need to drop an additional 5 kg to aid me with my running," or the coach may refer patients to me frequently. In order to follow up on a patient, I must ask both the coach and the athlete concerned how they are doing. I also communicate with them through referrals, but I also need to know how their performance is progressing, etc.

How do you suggest runners prepare what to eat before and after an intensive training session?

During the week, it's crucial to keep an eye on what they eat, so they still need to be cautious about junk food, highly processed foods, etc., but during the day, they must ensure they are properly fuelled by consuming enough carbohydrates from their diet. As I mentioned earlier, roughly 50 to 55 percent of the intake should consist of carbohydrates, which should then be spread out throughout the day. Then, if they have training, they have a carbohydrate-rich meal before to it, for example, if it is in the afternoon. The carbohydrate meal might consist of a dish of pasta with vegetables and some protein, such as lentils or meat, but not too much fat, since this can lead athletes to get gastroenteritis because lipids can be rather heavy on the small intestine. After that carbohydrate dinner, which may include rice or another starch, they have a carbohydrate snack, such as toast with banana slices on it or yogurt and fruit. Additionally, it's crucial that they drink enough water, and I prefer to advise

athletes to take electrolytes. I would advise them to consume a sports drink thereafter. After a run, I find it best to either drink a protein shake with bananas (protein shake with water and bananas) or eat a banana because they are high in carbohydrates and are easily absorbed. Additionally, the carbohydrates in the bananas will aid in the better absorption of the protein by the muscles. Following that, they'll have their regularly scheduled meal, which will still include a protein, vegetable, and carbohydrate component. I advise athletes to avoid becoming food obsessives since doing so might lead to unhealthy eating habits like anorexia.

I once had a client who approached me after the issue started. She attended a dance school in London, where they used to stress weight and food weighing, which caused her to acquire a distaste for eating. As a result, she got anorexia. It takes more than just the efforts of nutritionists to break this habit and build excellent eating habits, therefore I had to recommend her to a psychologist to address the problem. And as for myself, I don't advocate doing a lot of weighing etc. The fixation with weighing their meals is common among bodybuilders.

I use the Harris-Benedict equation for calories and will also take into account a person's level of physical activity. The equation will consider the person's height, weight, gender, and the amount of physical activity they engage in, but even after starting them on a diet of "X" number of calories, they won't need to weigh themselves because I will have already done the work for them. After consuming "X" number of calories, I will be able to tell if they need more or fewer calories from the scales since if this instance is increasing, it either suggests that they are consuming an excess of calories or that the plan has too many calories for them. So, I must adjust over time until I get it perfect, and sometimes it takes 3 to 6 months to find the correct diet.

Date 17/6/2022

Interviewee 3

Jonathan Balzan

49 years old, long-distance runner

What is your opinion of nutrition vs athletic performance? How does nutrition effect nutrition performance?

When it comes to running, finding the appropriate balance between carbohydrates, proteins, and fats is important for bodily function. Vitamins can be used to make up for a lack of natural meals or if a person doesn't like specific foods. Instead of eating one large meal, which can lead to weight issues, it's best to have many little meals every three hours. This is because the body stores excess calories as fat. Athletes in particular need water for performance and health reasons, in addition to preventing dehydration.

Do you recommend any special diets to long-distance runners?

I focus on carbs intake, I do not recommend any special diet

Which is your preferred diet? And why?

I do not have a preferred diet.

There is no junk food, pizza and spaghetti are the preferred sources of carbohydrates, and porridge occasionally takes the place of the daily banana. fish and meat products once every week. I have a sweet craving, but sugar is also necessary. As long as I continue working out every day, I may indulge in sugar as a reward or recompense.

What value do you give to the following when it comes to nutrition?

- Carbohydrates
- Protein
- Fat
- Supplements
- Fluid (including pre and post recovery drinks)

It is essential to strike a balance between carbohydrates, proteins, and lipids. Fluids are vital for preventing dehydration, and supplements are used to compensate for a lack of natural foods or a dislike for certain foods. I need to read about beetroot juice.

From where do you obtain information regarding nutrition?

Reading articles, my former coach’s advice, friends, internet.

Do you consult a nutritionist or a coach in planning your diet?

Never sought advice from a dietician; I have my doubts. While exercise should be a crucial component of a healthy lifestyle, the majority of plans simply concentrate on eating. I am aware of several people who were frustrated and ended up starting again or stopping halfway through.

How do you prepare before and after an intensive training session?
Always eat a banana before working out. Get up early enough the day before a race to enjoy toast with jam, an egg, tea, and a banana with water. a gel before the race and water intermittently while it is happening.
Breakfast, a glass of milk, and tea with well-earned croissants or cookies after the session. After a competition, I get a beer! Refuelling with carbohydrates!

Date 22/06/2022

Interviewee 4

Coach

Name Fabio Spiteri

How does nutrition effect athletic performance?

Nutrition is crucial to maintain a good performance, because the body needs energy especially from carbohydrates. It is important to consume enough food and fluid, before, during and after training.

Do you recommend any special diets to athletes?

I always remind my athletes to maintain a healthy diet, but they are free to follow any diet they choose as long as it is better for them. For instance, try to eat more vegetables, pasta during the day, protein in the evening, and have a light breakfast instead of using oil or frying food. Many individuals get up in the morning, have a cup of coffee, and then head off to work. Their metabolism begins to function because they are unaware of how crucial it is to start the day with a light meal. Additionally, I advise a healthy diet rather than any particular diet.

Which is your preferred diet?

I do not have a preferred diet, just eating healthy.

What value do you give to the following when it comes to nutrition?

- Carbohydrates
- Protein
- Fat
- Supplements
- Fluid (including pre and post recovery drinks)

Carbs are important especially for carb loading before the race and during a normal week just to get some fuel to burn while training.

You should always consume about 100 grams of protein for supper since protein's purpose is to repair damaged muscle tissues.

I believe that healthy fats like those found in avocado, coconut oil, and almonds should make up around 10% of your diet.

Supplements shouldn't even be an option if you have a highly nutritious food, in my opinion. I just eat well and no need supplements, but if you want to take vitamins or a protein shake before bed, by all means do so.

Fluid is also important. Our body contains about 60% water; thus we need to replenish any fluids lost during exercise. It varies from person to person and is based on how much the athlete sweat. For instance, I sweat far less than a typical athlete, thus I require less hydration. I won't push myself to drink water if I'm not thirsty, but let's suppose that the daily recommended amount of water for an average person is 2 or 2.5 liters. Due to heat and dehydration, you may need to raise this amount to 3 or 3.5 liters of water in the summer.

Do you keep yourself updated regarding nutrition?

I enjoy reading, but this is extremely elementary material. I'm only going to cover the bare fundamentals of nutrition.

Do you work closely with nutritionist and supporting athletes?

Let’s say i have around 40 athletes, 15 of those they use the help of nutritionist. I have a person who is a friend of mine, he just takes care of my athletes, I give them the amount of training they do, and he will give them a meal plan for their nutritional needs.

How do you suggest runners prepare what to eat before and after an intensive training?

They should consume something light, extremely light, such fruit, or yogurt, or energy bar, or cereal, one-hour prior training. For a morning race, they should consume breakfast—preferably something light—and never attempt anything new; instead, they should stick to their typical breakfast routine. I have been eating this kind of breakfast for many years in which I begin with Weetabix, Greek yogurt, and some fruit.

They should consume extra protein and vegetables after the marathon. After the race, you need to wait one hour to one hour and a half so that your body can settle down and you may resume your daily activities. I occasionally have a loss of appetite following a race. I don't even feel like eating, therefore you need to give your body some time to chill down before your hunger returns.

Pizza will be excellent the day before the race since it is entirely composed of carbohydrates and will be consumed as part of carb loading. I suggest increasing the intake of pasta four days before the race.

Gels are appropriate for marathons, although some athletes consume too many of them. I believe that 2 or 3 gels are plenty for a marathon. All it takes is a quick injection of sugar into your bloodstream. They must unquestionably stay hydrated by drinking water, Gatorade with electrolytes, or anything similar.

In my opinion Beetroot juice is good for recovery.

Date 16/6/2022

Interviewee 5

Nutritionist

What is your opinion of nutrition vs athletic performance?

Basically, they need a lot of energy and nutrition plays very important role. What is crucial the glycogen in the muscle and fat metabolism. The longer the event, the marathon the athlete will be using the combination of carbs and fat use of energy and it is imperative that the glycogen start being refinished along the way and even clear to the event which is called carbo loading which the athletes the last three days up to the event must increase the carbohydrates intake so that the glycogen source are full at the time of the event. In regard to fat usually all athletes have enough fat to sustain more than one marathon. One has to replenished along the way, not the get the glycogen deficiency and then the muscle to impair performance.

Another aspect is hydration depending on the weather and the sweat rate of the athlete, one should know their rate of sweat. Usually if one goes for 1 hour run, they weight themselves before and after the run, the difference is what you have lost in sweat. It varies from athlete to athlete, but this is a good calculation of how much water was lost. Obviously, water alone is not enough for this event because the loss of sweat must be replenished, otherwise the performance will suffer. During the whole year they have to take care of their nutritional requirements depending on the training road and daily routine like the work is one doing, which can be calculated by specific test and should aim to reach the required level of carbohydrates and protein in the diet to keep the muscles settled and recovered faster and ready for the next daily training.

In summer, as summer in Malta is very hot, it is not ideal that one goes for a run without taking any electrolytes drinks or water, because once the sodium level goes down will affect the performance, it might cause cramps or dizziness and ones can lose focus.

Do you recommend any special diets to athletes? Why?

My nutrition plan for athletes is very simple is like a balance sheet you must calculate the calories you need for your daily requirements and you're training, and you make sure you had them, not only the calories but also the distributions of the calories. It is important to know how many calories are coming from fat, how many form carbohydrates and how many from protein. I wouldn't recommend a Keto diet I don't agree with that. It doesn't matter what diet will be vegan or Mediterranean it is important to take all macro and micronutrient. Unfortunately, what happens is many people see some documentary or promotional

material about veganism and they think it is the solution for champions. Unless you know exactly what you are doing, I wouldn't recommend any diet unless one is completes conscious of what is he doing and preferably the athlete should take optional advice about veganism. When one does drastic changes in his diet, the blood should be checked every 6 months to make sure the diet is going well, and if need to be change.

Low Carbs, High Fat diet, I totally disagree, one cannot reach his potential with low carbohydrate diet. There is many books and scientific documentation that recommended 60 – 70 % total calories come from carbohydrates.

Which is your preferred diet?

