SUPPLEMENT CONSUMPTION PATTERN AND BODY COMPOSITION AMONG REGULAR GYM-GOERS

Dissertation submitted to

ST. TERESA'S COLLEGE (AUTONOMOUS), ERNAKULAM

Affiliated to
MAHATMA GANDHI UNIVERSITY

In partial fulfilment of requirement for the
AWARD OF THE DEGREE OF MASTER OF SCIENCE IN

HOME SCIENCE (BRANCH C)

FOOD SCIENCE AND NUTRITION

By

NANDANA PREMARAJ

Register No. AM23HFN011

DEPARTMENT OF HOMESCIENCE AND CENTRE FOR RESEARCH

APRIL 2025

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ERNAKULAM

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'Certified as bonafide research work'

Signature of the Examiner

Signature of the Guide

28/04/2025

Date

Signature of the Head of the Department

DEPARTMENT OF HOME SCIENCE ST. TERESA'S COLLEGE COCHIN-11

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ERNAKULAM

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Author Name	NANDANA PREMARAJ
Course of Study	M.Sc. Home Science Branch C - Food Science & Nutrition
Name of Guide	Dr. Anu Joseph
Department	Home Science & Centre For Research
Acceptable Maximum Limit	20
Submitted By	library@teresas.ac.in
Paper Title	SUPPLEMENT CONSUMPTION PATTERN AND BODY COMPOSITION AMONG REGULAR GYM-GOERS
Similarity	3% AI - 4 %
Paper ID	3539883
Total Pages	66
Submission Date	2025-04-24 14:56:51

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DECLARATION

I hereby declare that this research work titled **"Supplement consumption pattern and Body Composition among regular gym-goers"** is an original research work carried out by me under the supervision and guidance of Dr. Anu Joseph, Associate Professor, Department of Home Science, St.Teresa's College(Autonomous) Ernakulam.

Place : Ernakulam

Nandana Premaraj

Date : 28-04-2025

CERTIFICATE

I hereby certify that the dissertation entitled " **Supplement consumption pattern and Body Composition among regular gym-goers**" is an original research work carried out by Ms. Nandana Premaraj under my guidance and supervision.

Dr. Anu Joseph
Associate Professor
Department of Home Science
St.Teresa's College(Autonomous)
Ernakulam

Dr. Anu Joseph
Associate Professor
Dept. of Home Science
St.Teresa's College,Ernakulam

ACKNOWLEDGEMENT

This thesis has been kept on track and been seen through to completion with the support and encouragement of numerous people including my well-wishers, my family, friends, colleagues and various institutions. At the end of my thesis, I would like to extend my gratitude to everyone who made this thesis possible and an unforgettable experience for me. It is a pleasure to express my gratitude to everyone who contributed to making this study a success in so many ways.

First and foremost, I thank God for His countless blessings, guidance and for being my constant source of strength throughout this journey.

I hereby express my sincere gratitude Rev.Sr. Nilima Manager Rev.Sr.Francis Ann and Rev. Sr. Tessa CSST Directors and Dr. Alphonsa Vijaaya Joseph, Principal, St. Teresa's College, Ernakulam for granting me permission to commence this thesis in the first instance and for allowing me to continue the same.

I would like to express my deep and sincere gratitude to Smt. Teresa Kuncheria, Head of the Department of Home Science, St. Teresa's College, Ernakulam, for the valuable support throughout the time of research.

I am deeply thankful to my guide Dr. Anu Joseph, Associate Professor, St. Teresa's College, Ernakulam, for being my source of inspiration and support behind all my activities for her continuous support and guidance. Her constant encouragement, cooperation, motivation and support have always kept me on track. The insightful suggestions, expert advice and patience of my guide resulted in completion of this research.

I feel privileged to express my sincere thanks to all the teachers in the Department of Home Science for their support and guidance.

I express my gratitude to Ms Sunitha, Assistant Professor , Dept. of Management Studies St.Teresa's College,Ernakulam for helping with the statistical analysis.

I feel privileged to express my sincere thanks to Ms Anjana for her immense support in the conduct of the study and my heartfelt thanks to all the subjects in my study. Their time,

cooperation, and honest responses were vital for the successful completion of the data collection process.

I am grateful to all my family members for their constant encouragement, especially a deep sense of gratitude to my mother, father and brother who always stand by me as pillars of support and strength. Their patience and sacrifice will remain my inspiration throughout my life. My friends and well-wishers deserve special mention for their inseparable support and prayers.

Finally I would like to thank everybody who was important to the successful realization of the thesis.

Nandana Premaraj

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CHAPTER - 1
INTRODUCTION

The number of gyms has grown over the years. This is because of how conscious people are about the impact of their age on exercise. As reported by the International Health, Racquet, and Sports Club Association (IHRSA),gym members are made up of 33% of Generation Y, or Millennials(born between1980 and 1999), seconded by 24% of Generation X (born between 1965 and 1979), 22% of Baby Boomers (born between 1945 and 1964), 14% of Generation Z (born between years 2000 and beyond) and 7% of the Silent Generation (born prior to 1945).This indicates the way fitness centers have a tremendous market. Any kind and form of exercise under the category of regular physical activity, will help keep the body fit. Exercise plays an important role in maintaining health. All the benefits may be short term or long term for the betterment of muscles as well as bone strength will be maintained on the basis of regular exercise. Exercise not only also improves muscle strength but also helps to lower the chance of heart disease, maintain the balance of blood glucose level and highly reduce the chance of cardiovascular diseases (Khugshal, 2021).

Physical activity is all movement of the body which is brought about by the contraction of the skeletal muscles and results in energy expenditure above the resting level; e.g. walking, cycling, housework. Whereas exercise is a structured, repetitive type of physical activity which is undertaken to enhance health or physical fitness. It is established that both exercise and physical exercise are good habits against disease and unhealthy behaviour protective factors. They are said to enhance one's body image and self-esteem, maintain weight within limits, lower stress levels, some cancers and chronic pain, enhance sleep quality, muscle strength, endurance, flexibility and bone mineral density (Kaya *et al.,* 2022).

A gym (gymnasium) is a place created to encourage physical fitness and general health by organized training and exercise. Strength training, cardiovascular exercise, group fitness programs and functional workouts are just a few of the physical activities that people can do in a gym. They serve a wide range of fitness levels, including bodybuilders, athletes, beginners and those wishing to preserve or enhance their health. According to Rada and Szabó (2022), the COVID-19 pandemic significantly altered how individuals exercised. Group fitness, online personal training, obstacle course competitions, home-based fitness regimens, and even outdoor

training.In addition to challenging traditional gym use, sessions that included exercises tailored for kids, adults, the elderly, and persons with different medical issues also challenged the motivations for participation. However, earlier studies shed some light on the reasons why people pick the gym. Exercise participation is frequently conceptualized in studies in terms of both intrinsic and extrinsic motivation. Discipline, consistency, and a commitment to a healthier lifestyle are frequent characteristics of regular gym-goers who take care of their bodies. Their daily routine places a high priority on fitness, and they make time to work out whether it's in the morning, over lunch, or in the evening. For these people, obtaining and preserving their physical health depends on constancy. They frequently establish specific objectives, like gaining muscle, reducing body fat, increasing strength, or just being active, and monitor their progress to maintain motivation.

Aging of the population rapidly is a phenomenon throughout the world. Active preparation for aging is among the greatest concerns in the 21st century. Research has demonstrated that older people usually have extreme difficulties due to inactivity, such as higher risk of falling, higher psychological issues and less social engagement. Muscle strength is gradually declining as the physical functions reduce in older persons. The failure of muscle endurance for exercise and physical activity is easily associated with a higher risk of body function loss and non communicable conditions like obesity, diabetes and stroke. Moreover, poor quality of life and weak physical functioning are easily induced in older persons with sarcopenia. exercise and nutrition are effective ways to prevent and treat sarcopenia (Tsai et al., 2022).