We are in Malta so I will definitely recommend the Mediterranean diet. The diet varies, there is a lot of fresh vegetables and fruits, and you are eating a full variety of food and every food has its own elements. I recommend vegetables, full grains, avoid process food. All vegetables are good, and my recommendation for vegetables is very simple, the more colour you have in your plate the better.

What value do you give to the following when it comes to nutrition?

- Carbohydrates
- Protein
- Fat
- Supplements
- Fluid (including pre and post recovery drinks)

They are all important, even fat is important, if you take the right amount daily from the right source example Avocado, nuts olive oil, salmon etc you will not have issues. Body needs fats for hormones, brain functioning, join protection, energy and absorb fat soluble vitamins.

How do you keep yourself updated regarding nutrition?

I am reading books and taking courses about nutrition's effecting sports, but I didn't notice any drastic changes in the theory and how to apply. You get different approaches with different athletes, but the basics remain the same. There is no big difference between an athlete that lived 100 years ang and today. The genes will help to the genetically gifted athletes and the body types.

Do you work closely with coaches and supporting athletes?

Yes, with the top athletes I always want to have a chat with the coach to understand and work on the same philosophy same ideas not to confuse the athlete mainly, but obviously when I am doing the meal plans, I ask for the training program. I need to check the training

load to be able to come up with meals plan for the athletes. The communication with coaches is very important.

The intake number of calories varies a lot, form athlete to athlete, depending on the training period, of the training load of the day. Ideal to do a metabolic test so you know how much the body use food for energy. On rest day is not the same amount like on the training days. The intake will depend on the training load on the day. I cannot suggest the same amount of calories intake example 2,000 calories to an athlete that weight 40 kg and the other one 60kg. I usually go grams per kilo of body weight. Minimum is 0.8-1 gram of fat per kilo body wight, between 1.5 or 2gr protein per kilo body weight depending on the athlete needs, and carbohydrates at least 4 gr per kilo body weight and then on training days it can go up to 10gr per kilo body weight.

How do you suggest runners prepare what to eat before and after an intensive training session?

I usually recommend pre training meal 3 hours before rich on carbohydrates like plate of rice or pasta, olive oil, cereal, avocado, nuts, and light protein like egg whites and then after training is important, during a marathon I recommend 40-60g per hour of gels which consist of carbohydrates. I recommend a recovery meal easily digested, mixture of protein, carbs together with electrolytes within 30 minutes. In that format the digested system can absorb easily because after training the body is tired and is hard for the body to digest and after taking a regular meal. Training on an empty stomach has its benefits when you go to an easy run no longer than 90 min, however if you go for a longer marathon that wouldn't be beneficial. Training on an empty stomach in the morning you are stimulating your fat metabolism. I don't suggest beetroot juice because it have a lot of nitrates, I suggest hydration solution which consist of salt, potassium and magnesium.

Date: 9/ 7/2022

Interviewee 6

Coach

Name: Has Kesra

How does nutrition effects athletes' performance?

With nutrition only you cannot be a good athlete, that's impossible but you need balanced training, and the nutrition must be balanced as the training. You must go in parallel. I am talking about the elite athlete, not for someone who train 3-4 times and enjoy their life. You might have the best training program but if you do not eat healthy, you don't receive good results but not to be obsessed. If you go on a higher level, a tough session the nutrition is different than when you have a slow session. What we do is we have 4 stages and it start with the slow face, a lot of aerobic and more we get into the season the tougher the session will be. The nutrition must fit the intensity of the session.

Do you recommend any special diet to athletes?

The most important is that people must eat natural because there is no need to go supplementary stuff. A lot of scientific study show that these things doesn't work. A person must eat natural food. You can be a vegetarian or vegan it doesn't matter but you must have enough carbohydrate, fat and protein which you can get also form vegetable. So, you must do a study what can get you a lot of protein and carbohydrates in food, so there is no need to take the powder. When you eat natural food, your body absorbs it much better, so you need to know what's healthy and what's not healthy. You don't eat junk food, and if you eat junk food you must eat once in a while not every day or every week. You must be careful what you eat, not too much fat, more protein and carbohydrates, the right vitamins, fruit you must eat as healthy as possible. The most important is to eat healthy and balanced. If you eat healthy you will cover the need of your body.

What type of diet you preferred?

I don't really prefer any special diets, however eating healthy. Balancing food. Healthy habit is sustainable.

What value do you give to the following when it comes to nutrition?

- Carbohydrates
- Protein
- Fat

- Supplements
- Fluid (including pre and post recovery drinks)

I don’t touch supplements. I will not give my people sport drinks as they are full of sugar and it doesn’t hydrate you, for me it is a waste of money. Everything that you eat has salt in it, example bread, for magnesium you can get from food like avocado. I advise people to take water, eat healthy and that it. If your body needs some vitamins, you make blood test, and the doctor will advise what you must take. The doctor will advise you if you need to take some iron for example or anything missing, but don’t take something that your body do not need because you will overdo it.

If you have a competition, you eat a banana or an apple within 30 min and you are there. After 90 min of training eat a banana, because the gel contains nothing. They are a lot of studies very profound and details study from universities that the gel doesn’t help you because all this stuff is not regulated by the Government as medication, is regulated as food. It is important to get BCAA (branched- chain amino acids) from food. That’s what the supplement industry is about marketing and that how they do their income. If you go to Kenya, they don’t use, and if you put the Kenyan between the people that are taking everything you will go nowhere. The fastest marathon athlete in world takes nothing, so take a banana or yogurt after to recover.

During marathon you need to have some gel, but gel not the normal gel, there is brand called maurten from the Scandinavia, and it is very natural, but in half marathon, you don’t need anything.

You spend a lot of time to train your body, but you must also spend time to feed your body, because you cannot run without fuel. It is not only the physical side, but also nutrition is very important. You must teach your body to give it healthy habits, because the athlete is not only during the marathon but 24/7. Stay away from gels, supplements, and all these. It is very important what you eat. Balance food, more protein, and less carbohydrates. When you are a professional runner you will have a nutritionist with you, the coach will provide with the training, and it will be all calculated. I work together with a nutritionist from the Olympic centre who guides my athletes. I have one athlete from Malta who is very talented. I also have medical stuff and my athletes go there to be advise precisely.

I advise them to eat a lot of fish, chicken, vegetables, and fruit, and after training eat a banana or apple, in the evening eat Greek yogurt or something light like avocado, eat stuff that has magnesium. You must have a nutrition that has the right calories to feed your body.

How many calories one must take depends on the session, because some sessions are tough and you lose different number of calories, and that can be calculated. What your body doesn't need it turns into fat. Take the right amount of portion, during eating your body it will tell you is enough, but don't continue eating and this is something that every athlete knows, because all the weight you take with you and then you will suffer.

How do you keep yourself updated regarding nutrition?

We have from the association (Athletic Association) a lot of seminars which we attend to be updated. I update myself in training level, but the nutritionist is also super updated of what is going on, and that is how I get my knowledge. If I have somebody who train 5 times and I give that person to the best nutritionist he will not go faster, may be 15 seconds of a 5K but not more than that. You must really eat what you need, so if you don't need it don't take it. You must know what your capacity is, what you can and what you cannot and then you give the right amount of guidance.

Do you work closely with nutritionist and supporting athletes?

It is very important for the coach to work as a team with nutritionist, physiotherapist, and sport doctor. It is very important for the coach to be surrounded by professions because the coach doesn't know it all. Always responsible for the athlete when you go for an international race, you must deal with publicity as well, because some people are sponsored by another company. The higher level of the athletes more complex the team is. It is very important to communicate with the nutritionist, so you give the best training and nutrition for your athletes.

How do you suggest runners prepare what to eat before and after an intensive training session?

Sometimes I let the athlete train on an empty stomach in the morning, and the reason is to stimulate the fat burn. But not in all session, because on the intensive session is another story. Most of the time we do it in the afternoon, but easy session in the morning I advise to run without eating any food than the body will be more efficient with fat. If you have intensive session usually in the evening, I'll tell you to eat good carbohydrate, good protein, drink water 2 litres a day if it is normal weather, and if it is hot weather drink 3 litres per day but don't drink too much. After the session eat a banana or apple and go to eat your food light yogurt and go to sleep.

Most of the races in Malta are in the morning or made in the track yard in the evening. If you have the evening race you can eat anything you want in the morning. If you eat in the

morning it will not affect the race in the afternoon. In Malta you cannot eat before the race because you get a problem with the stomach, and one must experiment. You can eat a banana or toast with jam 2 -3 hours before, but you must see if your stomach can handle it. The athletes must experiment themselves what light food like banana, oats, toast with jam one can handle 3 hours before the race.

Beetroot juice has a lot of nitrates which cannot be healthy, and one must stop drink it 5 days before race. Also, some vitamin C to transport oxygen 3 days before the race, 1000mg per day but not more. Natural fruit juices can be taken every day and stay natural. If you spend time on your training, you must spend time on your nutrition.

Appendix 2 - Questionnaire

saqsini

Survey about Athletes' Nutrition

Settings

1 - I'm Nathalie Bellizzi, and I'm pursuing a Bachelor's Degree in Culinary Arts at the Institute of Tourism Studies researching the nutritional habits of long-distance runners in Malta. Kindly help a fellow runner by filling out this questionnaire. Thanks.