It is common for gym-goers to use supplements, which include a wide variety of goods designed to help anything from fat loss and muscle growth to general health. Although not all gym-goers depend on supplements, many do so as part of their regimens to maximize their nutritional intake, performance and recuperation. The choice to use supplements is frequently influenced by personal dietary requirements, exercise intensity, and particular goals. There are different levels of studies done on the physical activity patterns. WHO coined that a proper physical activity can significantly reduce the risk of age-related disease and extend life span. (Jiang, Zhang *et al.*,2024). A study utilizing the UK Biobank demonstrated that vigorous exercise can effectively decelerate aging (Zhu et al., 2023). Body composition assessment can be divided as an individual's total body mass into fat mass (FM) and fat-free mass (FFM), which includes muscles, bones, organs, ligaments, tendons, and water. Measuring these components provides

valuable insights for diagnosing, managing, and treating various nutrition-related health conditions. While an initial assessment helps create a dietary plan, continuous monitoring and adjustments are essential to track progress and set realistic short-term goals. A clear understanding of body composition assessment methods allows nutrition specialists to make more informed decisions and improve patient outcomes(Holmes and Racette, 2021).

Supplements are used by gym-goers for many purposes, but mainly to improve performance, aid in recovery, and make sure they are getting enough nutrition. Supplements that give the body vital nutrients that diet alone might not provide, such as protein powders, creatine, and BCAAs, aid in muscle building, strength, and quicker recovery. To improve energy, focus, and endurance during workouts, pre-workout supplements are frequently made with caffeine and other energy-boosting chemicals. Alongside diet and exercise, fat burners and supplements that increase metabolism provide extra support for people aiming to lose weight or maintain it.For the purpose of avoiding nutritional deficiencies, many gym-goers also take supplements, particularly if they have hectic schedules or adhere to particular diets. Omega-3 fatty acids, joint support supplements, and multivitamins assist close nutritional gaps, lower inflammation, and improve general health. Supplements should be used in conjunction with a healthy diet and regular exercise, not in substitute of them, even if they can offer convenience and performance advantages. Supplements can be useful tools for helping gym-goers reach their fitness objectives and preserve their long-term health when used carefully and sparingly.Protein powder is a supplement that is frequently linked to athletes and gym-goers. But its advantages go much beyond just gaining muscle. Protein powder is essentially a concentrated form of protein derived from either plant or animal sources. Protein powder is created by converting food sources like dairy, eggs, grains, or peas into a handy powder form. This powder supports tissue health, balances hormones and enzymes, and improves muscle restoration. Those who want to control their weight or muscular tone will find it extremely helpful.

In our body, protein is essential. It serves as the fundamental component of skin, bone, and muscle. Eating enough high-quality protein promotes long-term satiety and helps you stay healthy. It consequently lessens the need to snack regularly.protein powders are commonly used by the gym enthusiasts and athletes. They support muscle building. Food sources like dairy, eggs, rice, or peas transform into a convenient powder form to make protein powder. They will helps

to increase muscle repair, support tissue health, and balance hormones and enzymes. There are different types of protein powders including whey protein, casein protein, plant based protein, egg white protein and collagen protein. It can be further classified at different levels.

Supplements can be bought through shops, online and can be given through the gym itself. As mentioned earlier there are different types of supplements marketed every year. These may contain large amounts of protein or creations. Their use may cause raised blood urea or creatinine in an individual. In a study which is conducted on 2011-12 survey 2.9% of Australian adults of all ages reported using a special dietary product on the day before an interview. Approximately 70% of these supplements were sport and protein beverages or powder. People who take supplements get an enhanced muscle mass, lose weight and improved performance level. But they may not be aware that long term use of supplements can worsen their own health conditions or interact with drugs (Sarah, Sherly *et al.,* 2018).

Relevance of the study

In recent years, there is a gradual increase in the field of fitness industry. Aim for fitness is rapidly going high after corona. Along with this trend consumption of natural as well as dietary supplements has also increased among fitness enthusiasts. However, the increase in usage often occurs without professional guidance and sufficient knowledge about potential side effects or interactions with individual health conditions.This study aims to investigate the impact of supplement usage among regular gym trainees and their body composition.

Objectives of the study

1. To analyse the commonly consumed supplements among selected regular gym-goers/ fitness enthusiasts.
2. To analyse the body composition pattern among the selected gym goers.
3. To compare differences in body composition among the selected subjects
4. To assess the knowledge regarding supplement use among the gym-goers.

CHAPTER 2
REVIEW OF LITERATURE

The review of literature pertaining to the study on **"Supplement consumption pattern and Body Composition regular gym-goers"** given under the following headings.

2.3 Exercise and its role in body composition
2.1 Current trends in fitness training
2.2 Dietary supplements - Natural v/s Commercial
2.4 Health risk and safety concerns of supplement use
2.5 Influence of social media and fitness influencers on supplement use

2.3 Exercise and its role in body composition

Skeletal muscles play a significant role in the upkeep of physical and health. Thus primary attempts to enhance and preserve skeletal muscle mass must be taken by various individuals ranging from those looking to optimize athletic performance to those involved in maximizing the health span(Joanisse, Lim, *et al.,*2020).

Muscle protein synthesis is an important role in increasing the growth and repair of muscles in response to resistance exercise. For the regulation of MPS, nutritional strategies play a significant role. By the intake of proper dietary protein consumption and resistance training will increase muscle growth and directly change the body composition. Protein requirements vary among different age groups, type of exercise and physiological demands. for maximising the muscle protein synthesis, consume protein within two hours after exercise. (Hamilton, E.2025)

Maximal aerobic exercise is also associated with higher stress on different systems, but overall body homeostasis is remarkably maintained. For example, world-class endurance athletes will elevate overall energy production more than 20 folds while keeping blood glucose levels at resting levels(Ruegsegger *et al.,* 2018).

People may interchange the words physical activity and physical fitness. According to the CDC, physical activity . without excessive fatigue, and with sufficient energy remaining to enjoy recreation and respond to emergencies. physical fitness comprises several components that include cardiorespiratory endurance, endurance of skeletal muscle, strength of skeletal muscle, power of skeletal muscle, flexibility, balance, speed of movement, reaction time, and body movement produced by the contraction of skeletal muscle that increase energy expenditure above the basal level(Booth *et al.,* 2012).

Exercise had an effect on BMI, and exercise was linked with favorable changes in body composition. exercise added lead mass to normal fat individuals and decreased fat mass in overfat and obese adults. excess body fat adults could benefit most from resistance exercise(Drenowatz *et al.,* 2015).

Sedentary life leads to insulin resistance and obesity, the beneficial impact on regular physical activity and glucose tolerance is established, with significant heterogeneity in responsiveness to exercise training. As muscle is the primary target of insulin in the body and the important glucose-consumption tissue, it is only logical that muscle activity is a powerful modulator of insulin action. A single episode of exercise augments skeletal muscle glucose uptake through an insulin- independent pathway that circumvents the insulin signaling process.(Jung, F.,2011).

Conversely, HIIE has been found to cause more fat loss. For instance, a study conducted by Trapp et al., implemented a HIIE involving an 8 s sprint interrupted by 12 s low intensity cycling for a total of 20 min. A separate group of women performed an aerobic protocol on the cycle for

40 min per session. Outcome was to find that female subjects in the HIIE intervention lost 2.5 kg of subcutaneous fat(Heydari *et al.,*2012).

2.1 Current trends in fitness training

Worldwide survey of fitness trends 2020 described as top 20 trends are present in fitness training. The topmost one is wearable technologies followed by high- intensity interval training(HIIT), Group training, Training with free weights etc. worksite health promotion and workplace well-being programs, Outcome measurements and children and exercise are least ones. (Walter R. Thompson, 2019).

A survey of fitness trends has been conducted by International awareness of the American College of Sports Medicine's (ACSM's) Worldwide. Practitioners across the world recognize the value in assessing health and fitness trends annually as one approach to guide future programming efforts. After covid 19 the fitness industry became ahead.(Kercher, Vanessa Marie, 2021).

Fitness centres have an important role in the physical activity participatory experiences. This may include private health centres as well as government -funded community facilities. It will offer a wide range of fitness and exercise related services. In the year 2019 it was estimated that 30% of Australians get a fitness centre membership and over 1.7 million Australians aged between 25 and 35 years started going to the gym in 2020(Yeomans , Karag , 2024).

Studies showed that exercise is very effective for improving aspects of fitness. a strong evidence was present to conclude that exercise done 2-3 times weekly at moderate to vigorous intensity promotes physical capacity as well as muscle strength within the chronic spinal cord injury groups

The study done on the visit frequency as fitness centre retention strategy suggest that visit frequency in gym plays a significant impact. Also the age of the member's has a significant impact on the frequency and retention(Connerton, & Park, *et al.,*. 2021).