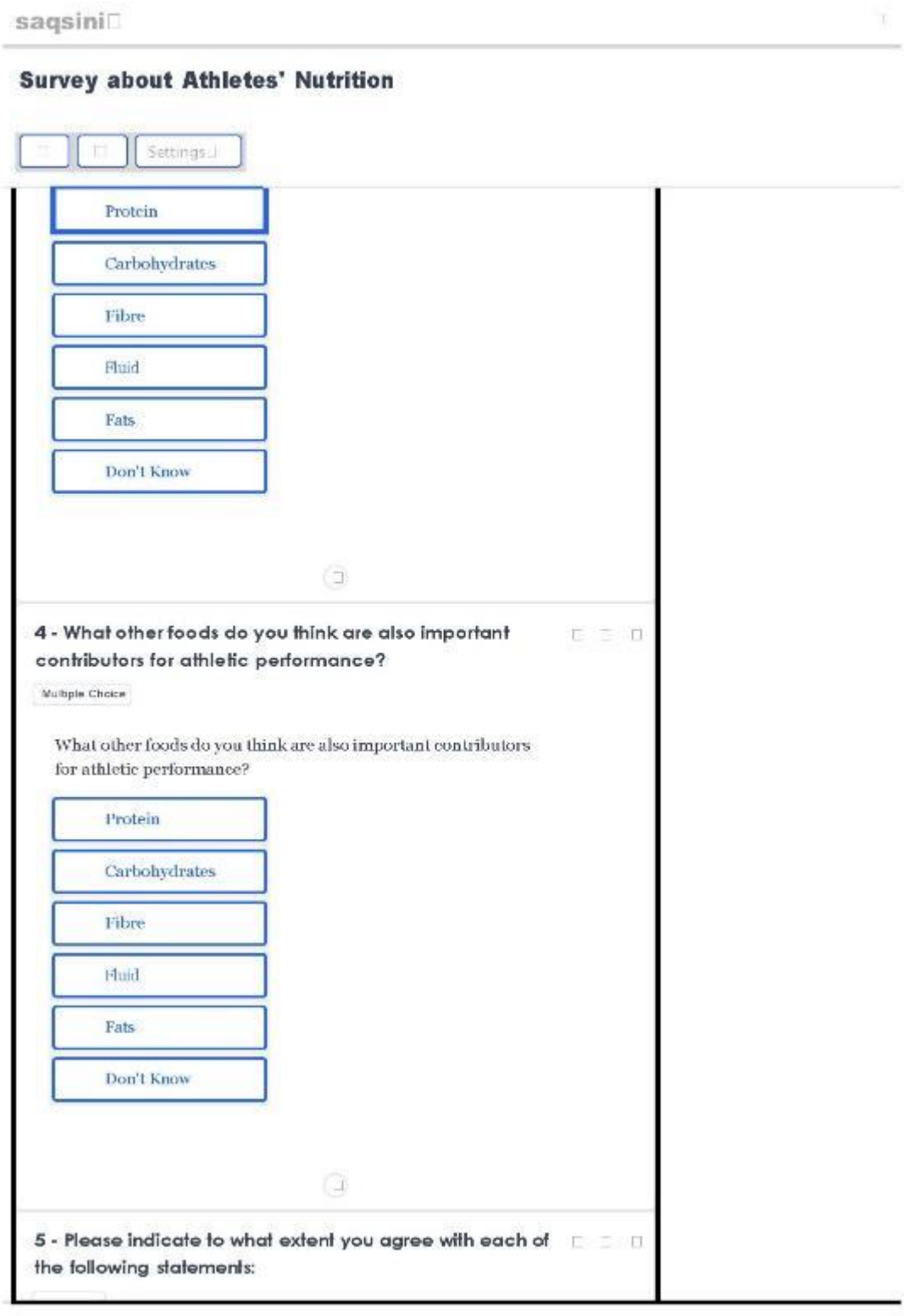
2 - Some people always base their choices on what food they should eat depending on the sport they practice, whilst others make food choices regardless of the sport they do.

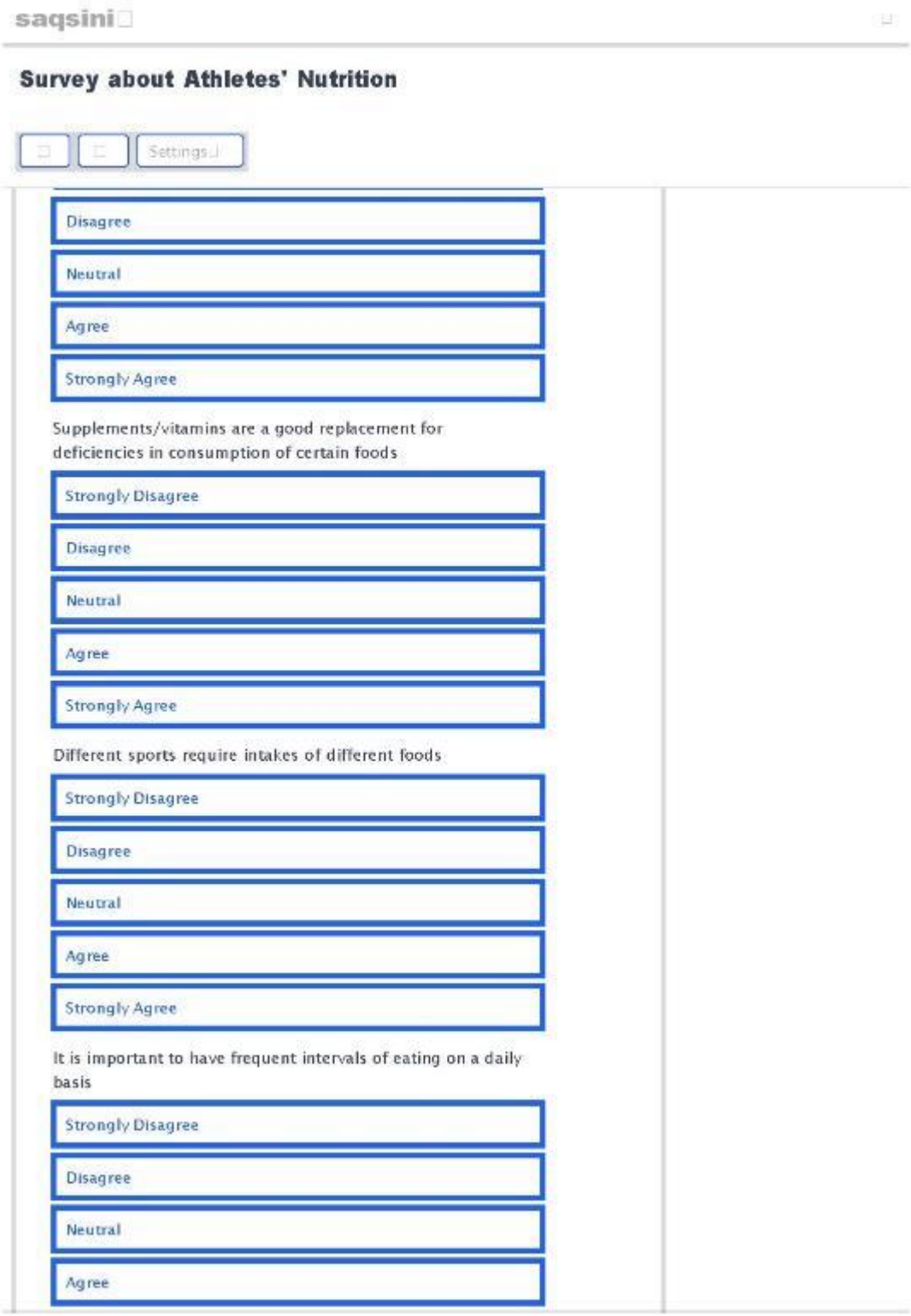
Likert

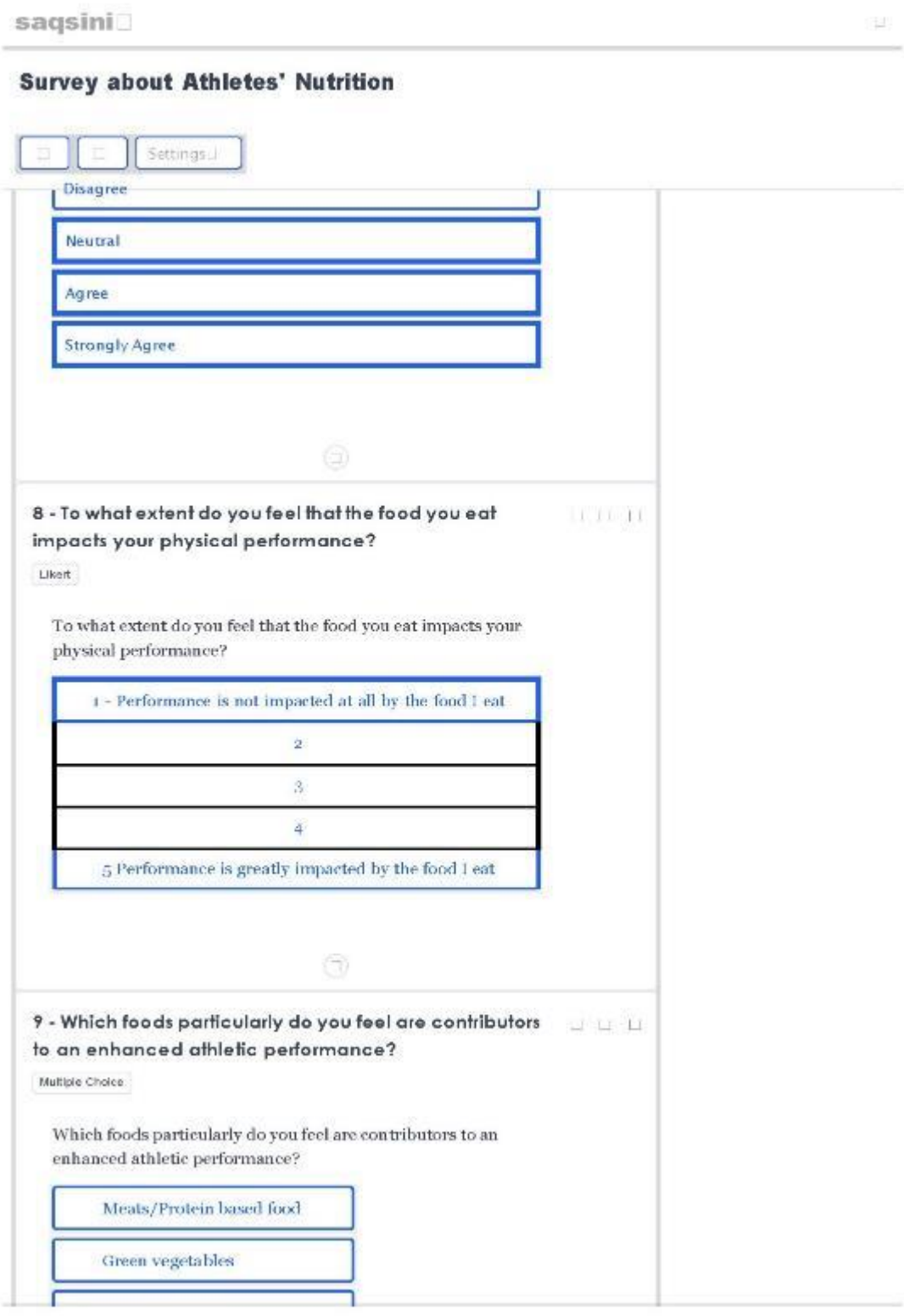
Some people always base their choices on what food they should eat depending on the sport they practice, whilst others make food choices regardless of the sport they do.