Changes in fitness gyms started a long time back. So it may be considered a revolution period in the fitness centres. This revolution was an independent relation between bodybuilding and fitness. Whereas bodybuilding depends upon drugs, steroids, masculinity etc, fitness has come to be connected with health, beauty and youth(Andreasson, & Johansson, 2014).

A study conducted in Brazil showed that positive physical activities such as improved mood and maintaining stress levels. Exercise level directly linked with the good relationship, and support among the groups and instructors (Tross, Magalhaes Dias, *et al.,*2024)

2.2 Dietary supplements natural v/s commercial

Dietary supplements play an important role in health. These are targeted to the people who need it. micronutrient deficiencies and other nutritional requirements are gradually decreasing. food fortification could help meet the requirements. supplementation of low -dose multivitamin daily reduces the incidence of cancer and cataracts,especially among men(Rautiainen, Manson, *et al.,*2016).

A study conducted by AA Mahmood and JM Hadi in 2021 reported that almost half of the subjects were taking supplements and hormones. Thirty percent of the subjects were having many kinds of protein supplements. The usage of dietary supplements is very high and they will not be concerned about the adverse effects of these products.

A study done in Southern Brazil found that men are more likely to consume supplements other than women. They have a specific goal to attain increased muscle mass also. Men are self-prescribed uses of these supplements , while women tend to gather more information from nutritionists(Molz, Rossi, *et al.,* 2023).

There are different types of supplements including protein powders, isotonic drinks, weight loss supplements casein and whey proteins. These are more popular choices of supplements. Many studies reported that without a specific goal or motive with respect to need. Gym instructors are the main source of information about these supplements and they will be the suppliers also(Sindhuja , Verma . 2023).

Fruits and vegetables, saltwater fishes are the common dietary components to reduce and prevent cardiovascular disease. The high intake of omega-3 fatty acids the sources include fish and seafood lowers the risk of mortality rate by cardiovascular disease(Wierzejska, . 2021).

The use of nutritional supplements is widespread in gyms. exposure to the supplement constantly through advertisements in glossy magazines and the internet, shops and may be provided through the gym itself(Malik, & Malik,2010).

Caffeine (1,3,7-trimethylxanthine, CAS no 58-08-2) is a natural product in seeds from coffee (Coffea arabica L.), cola (Cola nitida (Vent.), guarana , and in tea bush leaves and maté leaves (Ilex paraguariensis A.St.-Hil.). Coffee and black tea have been traditional hot drinks for centuries in Europe because of their flavor and stimulating effect. More recently, caffeine-containing soft drinks, such as cola, were also introduced in Europe and, in the past two decades, energy drinks too. Additional sources of caffeine include food supplements and pre-workout (PWO) formulations. Pre Workout Formulations are not regulated but are sold for consumption before training. They have a composition of several ingredients claimed to enhance energy, prolong endurance and enhance muscle gain(Pilegaard, , Uldall, *et al.,*2022).

2.4 Health risk and safety concern of supplement use

Pasiakos reported that high-quality, consistent data showed that no obvious relationship exists between recovery of muscle function and ratings of muscle soreness and surrogate indicators of muscle damage when protein supplements are taken before, during, or after a session of endurance or resistance exercise. There also seems to be a lack of experimental evidence

showing ingestion of a protein supplement after an exercise reduces muscle soreness and/or decreases markers of muscle damage. Nevertheless, favorable effects like decreased muscle soreness and markers of muscle damage are more pronounced when supplemental protein is ingested after training sessions each day. Also, the results indicate potential ergogenic effects linked to protein supplementation are optimal if subjects are in negative nitrogen and/or energy balance (Pasiakos *et al.,*2015).

Sometimes searching the list of ingredients does not suffice. In early 2018, an independent, nonprofit group, Clean Label Project, published the findings of a study in which more than 130 top-selling protein powders were analyzed for concentrations of pesticides, heavy metals, bisphenol A (BPA), and other harmful contaminants. Three-quarters of the powders had detectable levels of lead and cadmium, both of which have the potential to permanently affect health by causing kidney and brain damage. Half of the powders had detectable amounts of BPA, which has an impact on hormones and contributes to many types of health complications. One item was found to have more than 25 times the regulatory maximum amount of BPA per serving(Jared ,2025).

Protein supplements are typically used to augment protein consumption and performance, recovery, and muscle building. These supplements are marketed for athletes but are also consumed on a regular basis by teenagers and young adults who exercise. Protein supplementation has favorable impacts on metabolic and cardiovascular risk factors and improved glycemic control in people with diabetes. But caution must be exercised regarding potential hazards, including hyperfiltration and excessive urinary calcium excretion(Patel, *et al.,*2024).

2.5. Influence of social media and fitness influencers on supplement use

A study entitled ' The power of social media fitness influencers on supplements: how they affect buyer's purchase decision' by Kumar N et al.,(2024) found that social media fitness influencers had an important role on buyer's purchase decisions. Other factors like number of followers, attractiveness and content do not have any correlation with buyer's purchase decisions.

The growing role of social media on body image perception has affected gym members' behavior greatly, especially with the consumption of dietary supplements and performance-enhancing drugs. Empirical evidence shows that image-oriented use of social media is positively linked with the consumption of ergogenic dietary supplements like protein and creatine and anabolic-androgenic steroids (AAS), although there exists no significant linkage with selective androgen receptor modulators (SARMs) ($r = .26$, $p < 0.01$; $p < 0.05$). Moreover, increased exposure to visual content is linked with higher body dissatisfaction among women ($r = .34$, $p < 0.01$), indicating that social media promotes unrealistic body standards that lead to the use of supplements by individuals striving for an ideal body. In spite of such associations, body image dissatisfaction doesn't seem to mediate between social media exposure and doping compound use, suggesting that there is a contribution by other variables like peer influence or fitness culture. The very high use of dietary supplements (83%) in young male gym attendees, coupled with the high prevalence of AAS (9%) and SARMs (2.7%) use, emphasizes the urgent need to investigate the psychological and sociocultural determinants of these trends. These results place emphasis on resolving the role of social media in body image and supplement use, especially among gym-going individuals where the aesthetic ideal is highly emphasized(Hilkens *et al.,* 2021).

Various studies have investigated the effects of dietary supplementation on health and fitness. Social media has been a prominent platform that drives the consumption of supplements, with more than four million people reached and 18,595 posts during our search. The most common supplements are "Whey Protein," "Branched Chain Amino Acids," "Creatine," "Multivitamin Supplements," and "Nitric Oxide Boosters." These supplements are mainly consumed for muscle growth (23%), improved energy (17%), and weight reduction (8%).

Literature indicates that although supplementation is mostly perceived in a positive light in online fitness forums, a considerable proportion of users experience side effects. About 19% of the users of fitness forums have reported side effects, such as acne (9%), water retention (9%), abdominal pain (9%), rashes (7%), erectile dysfunction (7%), and weight gain (5%). Additionally, issues related to supplement quality and safety are well-documented, with contamination (47%), fake products (17%), and concealed ingredients (11%) being major concerns.

Considering the commonality of social media-led health fads, studies call for regulatory controls and professional guidance to make supplementation safe. The absence of control in online discourse highlights the necessity of proper, evidence-based information to counteract misinformation and protect public health. (Catalani, *et al.,* 2021).

CHAPTER -3
METHODOLOGY

Research methodology is a specific procedure or technique used to identify, select, process and analyze information about a topic. It is a systematic way to solve a research problem. " The strategy or architectural design through which the researcher maps out an approach to problem-finding or problem-solving is known as research methodology.

The methodology adopted for the study on **"Supplement consumption pattern and Body Composition among regular gym- goers"** is given under the following headings:

3.1 Selection of Area

3.2 Selection of Sample

3.3 Selection of Tool

3.4 Conduct of study

3.5 Analysis and Presentation of data

3.6 Research Design

3.1 Selection of Area

The area selected for the study was Ernakulam. This area has been chosen for the heterogeneous population containing both urban and semi-urban population. The presence of subjects from various socio-economic groups will also enable a diverse view in the study.

3.2 Selection of Sample

Sampling is a process used in statistical analysis in which a predetermined number of observations are taken from a larger population.

A total of 100 subjects from the selected area were the sample for the study. The sample selected included adults both male and female between the age group of 18-60 years.

The samples were selected using a purposive sampling method, consisting of subjects who are regular gym-goers.

"Purposive sampling is a form of non-probability sampling in which researchers rely on their own judgement when choosing members of the population to participate in the study"(Foley 2018).