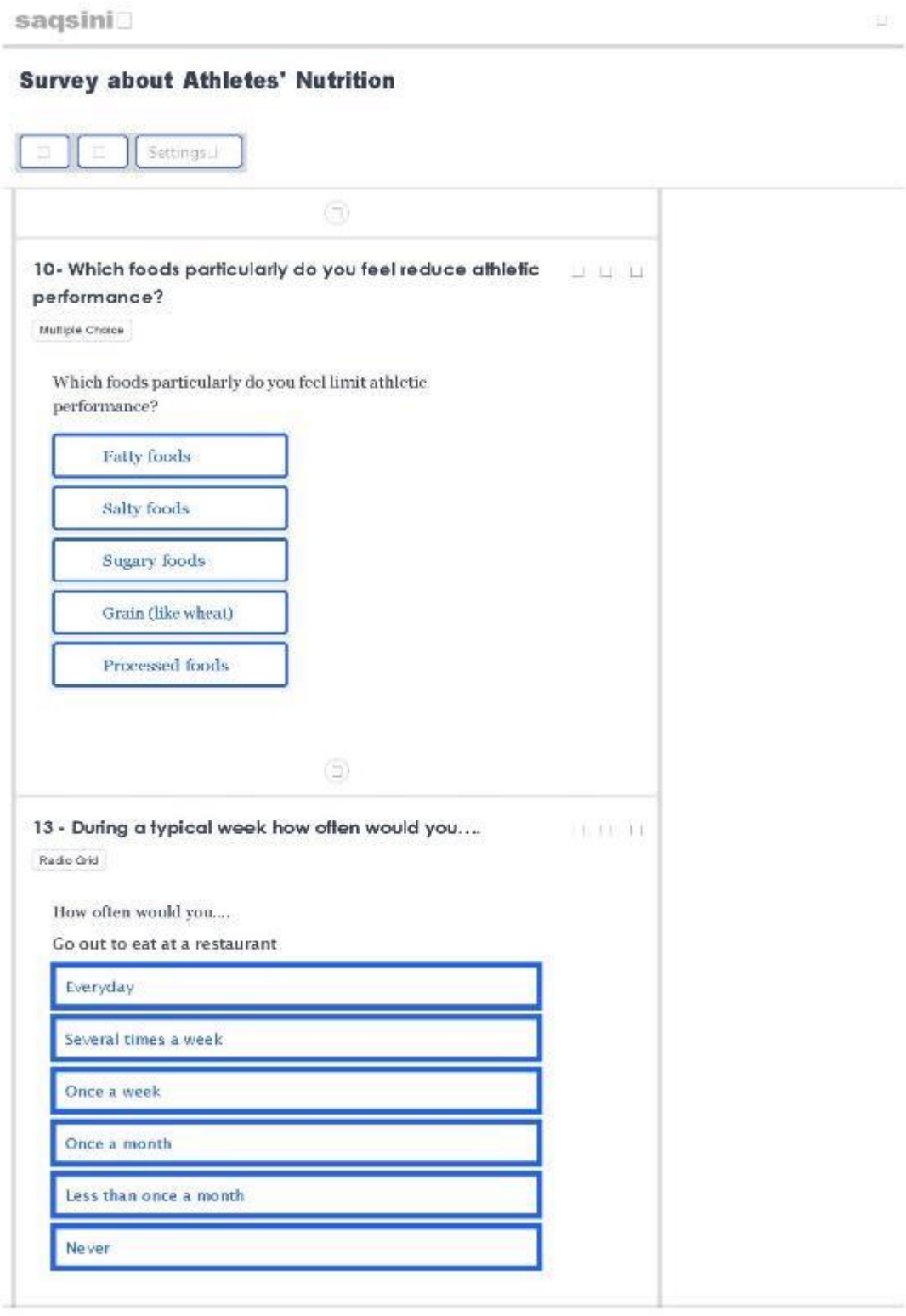
1 - Food choice never driven by sport activity
2
3
4
5 - Food choice is always driven by sports activity

3 - Which of the following nutritional properties do you


saqsini
Survey about Athletes' Nutrition
Settings
Protein
Carbohydrates
Fibre
Fluid
Fats
Don't Know
4 - What other foods do you think are also important contributors for athletic performance?
Multiple Choice
What other foods do you think are also important contributors for athletic performance?
Protein
Carbohydrates
Fibre
Fluid
Fats
Don't Know
5 - Please indicate to what extent you agree with each of the following statements:


saqsini
Survey about Athletes' Nutrition
Settings
Disagree
Neutral
Agree
Strongly Agree
Supplements/vitamins are a good replacement for deficiencies in consumption of certain foods
Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree
Different sports require intakes of different foods
Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree
It is important to have frequent intervals of eating on a daily basis
Strongly Disagree
Disagree
Neutral
Agree