Criteria for selection of sample

The criteria for the selection of sample was as follows;

Age groups of 18-60 years were selected (ie) youth and adults under the age group classification were selected. Only subjects who were going to the gym regularly were selected.

The selection of the sample is based on characteristics of a population and the objective of the study.

3.3 Selection of Tool

In a research project, the selection of a suitable instrument is critical. A self structured interview schedule was designed to evaluate data of the selected subjects. The interview schedule was divided into six sections: (a) Demographic characteristics, includes gender, age, occupation, education and family income; (b) Exercise trends; duration, type of exercise, ; (c) Nutritional supplement consumption; kind of supplement, quantity of supplement, (d) Dietary pattern (e) Lifestyle pattern and (f) Body composition analysis. Face to face structured interviews were used to gain relevant data from the subject.

A structured interview is a method of data collection that depends on asking questions in a predetermined order to collect data on a specific topic(George and Merkus 2023).

3.4 Conduct of the study

The study aims to analyse the supplement usage among regular gym trainees and assess the body composition. The study was conducted in different gyms in Ernakulam. By the face to face interview method data was collected from the 100 subjects. Before data collection, consent was sought from the gym owners and trainers. The interview schedule designed for the study which included details about the gym workout patterns, supplements consumption was used to collect information from the subjects.

Body composition was analysed by OMRON -HBF 375 Body Composition Monitor. Height was measured using measuring tape. Weight , BMI, Calorie, Body age, Fat %, Visceral fat, Skeletal mass and Subcutaneous mass were measured. BMI classification by WHO (2010) was used.

Table 1:BMI Classification

*BMI	Nutritional Status
<18.5	Underweight
18.5-24.9	Normal
25-29.9	Overweight
30-34.9	Obese class 1
35-39.9	Obese class 11
>40	Obese class 111

(*BMI classification was as per WHO,2010)

3.5 Analysis and presentation of data

The collected data was tabulated, analyzed and presented. Statistical tool was used.

Independent T Test

The study involves two groups of gym- goers, those who use supplements and those who do not consume. These two groups were paired and a T test was performed comparing mean values of variables (BMI, Skeletal mass, Visceral fat, Subcutaneous fat). The independent T test will check whether the two means of the two groups are statistically different from each other.

Null hypothesis: There is no difference between body composition factors between users and non-users of supplements.

Alternative hypothesis: There is a significant difference between users and non-users of supplements.

3.6 Research Design

The collected data was analysed and presented.

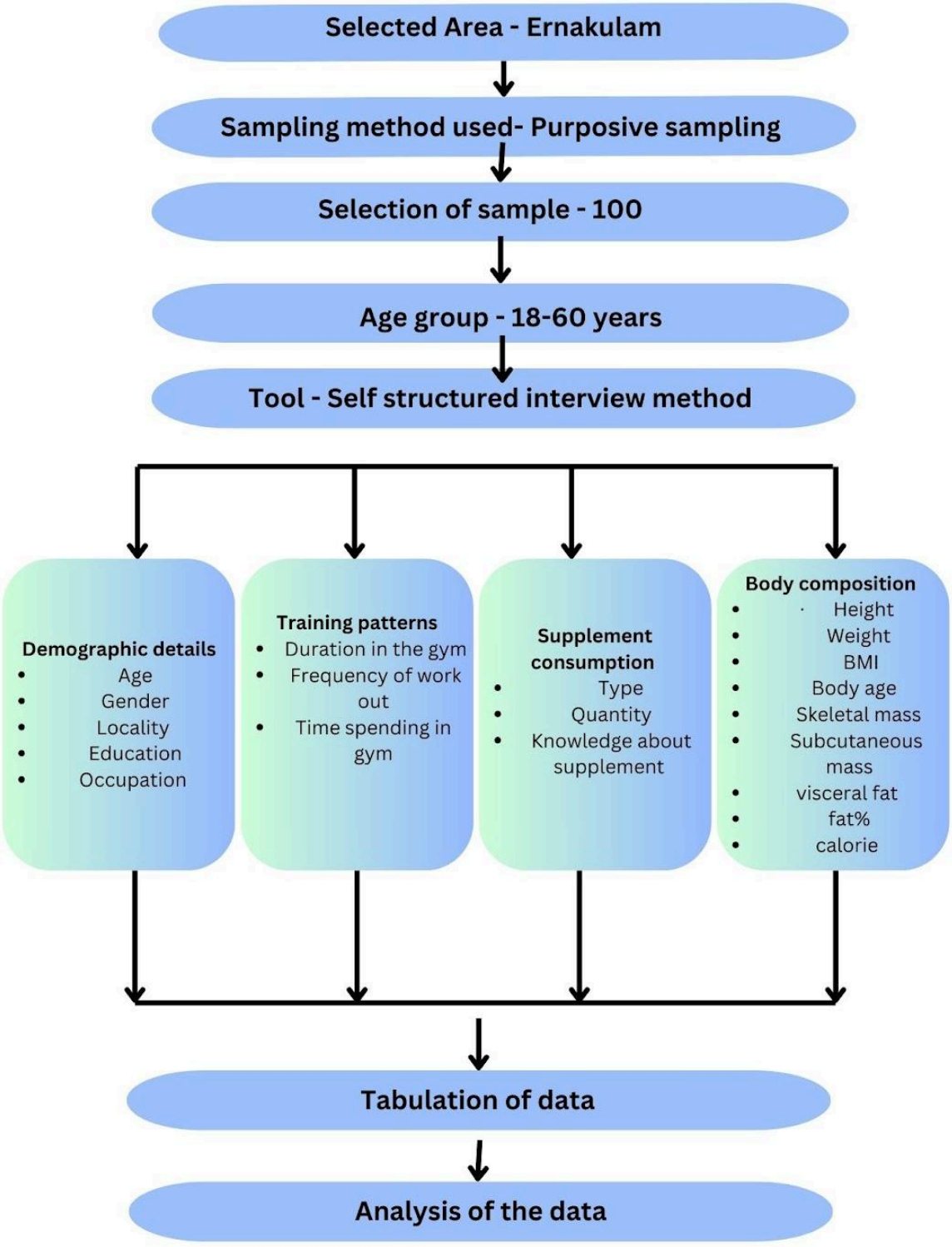

Figure 1. Research Design

CHAPTER 4
RESULTS AND DISCUSSIONS

The result and discussion of the study entitled "**Supplement consumption pattern and Body Composition among regular gym-goers"** is discussed under the following headings

4.1 Socio- demographic profile of the subject

4.2 Training Pattern in the gym

4.2.1 Duration of gym attendance ,Frequency of gym workout, Workout time

4.2.2 Primary aim of gym goers and achievement of the goal.

4.2.3 Source of recommendation

4.3 Nutritional supplement consumption pattern

4.3.1 Opinion on taking supplement and consumption among trainees

4.3.2 Kind of supplement and quantity of consumption

4.3.3 Age of first consumption and supplement prescription

4.3.4 Purchasing source and buying cost of supplements

4.3.5 Awareness about the supplements

4.3.6 Knowledge and awareness about the dietary allowance and protein requirement

4.3.7 Problems while using and skipping supplements

4.4 Dietary pattern

4.5 **Lifestyle of subjects**

4.6 **Body composition analysis**

4.6.1 BMI

4.6.2 Body fat

4.6.3 Visceral fat

4.6.4 Skeletal muscle

4.7 **Significant correlation of body composition among supplement users and non-users.**

4.1 Socio demographic profile of the selected subjects

The socio demographic profile investigates the social status composition and distribution of the population. The table includes information on age, education, occupation and income of the subjects

Table 2 : Socio - Demographic profile of the subjects

Age (in years)	**Percent (%) N=100**
18-27	26
28-37	**52**
38-47	13
48-60	9
Education	
Plus Two	10
Degree	**59**
Diploma	11
Masters	15
Others	5
Occupation	
Business and Finance	**39**
Legal and government services	15
Professional employees	13
Food and Health industry	7
Others	**26**
***Income**	
High income (>15 lakhs/annum)	12
Middle income (3-15 lakhs/annum)	**55**
Low income (<3 lakhs/annum)	33

*Income as per NCAE R-CMCE Survey 2020

Majority of the subjects belonged to the age group 28-37(52%) followed by the group 18-27 (26%).

The education level of the subjects indicated that 59 percent of subjects (majority) completed their degree and 15 percent completed their masters.

Occupation of the subjects indicated that 39 percent of subjects were in the field of business and finance, followed by other miscellaneous work like self employment, packing, part time jobs etc.

The classification of the income was as per NCAER- CMCR survey (2020). From the above table it is understood that the majority of the subjects (55%) belonged to middle class families, 33% low income and 12% were high income families.

4.2 Training pattern in the gym

4.2.1 Duration , frequency and workout time in the gym

Table 3: Training pattern of the subjects

Duration of joining gym	**Percent (%) N=100**
3-5 months	21
6-12 months	**45**
1-2 years	11
More than 2 years	23
Frequency of workout	
Daily	**87**
Weekly thrice	12
Twice a day	1
Workout time in gym	
1-2 hours	**93**
2-3 hours	6
3-4 hours	1

Nearly half of the subjects (45%) reported that they have been going to the gym for the past 6-12 months, while 23% have been attending gym for the past two years.
Regarding the frequency of workout 87% were working out daily, while 12 % of subjects attended the gym twice a day for workout.

Majority of the subjects (93%) were spending 1-2 hours in the gym during their workout. only 6% were spending 2-3 hours in the gym.

4.2.2 Purpose of joining gym

Table 4: Purpose of joining gym

Purpose of joining gym	Percent (%) N=100
Strength training	**44**
Weight loss	27
Weight gain	21
Flexibility	6
Fitness	1
Passion	1

It was seen that 44 percent of the subjects went to the gym with the primary aim of strength training, followed by weight loss (27%) and weight gain (21%).
A study conducted by Zammit(2024) proved that increasing strength was the most commonly cited reason for starting to go to the gym. This can be elucidated, under both categories of physical betterment as well as improving general health.
Research on exercise motivation by Nathan *et al., (*2022), suggests that gym trainees give more importance to their appearance and weight management goals hence they were more prone to self-objectification and tend to have lower body satisfaction and self esteem.

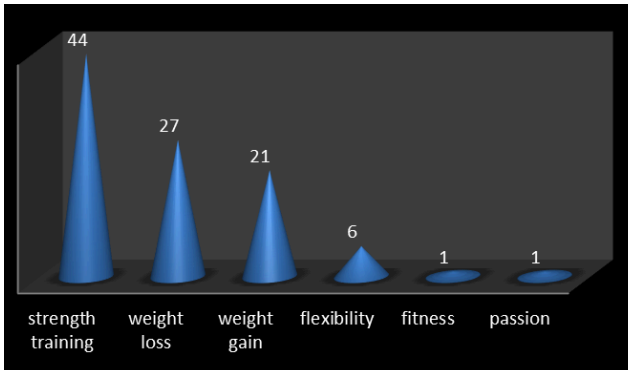

Figure 2 Purpose of joining gym

4.2.3 Achievement of the goal

Table 5:Achievement of the goal

Achievement of the goal	Percentage (%) N=100
Yes	**41.8**
Progressing	34
No	24.2

In today's fast going world, achieving and maintaining a fitness goal requires more than just motivation and will power but also having a well structured plan to meet an individual needs.

The study revealed that the majority (41.8 percent) of subjects reported to have achieved their goal by regular workout in the gym. The major goal achieved was strength training followed by weight loss, while 34 percent indicated that they were progressing towards achieving their goal. However, almost a quarter of subjects reported that they have not achieved their goals.

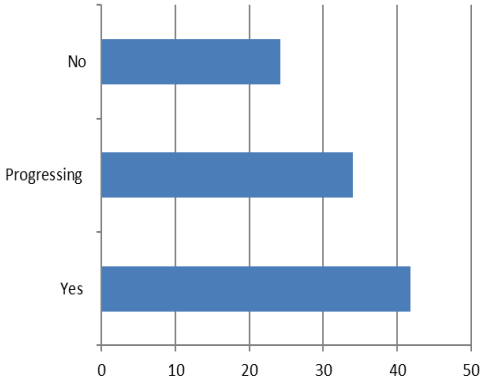

Figure 3 Achievement of goal

4.2.3 Gym recommended by

The classification of the source of recommendation is given below;

Table 6: Gym recommended by

Source of recommendation	Percent (%) N=100
Own decision	**75**
Friends	22
Dietitian/ Nutritionist	3

From the above table it can be understood that people are more health conscious about themselves. Three-fourths (75%) of the subjects were coming to the gym by their own decision while 22 were coming by the recommendation of friends.

4.3 Nutritional supplement consumption pattern

Supplement consumption varies according to the workout patterns. knowledge, attitude and practice among subjects.

4.3.1 Opinion on taking supplements

The subjects had different opinions on taking supplements. More than half of the subjects (64%) had the opinion that supplements were good for health. This opinion is not only from subjects who consumed supplements, but also those who did not. Some of the subjects who were not taking supplements were planning to start the consumption of supplements soon.

According to Khoury *et al., (*2012), the nutritional supplements' industry is currently an International market worth billions of dollars. In the United States, more than 3 million people were reported to be using or to have used ergogenic supplements. There has been an increasing use of nutritional supplements by people engaged in physical or athletic activities. Supplement use among athletes is well documented. It was estimated to range from 40 to as high as 88% and was found to vary according to types of sports, cultural aspects, age group and gender.

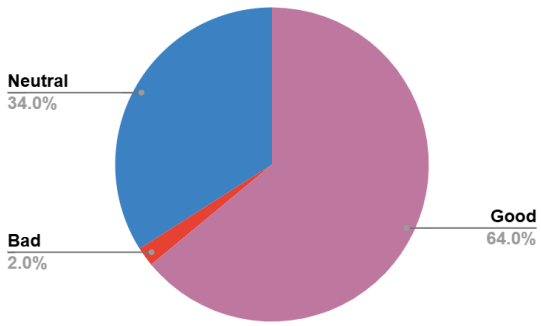

Figure 4. Opinion on taking supplements

4.3.2 Kind of supplement used and frequency of consumption

Out of 100 subjects, 50 were taking supplements and 50 were not taking supplements. The supplement consumers were consuming different types of supplements and the quantity is given below.

Table 7:Type of supplements taken and frequency of consumption

Type of supplement taken	Subjects using supplements		Quantity		
	Number	percent (%) N=50	Daily/scoop	Twice a day/scoop	Weekly
Whey protein	**38**	**76**	28	10	-
Multi vitamins	6	13	3	3	-
Creatine	19	**38**	16	3	-
Fish oil	11	22	9	1	1
BCAA	2	4	2	-	-
Muscle club	1	2	1	-	-
Caffeine	1	2	1	-	-

The above table gives an idea about the types of supplements taken by the subjects. Majority of subjects (76%) were taking whey protein as their primary supplement followed by creatine (38%). It can be seen that multiple supplements are taken by a single individual. Many kinds of supplements including omega-3 tablets, BCAA etc were also reported to be taken.

Several studies showed that protein supplementation will not increase further improvements in muscle strength among individuals who intake proper amounts of dietary protein. But for the objective of increasing the performance level, they are likely to consume high amounts of protein with the misconception that higher the intake will boost up muscle protein (Saleh *et al.,*2022).

4.2.Improvements after taking supplements

subjects had several improvements after taking supplements. The improvements are tabulated below

Table 8: Improvements after taking supplements

Improvements	Percent (%) N=50
Increased confidence	**60.5**
Gaining muscles faster	39.5
Weight loss	2.3
Weight gain	7
Increased muscle tone	34.9
None	4.7

From the above table, it was observed that 60.5 percent of subjects reported having a feeling of higher confidence followed by gaining muscle faster (39.5%).

4.3.3 Age at which supplements were first consumed

Table 9:Age of consumption of supplements

Age category	Percentage (%) N=50
High school (16-18 years)	2.4
Adulthood (above 18 years)	9.5
When Started workout in gyms	**88.1**

The above table gives the details of the participant's first consumption age of supplement and the source of supplement prescription. Higher percent of subjects started the supplement consumption (88.1%) after starting workout in the gym. 9.5 percent of subjects were taking supplements before coming to the gym. At this point of view, people become conscious about their health after joining the gym.

4.3.4 Supplement prescription

The source of supplements taken are tabulated below

Table 10: Source of supplements taken

Source of supplement prescription	Percent (%) N=50
Gym trainer	**40**
Friends	23
Online	21
Books / magazines	11
Dietitian	5

The above table reported that 40 percent of subjects were taking supplements by the advice of their gym trainer. The influence of friends (23%) also had a major role in it. Less than 10 percent of subjects only took supplements by the prescription of a dietitian.