saqsini
Survey about Athletes' Nutrition
Settings
Disagree
Neutral
Agree
Strongly Agree
8 - To what extent do you feel that the food you eat impacts your physical performance?
Likert
To what extent do you feel that the food you eat impacts your physical performance?
1 - Performance is not impacted at all by the food I eat
2
3
4
5 Performance is greatly impacted by the food I eat
9 - Which foods particularly do you feel are contributors to an enhanced athletic performance?
Multiple Choice
Which foods particularly do you feel are contributors to an enhanced athletic performance?
Meats/Protein based food
Green vegetables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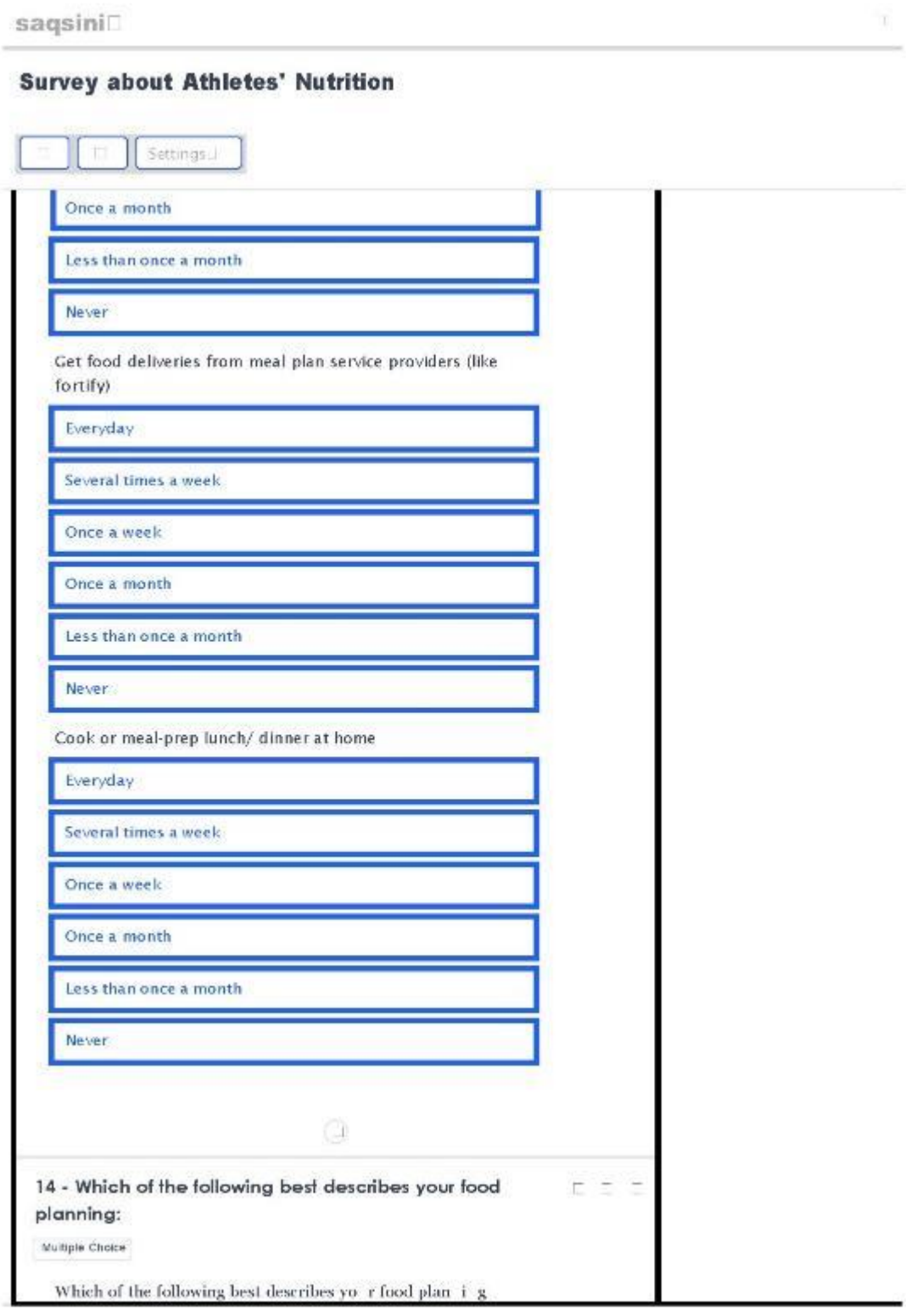
Survey about Athletes' Nutrition
Settings
10- Which foods particularly do you feel reduce athletic performance?
Multiple Choice
Which foods particularly do you feel limit athletic performance?
Fatty foods
Salty foods
Sugary foods
Grain (like wheat)
Processed foods
13 - During a typical week how often would you....
Radio Grid
How often would you....
Go out to eat at a restaurant
Everyday
Several times a week
Once a week
Once a month
Less than once a month
Never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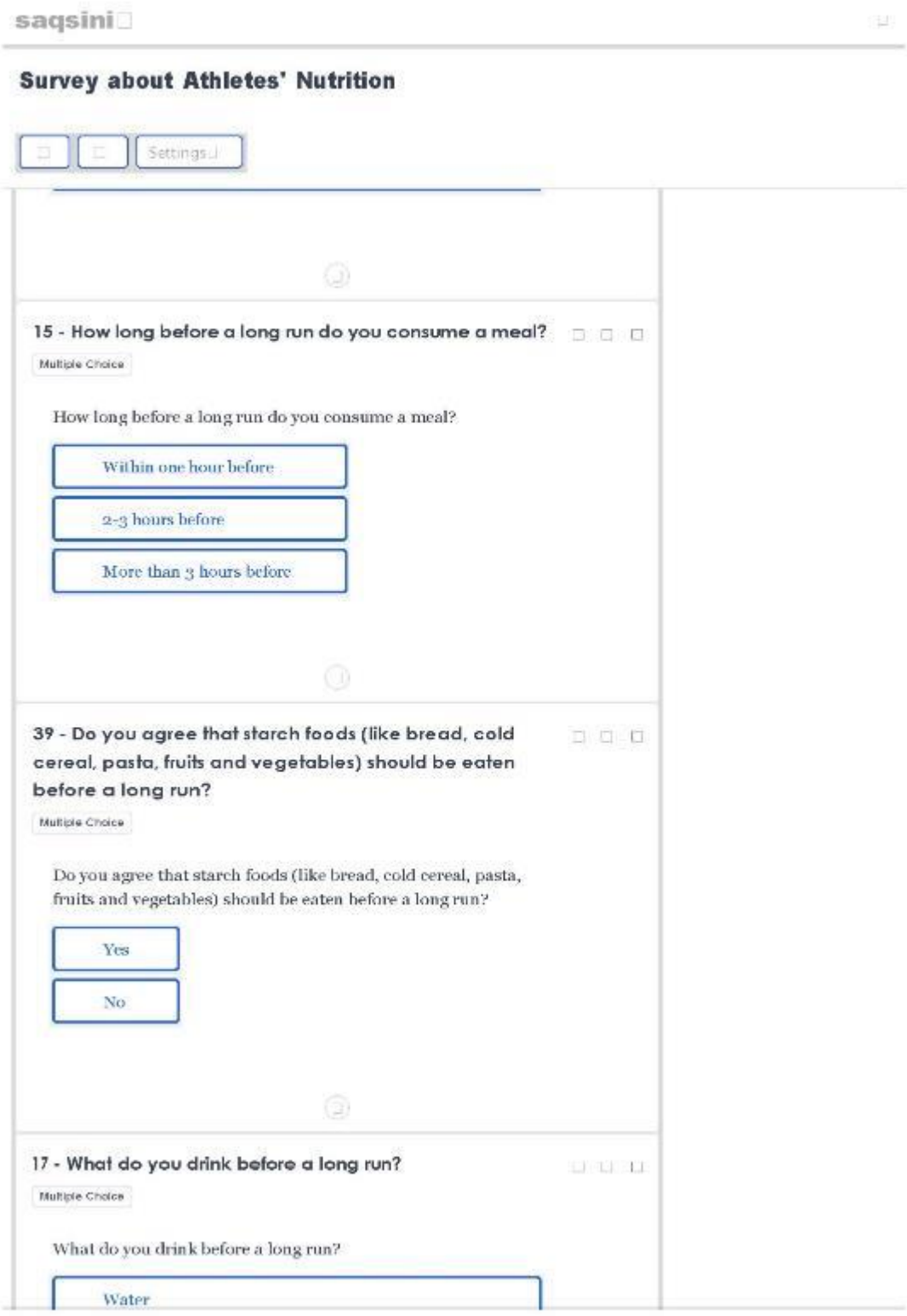
Survey about Athletes' Nutrition
Settings
Once a month
Less than once a month
Never
Get food deliveries from meal plan service providers (like fortify)
Everyday
Several times a week
Once a week
Once a month
Less than once a month
Never
Cook or meal-prep lunch/ dinner at home
Everyday
Several times a week
Once a week
Once a month
Less than once a month
Never
14 - Which of the following best describes your food planning:
Multiple Choice
Which of the following best describes yo r food plan i g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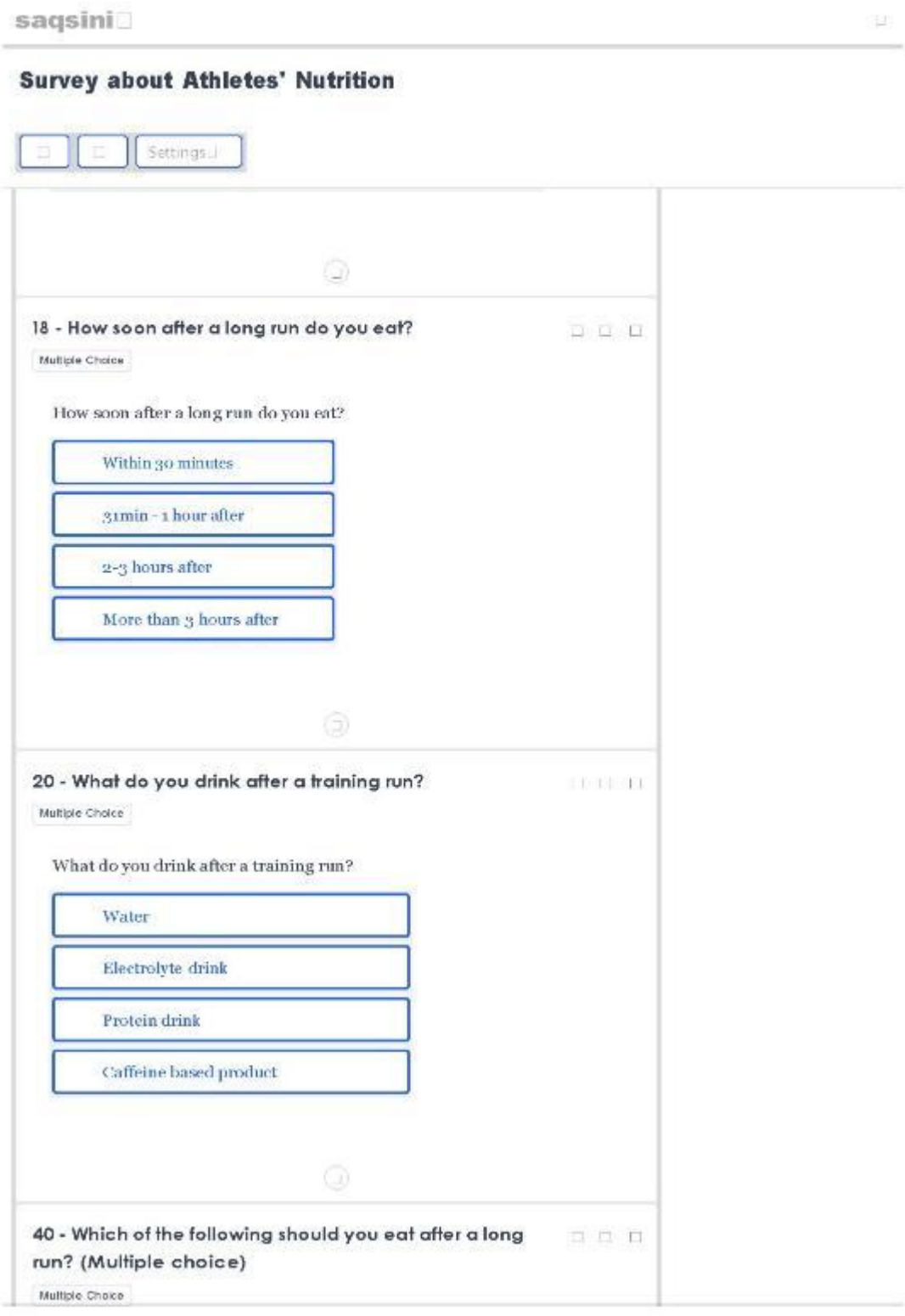
Survey about Athletes' Nutrition
Settings
15 - How long before a long run do you consume a meal?
Multiple Choice
How long before a long run do you consume a meal?
Within one hour before
2-3 hours before
More than 3 hours before
39 - Do you agree that starch foods (like bread, cold cereal, pasta, fruits and vegetables) should be eaten before a long run?