A study by van der Walt et al.,(2016) pointed out that many of the respondents indicated that the information on supplements provided by pharmacists, dietitians, nutritionists and doctors. only 24 percent of subjects are influenced by the coach.

4.3.4 Source of purchase and cost of supplements

The list of source of supplement purchased and the cost are tabulated below

Table 11:Purchasing source and cost of supplements

Purchasing source of supplement	Percent (%) N=50
Providing through gym	**42**
From shop	31
Online shopping	27

Buying cost of supplement (monthly)	
Above Rs 3000	**49**
Rs 2000-3000	30.1
Rs 1000-2000	11.6
Below Rs 1000	9.3

From the above table it is understood that supplements are purchased through gyms(42%) and from shops(31%) followed by online shopping(27%).

Almost half of the subjects(49%) were buying the supplements at an average cost of above Rs 3000 per month followed by the range of Rs 2000- 3000.

The usage of supplements are increasing day-by-day, especially people who go to the gym to make better body composition. A study done in Portugal also reported that gym users are the highest buyers of dietary supplements, mainly protein powders, by the objective of improving muscle mass and getting information from registered dietitians or think about themselves as knowledgeable and buying supplements online(Ruano *et al.,* 2020).

4.3.5 Awareness about supplement intake

Overuse of supplements leads to several side effects. Awareness about the adverse effect of supplements and aware of the condition bigorexia were tabulated

Table 12:Aware of adverse effect of supplements and bigorexia

Awareness about adverse effect of taking supplement	**Percent (%) N=100**
Yes	51.2
No	48.8
Aware about bigorexia	
Yes	11
No	89

Awareness about the adverse effect of over consumption of supplements and the condition of bigorexia are listed above table. 51.2 percent of subjects were aware about the adverse effect of supplements.

Bigorexia is a kind of mental disorder that, people believe that they are not attractive and skinny and think that they have unusual muscularity. So they work extremely hard and control their diet to increase their muscularity. From the above table it is understood that 89 percent of subjects have no idea about this condition, while 11 percent of them have this kind of condition.

84 percent of the subjects did not get any kind of counselling regarding the supplements. Very few of them (16%) have got counselling about supplements from dietitians.

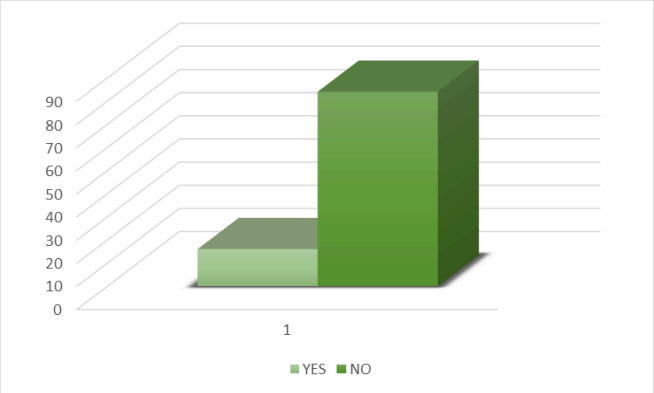

Figure 5. Nutritional supplement counselling

4.3.6 Knowledge and awareness about the dietary allowance and protein requirement

Table 13 :Knowledge about Dietary Allowance

Statements	Yes (%)	No (%)	Never knew (%)
	N=100		
Knowledge about dietary allowance by any health organisation	29	30	**41**
Aware about the required allowance of protein	30	**70**	

According to the National Institute of Nutrition (NIN) , the Recommended DietaryAllowance (RDA) is the average daily intake level of nutrients that is sufficient to meet the needs of nearly all (97-98%) healthy individuals, and is used to plan a nutritionally adequate diet.

From the above table it is observed that 41 percent of subjects had never heard about recommended dietary allowance by any health organisation and almost 70 percent of them did not know about the required protein intake by an individual per day.

4.3.7 Problems while using and skipping supplements

The problems after using supplements and after skipping supplements are discussed below.

Out of 50, nearly half of subjects had problems while using supplements for the first time. 75 percent of these had a problem of indigestion using whey protein. Remaining have bloating on their abdomen.

From the below figure it is found that 61.6 percent didn't have any kind of problems while skipping supplements a day, while the rest of the group had different kinds of problems like body pain(25.3%), strain(7.1%)and muscle pain (6.1%).

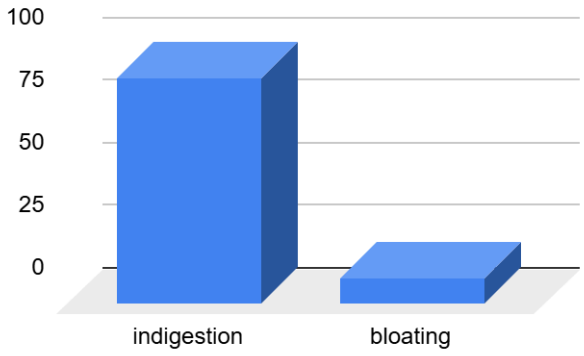

Figure6. Problems while using supplement

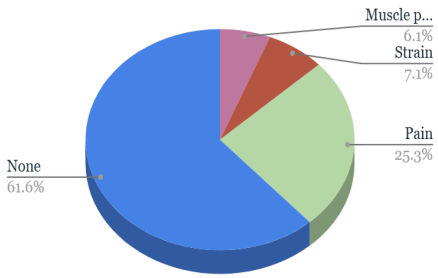

Figure 7 .Problems while skipping supplement

4.4 Dietary pattern of subjects

Regular fitness trainees may have their own diet plan or normal diet plan. Diet plan which was followed by the subjects are listed below.

4.4.1 Diet plan of gym trainees

Table 14: Diet plan of subjects

Diet plan	Percent (%) N=100
Normal diet	81
High protein diet	15
Intermittent fasting	1
Vegan diet	3

From the above table it can be observed that the majority of subjects(81%) were following a normal diet. Only a few of them were on a high protein diet(15%).

4.4.2 Dietary source of protein

Subjects were consuming different types of dietary sources of protein in their diet on a daily, weekly, monthly or occasionally basis.

Table 15:Dietary source of protein of the gym goers

Dietary source	Response N=100			
	Daily	Weekly	Monthly	Occasionally
Meat	49	36	3	2
Egg	79	15		
Milk	41	17	4	1
Fish	38	31	2	3
Legumes	39	23	1	2
Nuts	53	14	7	8
Paneer	2			1

From the above table it is seen that subjects were consuming protein through many different sources. Here 79 percent of subjects were having eggs on a daily basis followed by nuts(53%) ,meat(49%), milk(41%) and fish(38%).

4.5 Lifestyle pattern

Out of 100 subjects 87 percent of them were not having any kind of health issues. Others had migraine, diabetes, uric acid, allergy cholesterol, osteoporosis, thyroid and fatty liver for each. All these health problems were among the age group of above 40 years.

From the below figure it is observed that 66 percent of subjects were not using alcohol. 15 percent daily and 19 percent occasionally using alcohol.

In the case of smoking only 17 percent had the habit of smoking, remaining were not interested in smoking.

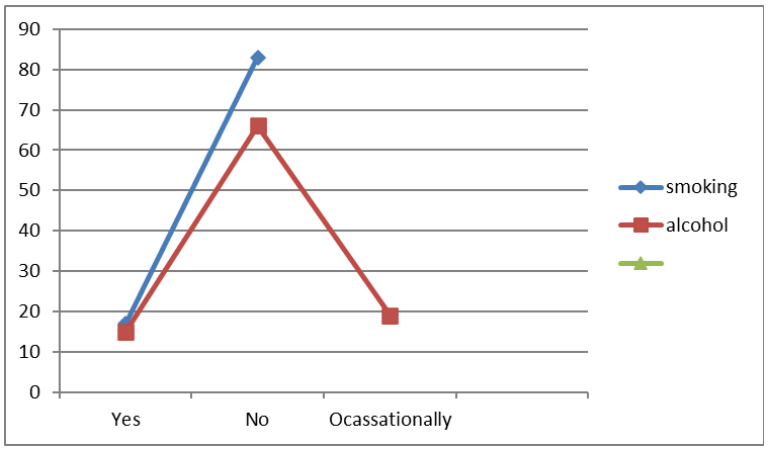

Figure 8. Smoking- Alcohol consumption

4.6 Body composition

Body composition is an important element for sustaining good health. It can be affected by various factors like genetics, lifestyle patterns and environment. Fat mass has a direct relation between age. When humans age, there is an automatic increase in fat mass with a gradual decrease in lean mass. Higher body fat indicates the risk of cardiovascular disease,, type 2 diabetes etc(Holmes et al.,2021).