Multiple Choice
Do you agree that starch foods (like bread, cold cereal, pasta, fruits and vegetables) should be eaten before a long run?
Yes
No
17 - What do you drink before a long run?
Multiple Choice
What do you drink before a long run?
Water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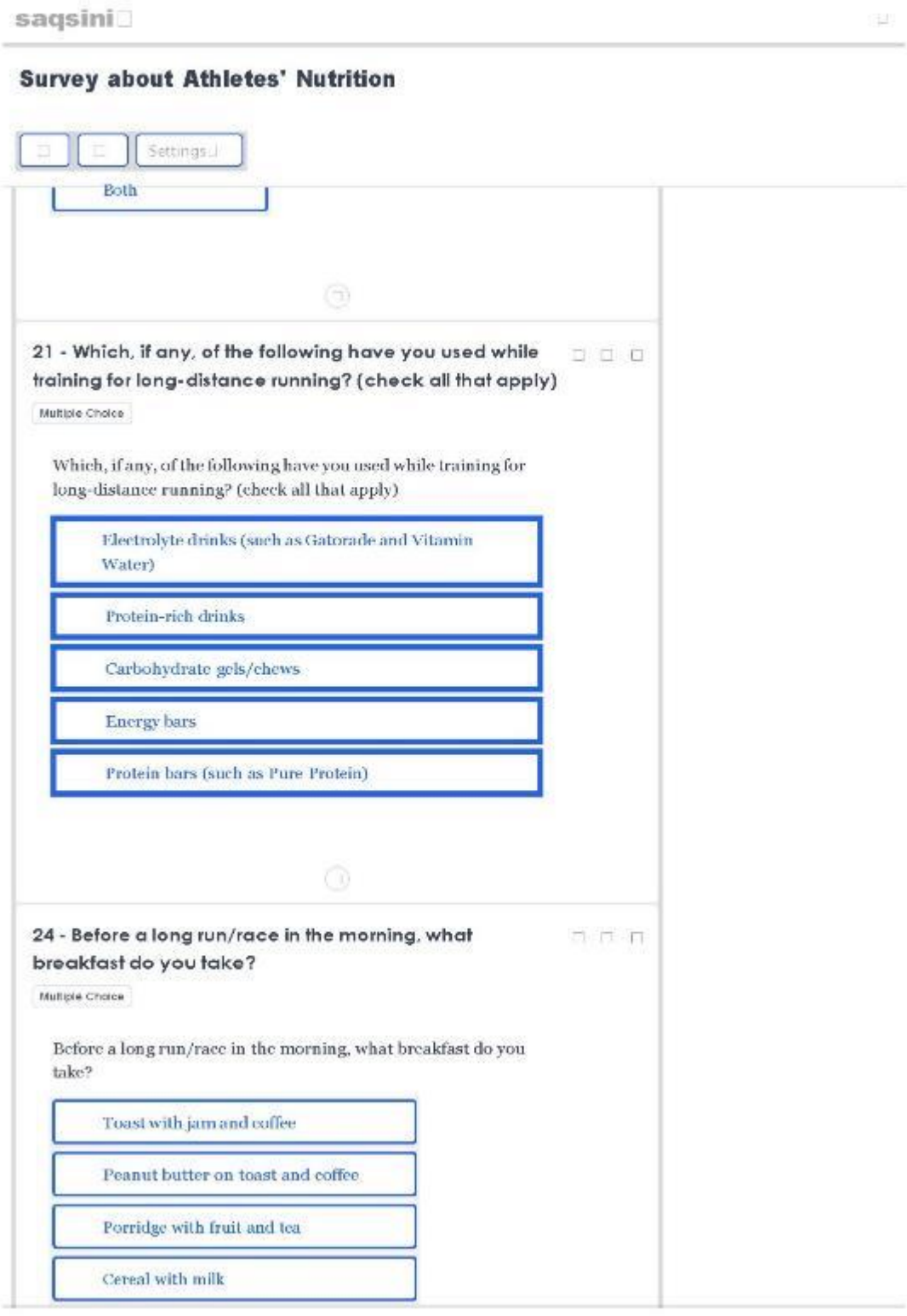
Survey about Athletes' Nutrition
Settings
18 - How soon after a long run do you eat?
Multiple Choice
How soon after a long run do you eat?
Within 30 minutes
31min - 1 hour after
2-3 hours after
More than 3 hours after
20 - What do you drink after a training run?
Multiple Choice
What do you drink after a training run?
Water
Electrolyte drink
Protein drink
Caffeine based product
40 - Which of the following should you eat after a long run? (Multiple choice)
Multiple Choice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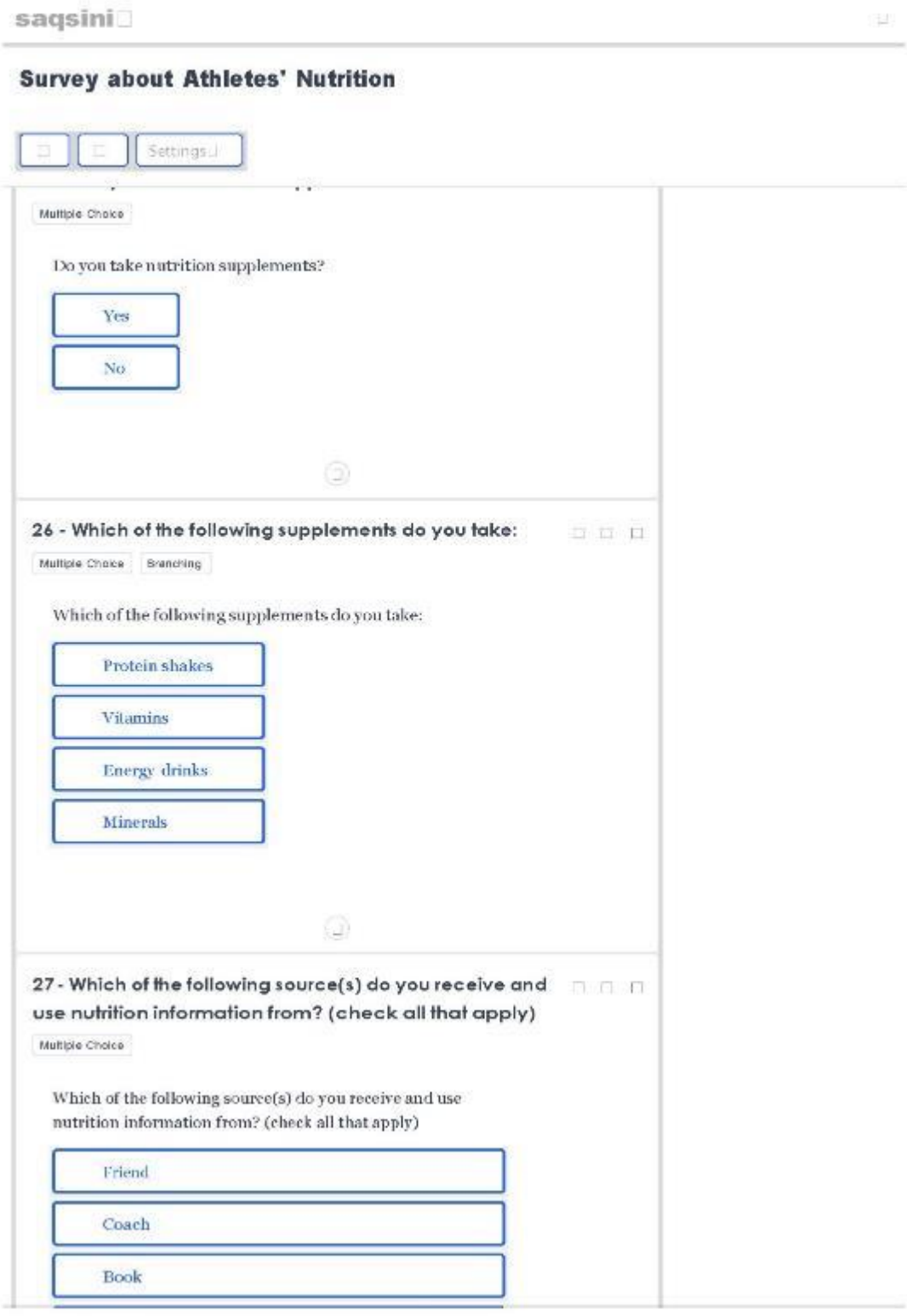
Survey about Athletes' Nutrition
Settings
Both
21 - Which, if any, of the following have you used while training for long-distance running? (check all that apply)
Multiple Choice
Which, if any, of the following have you used while training for long-distance running? (check all that apply)
Electrolyte drinks (such as Gatorade and Vitamin Water)
Protein-rich drinks
Carbohydrate gels/chews
Energy bars
Protein bars (such as Pure Protein)
24 - Before a long run/race in the morning, what breakfast do you take?
Multiple Choice
Before a long run/race in the morning, what breakfast do you take?
Toast with jam and coffee
Peanut butter on toast and coffee
Porridge with fruit and tea
Cereal with milk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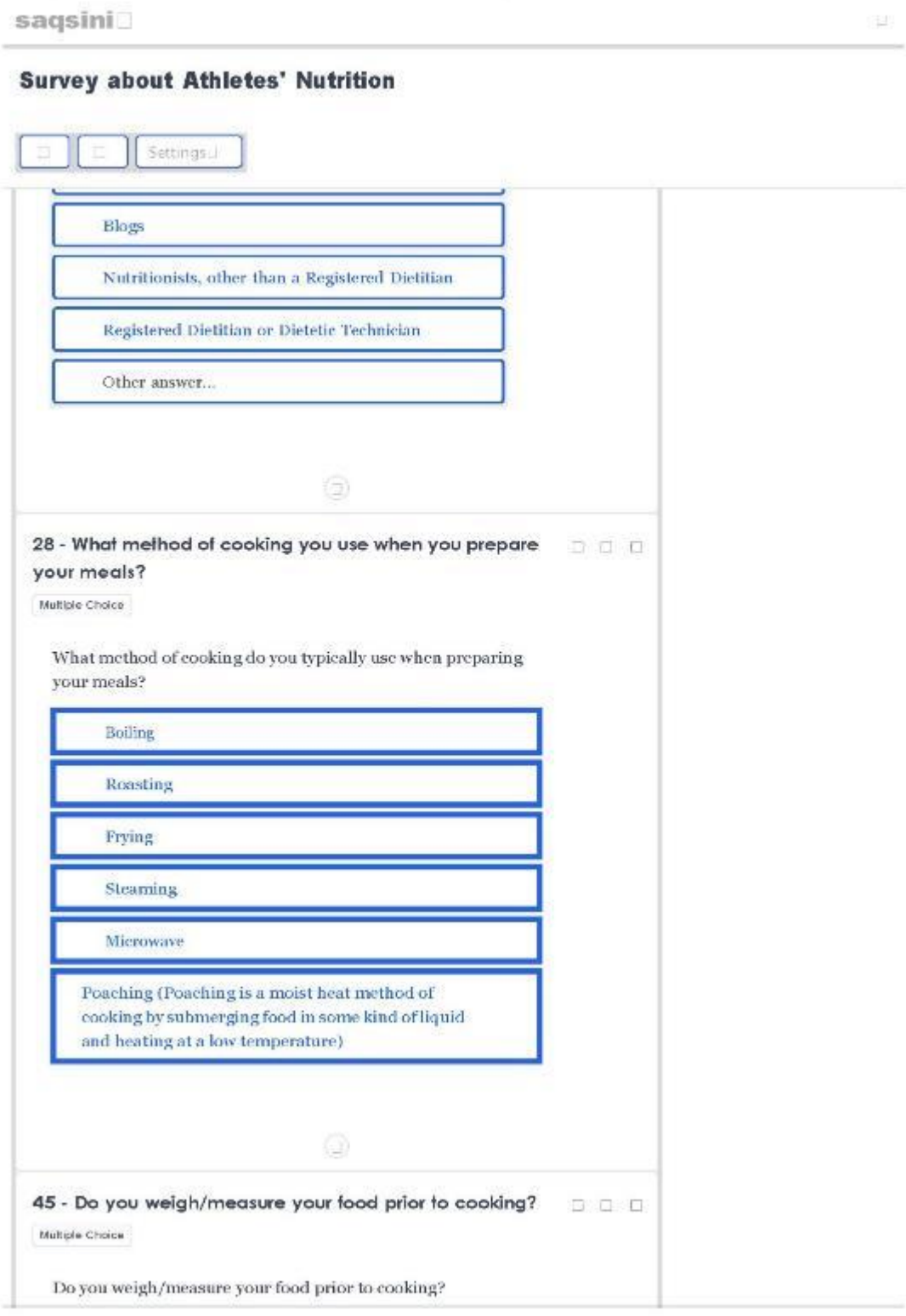
Survey about Athletes' Nutrition
Settings
Multiple Choice
Do you take nutrition supplements?
Yes
No
26 - Which of the following supplements do you take:
Multiple Choice
Branching
Which of the following supplements do you take:
Protein shakes
Vitamins
Energy drinks
Minerals
27 - Which of the following source(s) do you receive and use nutrition information from? (check all that apply)
Multiple Choice
Which of the following source(s) do you receive and use nutrition information from? (check all that apply)
Friend
Coach
Book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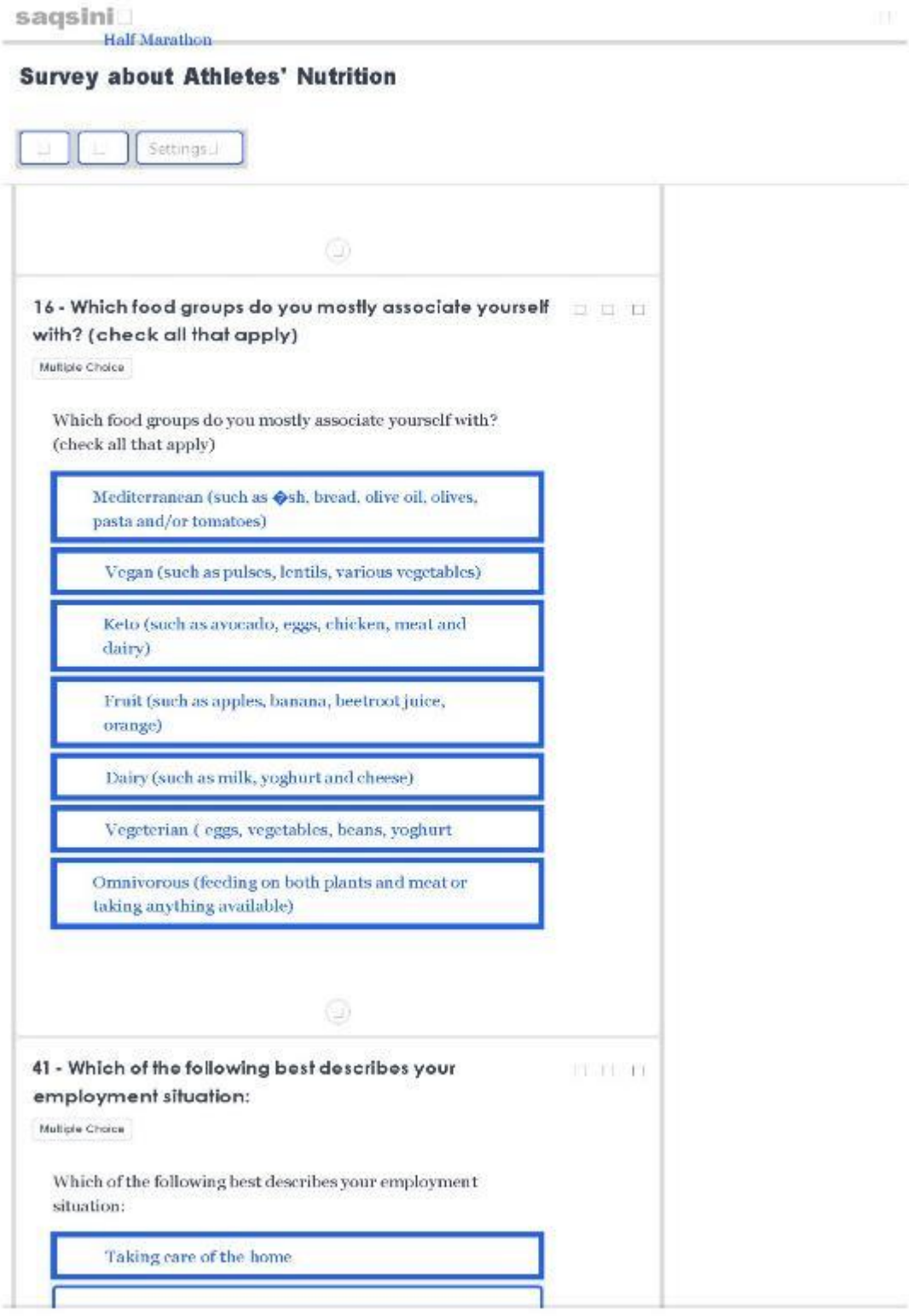
Survey about Athletes' Nutrition
Settings
Blogs
Nutritionists, other than a Registered Dietitian
Registered Dietitian or Dietetic Technician
Other answer...
28 - What method of cooking you use when you prepare your meals?
Multiple Choice
What method of cooking do you typically use when preparing your meals?
Boiling
Roasting
Frying
Steaming
Microwave
Poaching (Poaching is a moist heat method of cooking by submerging food in some kind of liquid and heating at a low temperature)
45 - Do you weigh/measure your food prior to cooking?
Multiple Choice
Do you weigh/measure your food prior to cooking?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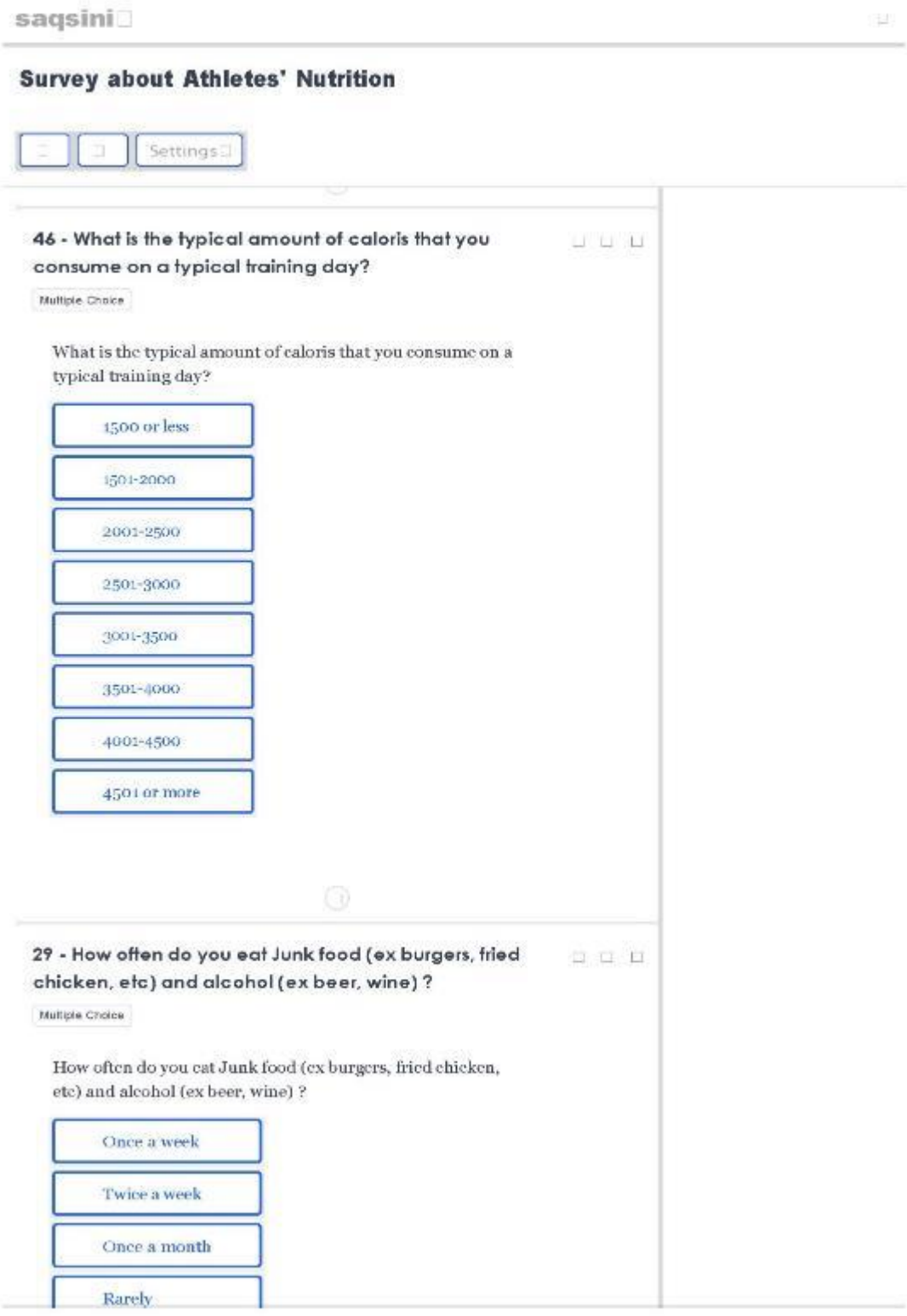
Half Marathon
Survey about Athletes' Nutrition
Settings
16 - Which food groups do you mostly associate yourself with? (check all that apply)
Multiple Choice
Which food groups do you mostly associate yourself with? (check all that apply)
Mediterranean (such as sh, bread, olive oil, olives, pasta and/or tomatoes)
Vegan (such as pulses, lentils, various vegetables)
Keto (such as avocado, eggs, chicken, meat and dairy)
Fruit (such as apples, banana, beetroot juice, orange)
Dairy (such as milk, yoghurt and cheese)
Vegeterian (eggs, vegetables, beans, yoghurt
Omnivorous (feeding on both plants and meat or taking anything available)
41 - Which of the following best describes your employment situation:
Multiple Choice
Which of the following best describes your employment situation:
Taking care of the home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Survey about Athletes' Nutrition
Settings
46 - What is the typical amount of caloris that you consume on a typical training day?
Multiple Choice
What is the typical amount of caloris that you consume on a typical training day?
1500 or less
1501-2000
2001-2500
2501-3000
3001-3500
3501-4000
4001-4500
4501 or more
29 - How often do you eat Junk food (ex burgers, fried chicken, etc) and alcohol (ex beer, wine) ?
Multiple Choice
How often do you eat Junk food (ex burgers, fried chicken, etc) and alcohol (ex beer, wine) ?
Once a week
Twice a week
Once a month
Rarely