4.6.1 Body Mass Index

Table 16 : BMI of subjects

*Body Mass Index	Percent (%) N=100
<18.5	5
18.5-24.9	48
25-29.9	38
30-34.9	3
35-39.9	6

(*Classification according to WHO, 2012)

The above table shows the range of BMI of total subjects. It is understood that 48 percent of subjects had body mass index followed by class 1 obese. Rest of them were underweight and obese classes.

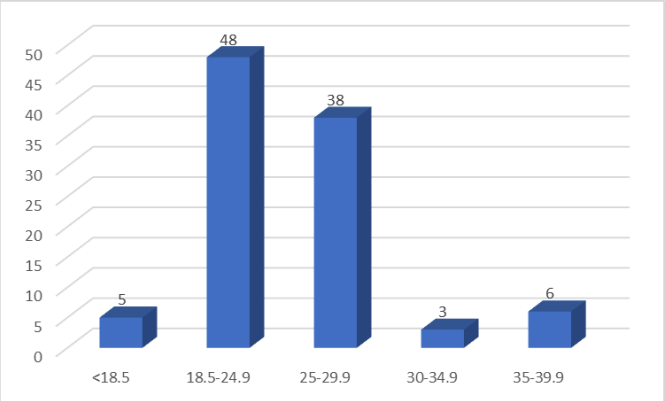

Figure 9. Body Mass Index of subjects

4.6.2 Body Fat percentage

Table 17 : Body fat percentage male subjects

Body Fat Percentage	Classification	Percent (%) (N=85)
25% or more	Very High	25.8
20%-25%	High	**45.8**
10%-20%	Normal	28.2
Less than 10%	Low	-

(Based on obesity values proposed by Lohman (1986) and Nagamine(1972)

From the above table it was reported that out of 85 male gym trainees 45.8 percent of them were having high body fat percentage and 25.8 percent had a very high percentage of body fat. Remaining were having normal fat percentages.

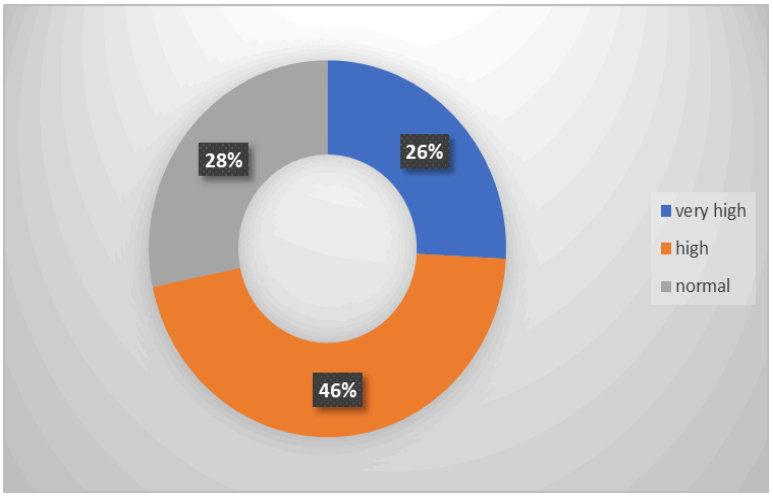

Figure 10. Body Fat percentage male subjects

Table 18: Body fat percent female subjects

Body Fat Percentage	Classification	Percent (%) (N=15)
35% or more	Very high	93.3
30%-35%	High	6.6

(Based on obesity values proposed by Lohman (1986) and Nagamine(1972)

Only 15 females are in out of 100 subjects. In these 15 female subjects the majority (93.3 %) were having very high body fat percentages. There were no individual under the category of normal

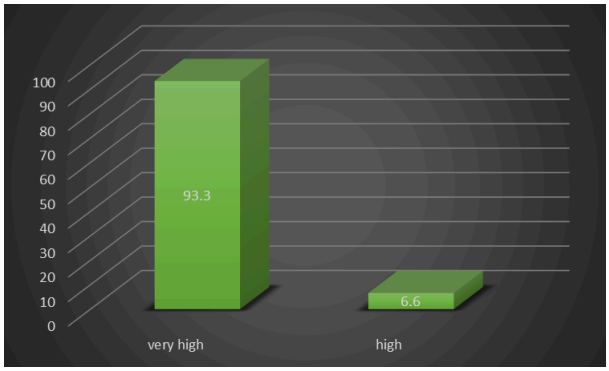

Figure 11. Body fat Percentage of female subjects

4.6.3 Visceral fat

Visceral fat represents approximately 10-15 percent of total fat. It will release free fatty acid directly into the bloodstream.

Table 19 :Visceral fat of subjects

Visceral fat level	Classification	Percent (%) N=100
0.5-9.5	Normal	57
10-14.5	High	28
15-30	Very high	15

(The data referenced by OMRON Healthcare)

From the above table it is understood that , above half of subjects(57%) have normal visceral fat. Remaining subjects were high (28%) and very high (15%) visceral fat.

A study conducted by Sironi M , Petz R et al., (2012) found that increased levels of epicardial fat does not always mean presence or any chance of disease. On the other hand , high in visceral abdominal and extra-pericardial mediastinal fat deposition both are linked to a higher level of cardiovascular disease risk profile.

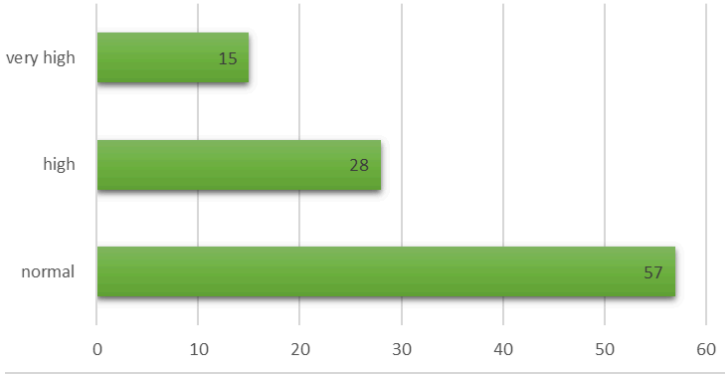

Figure 12. Visceral fat of subjects

4.6.4 Skeletal muscle

Table 20 : Skeletal mass male subjects

Skeletal mass level	Classification	Percent (%)N=85
5.0-25.8	Low	42.3
25.9-27.9	Normal	41.1
28.0-29.0	High	12.9
29.1-60.0	Very high	3.5

(According to OMRON HEALTHCARE)

From the above table it is revealed that most of the male subjects were having low (42.3%) and normal (41.1%) skeletal mass. Only 12.9 percent of subjects had high skeletal mass and very few (3.5%) having a very high level of skeletal mass.

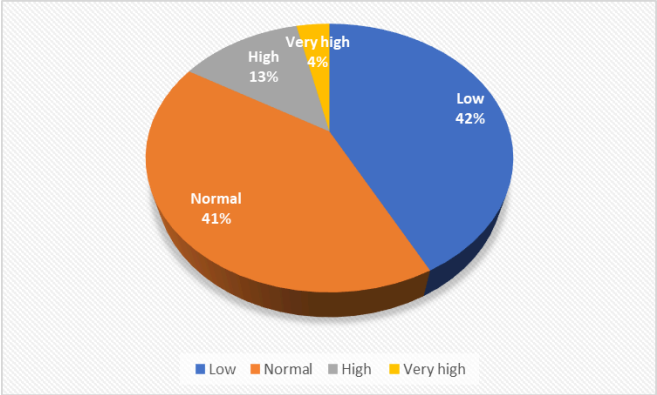

Figure 13. Skeletal mass of male subjects

Table 21 : Skeletal mass (Female)

Skeletal mass level	Classification	Percent (%)N=15
5.0-32.8	Low	60
32.9-35.7	Normal	33.4
35.8-37.3	High	6.6
37.4-60.0	Very high	-

(According to OMRON HEALTHCARE)

Out of 15 female subjects, 60 percent subjects had a low level of skeletal mass, while 33 percent of them had normal skeletal mass. Rest of them fall under the category of high skeletal mass.