saqsini

Survey about Athletes' Nutrition

Settings

30 - Do you cook for yourself, or do you eat what is prepared for all the family?

Multiple Choice

Do you cook for yourself, or do you eat what is prepared for all the family?

- Cook myself
- Eat what is prepared

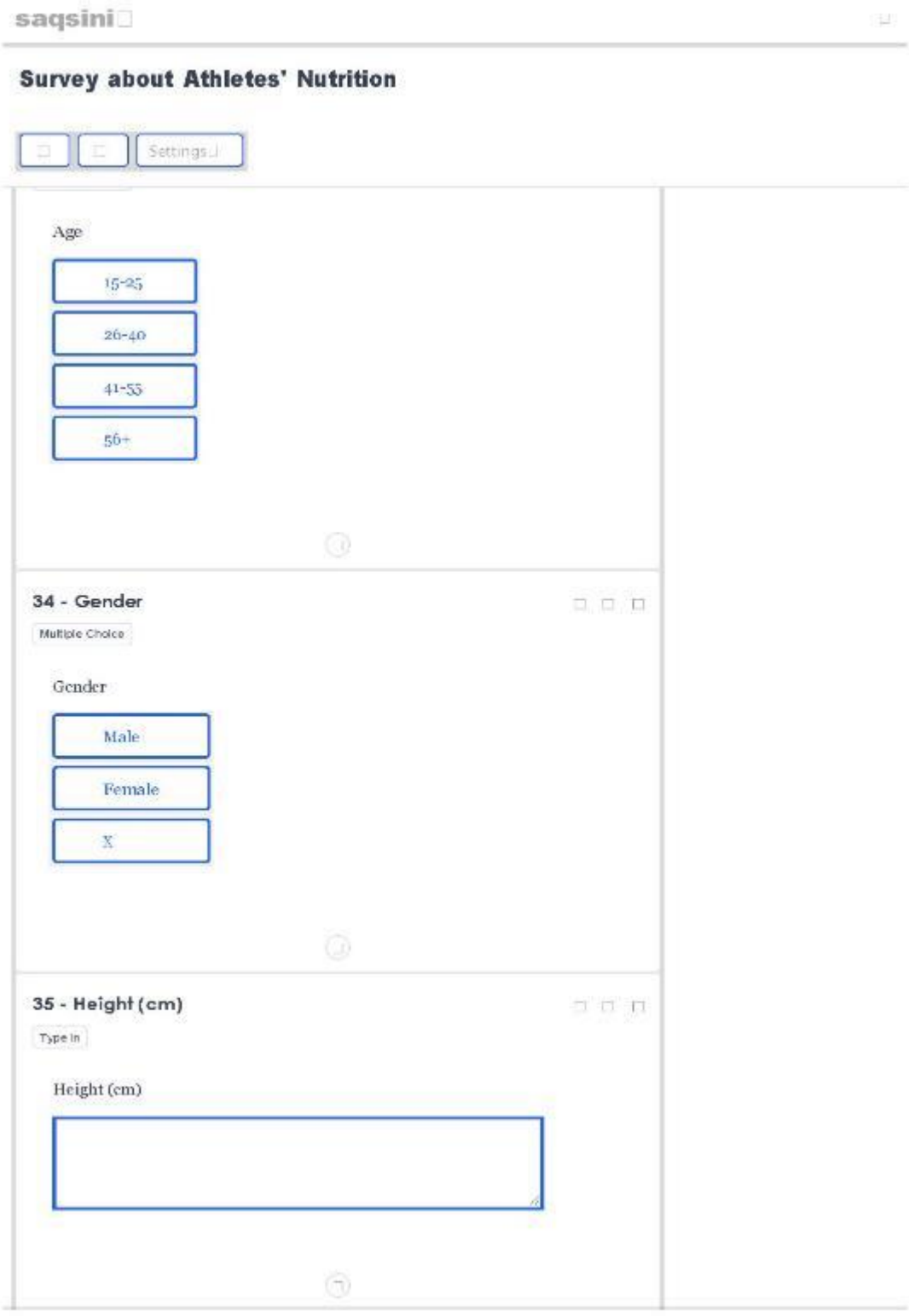
31 - During your runs and races, have you ever had problems with these conditions?

Multiple Choice

During your runs and races, have you ever had problems with these conditions?

- Dehydration
- Cramps
- Gastric distress
- Injuries
- Heatstroke
- Low blood pressure
- None of the above

32 - Demographics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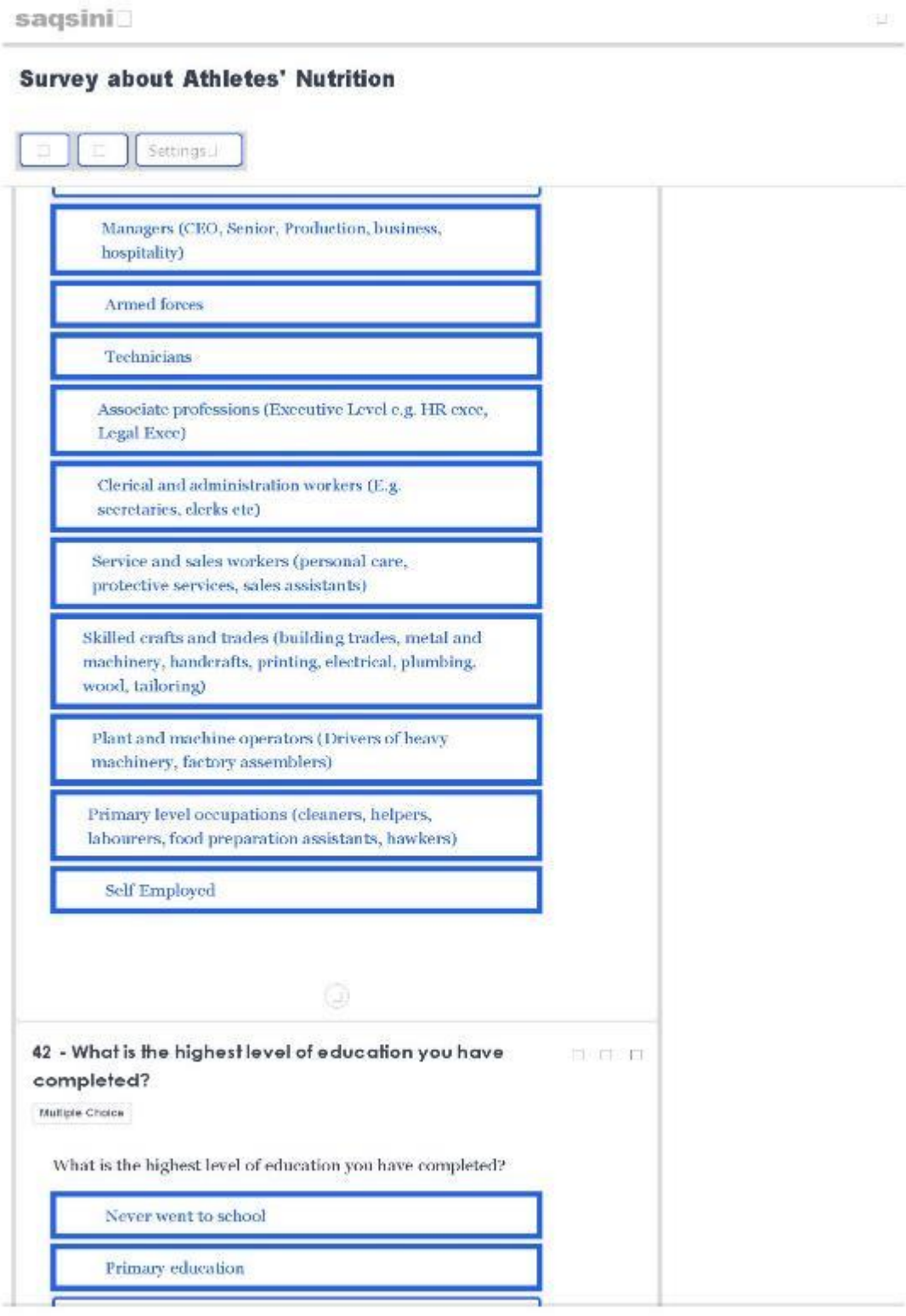
Survey about Athletes' Nutrition
Settings
Age
15-25
26-40
41-55
56+
34 - Gender
Multiple Choice
Gender
Male
Female
X
35 - Height (cm)
Type in
Height (cm)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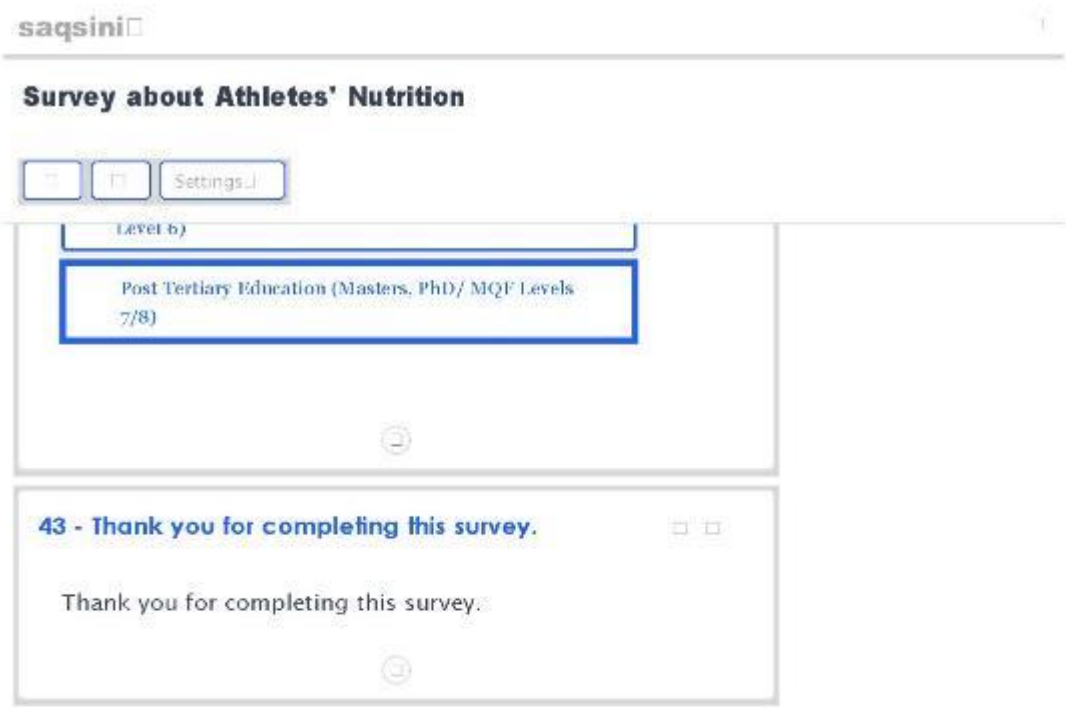
Survey about Athletes' Nutrition
Settings
Managers (CEO, Senior, Production, business, hospitality)
Armed forces
Technicians
Associate professions (Executive Level e.g. HR exec, Legal Exec)
Clerical and administration workers (E.g. secretaries, clerks etc)
Service and sales workers (personal care, protective services, sales assistants)
Skilled crafts and trades (building trades, metal and machinery, handcrafts, printing, electrical, plumbing, wood, tailoring)
Plant and machine operators (Drivers of heavy machinery, factory assemblers)
Primary level occupations (cleaners, helpers, labourers, food preparation assistants, hawkers)
Self Employed
42 - What is the highest level of education you have completed?
Multiple Choice
What is the highest level of education you have completed?
Never went to school
Primary education


saqsini
Survey about Athletes' Nutrition
Settings
Level 6)
Post Tertiary Education (Masters, PhD)/ MQF Levels 7/8)
43 - Thank you for completing this survey.
Thank you for completing this survey.