A study entitled "the effect of 8 weeks resistance training and branched chain amino acid supplementation on body composition and muscle performance by Mike Spillane *et al.*,(2014) reported that heavy resistance training for 8 weeks with additional supplementation of BCAA before and after exercise had no effects on the body composition and performance of muscle.

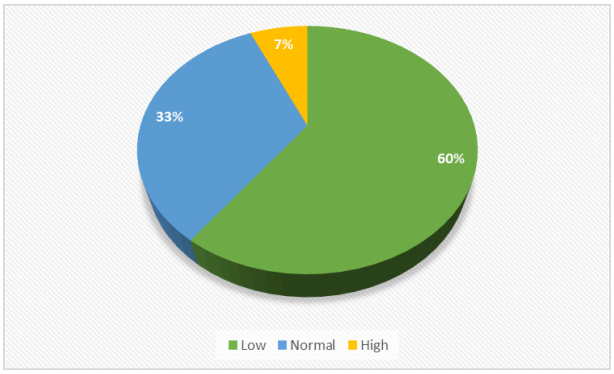

Figure 14. Skeletal mass of female subjects

4.7 To compare body composition factors between supplement users and non-users

To understand if body composition factors like BMI, Body fat, Visceral fat, Skeletal mass and subcutaneous fat varied between users and non-users of supplements, an independent sample t test was performed using SPSS**.**

Independent Sample T Test

Body composition factors like, BMI, body fat, visceral fat, subcutaneous fat, skeletal mass and body age were measured from 100 respondents (50 users and 50 non-users of supplements)

The null hypothesis says that there is no difference in the body composition factors between users and non-users of supplements.

From the table, we can see that p value is <.05 for all the body composition factors.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BMI	Equal variances assumed	1.107	.295	-2.694	97	.008	-2.310	.857	-4.012	-.608
	Equal variances not assumed			-2.689	93.895	.008	-2.310	.859	-4.015	-.605
body fat	Equal variances assumed	1.398	.240	-3.546	98	.001	-4.390	1.238	-6.847	-1.933
	Equal variances not assumed			-3.546	97.504	.001	-4.390	1.238	-6.847	-1.933
body age	Equal variances assumed	.151	.698	-2.442	98	.016	-5.940	2.432	-10.767	-1.113
	Equal variances not assumed			-2.442	97.979	.016	-5.940	2.432	-10.767	-1.113
viseral fat	Equal variances assumed	12.866	.001	-2.696	98	.008	-2.837	1.052	-4.925	-.749
	Equal variances not assumed			-2.696	81.608	.009	-2.837	1.052	-4.930	-.744
skeletal mass	Equal variances assumed	.478	.491	2.030	98	.045	1.966	.968	.044	3.888
	Equal variances not assumed			2.030	90.087	.045	1.966	.968	.042	3.890
subcutaneous fat	Equal variances assumed	10.816	.001	-3.742	98	.000	-4.570	1.221	-6.994	-2.146
	Equal variances not assumed			-3.742	81.834	.000	-4.570	1.221	-7.000	-2.140

Table 22 : Independent T test among supplement users and non-users

Independent factors	T test			P value	Significance
	Supplement users	Supplement non-users	T value		
BMI	24.26±3.9	26.57±4.6	t(97)=-2.7	0.008	Significant
Body fat	22.15±5.9	26.54±6.4	t(98)= -3.7	0.001	Significant
Visceral fat	8.48±3.9	11.3±3.9	t(98)= -2.7	0.008	Significant
Skeletal mass	32.3±5.5	30.38±6.3	t(98)= 2	0.045	Significant
Subcutaneous fat	15.81±4.5	20.38±7.3	t(98)= -3.7	0.000	Significant

From the above table it is noted that parameter against supplement consumption and not consuming, all the p values are less than significance level of 0.005(95%confidence level).

BMI

The 50 non-users of supplements (M = 26.57, SD = 4.6) compared to the 50 users of supplements (M = 24.26, SD = 3.90) demonstrated significantly greater BMI values, $t(97) = -2.7$, $p = .008$.

Body Fat

The 50 non-users of supplements (M=26.54, SD= 6.4) compared to the 50 users of supplements (M= 22.15, SD=5.9) demonstrated significantly greater body fat values, $t(100) = -3.7$, $p = .001$.

Visceral Fat

The 50 non-users of supplements (M= 11.3, SD= 3.9) compared to 50 users of supplements (M= 8.48 , SD= 3.9) given significantly greater visceral fat values , $t(100) = -2.7$, $p = .008$

Skeletal Mass

The 50 users of supplements (M = 32.3, SD= 5.5) compared to 50 non- users of supplements (M = 30.38, SD = 6.3) demonstrated significantly greater skeletal mass values, $t(100) = 2$, $p = 0.45$.

Subcutaneous Fat

The 50 non- users of supplements (*M*= 20.38, *SD*= 7.3) compared to 50 users of supplements (*M* = 15.81, *SD*= 4.5) demonstrated significantly greater subcutaneous fat values, *t*(100)= -3.7, *p*= 0.00.

Rejection of null hypothesis: Since the T test at the **0.05 level**, the **null hypothesis- which states that there is significant difference in between the supplement users and non-users.**

A study done by Lubowiecki *et al.,* 2019 reported that the use of dietary supplements to support weight reduction(DSSWR) had a significant association with BMI and body fat percentage.

CHAPTER 5
SUMMARY & CONCLUSION

The growing use of dietary supplements among gym-goers often occurs without adequate professional guidance or a clear understanding of their potential side effects and interactions with individual health conditions. This lack of awareness increases the risk of misuse, adverse health outcomes, and reliance on supplements as a substitute for proper nutrition and training. Ultimately, such practices can be counterproductive, causing more harm than good and underscoring the need for informed decision-making and expert consultation. The study undertaken by the researcher was on "**Supplement consumption pattern and Body Composition among regular gym-goers"** . The overall objective of the present investigation was to know about the supplement consumption among regular gym goers. In the present study, a body composition analyser OMRON-HBF375 was used to identify the body composition of the subjects. The area selected for the study was Ernakulam. The sample for the present study comprising 100 belongs to the age group of 18-60. The method of sampling adopted was 'purposive sampling'. Almost 3-4 gyms were included in the study. A self-structured interview schedule was the tool. It includes the exercise pattern, nutritional supplements consumption, dietary pattern, lifestyle pattern and body composition analysis. Differences in the body composition among supplement consumers were statistically analysed.

The finding of the study are summarized as follows;

- ➢ Majority of the subjects in the study were male and between the ages of 28-37.
- ➢ Most of the subjects graduate and work in the field of business and finance.
- ➢ Majority of the subjects belonged to the middle income group.
- ➢ Majority of the subjects have been going to the gym past 6-12 months(45%) and most of them were daily(87) going people and work out time in the gym was 1-2 hours(93%)
- ➢ Among 100 subjects 44 percent joined for the goal of strength training and in those objectives 41.8 % achieved their goal.
- ➢ More than half of the subjects (64%)have a good opinion on taking supplements and 34% have a neutral opinion on taking supplements.
- ➢ Half of the people were taking supplements and the rest of them were not taking supplements.

- Among 50 subjects 76 percent subjects were taking whey protein as supplement followed by creatine(38%)
- 60.5 percent of subjects have more confidence as an improvement after taking supplements.
- Gym trainers (40%) were the source of supplements recommendation. Less than 10 percent of subjects seek consultation from dietitians.
- The sources of purchasing supplements were different. Most of them (42%) were provided through the gym.
- Out of 50 subjects of supplement consumers, almost half of the subjects (49%) , were buying the supplements at an average cost of above 3000 rs per month.
- Among 100 subjects , half of them (51.2%) were aware of the adverse effects of taking supplements
- Less than half (41%) of subjects were aware about the dietary allowance by any health organisation, in that 70 percent were not aware about the required dietary allowance of protein.
- Among 50 , nearly half of the subjects had problems while using supplements. 75 percent of these groups had a problem of indigestion using whey protein. Remaining have bloating on their abdomen.
- 66 percent of subjects did not have the habit of using alcohol. In the case of smoking only 17 percent have the habit of smoking.
- 48 percent of subjects have the normal body mass index.
- Out of 85 male subjects, 45.8 percent were longs to high body fat percentage category. In 15 female subjects almost all of them were belongs to very high category
- In the case of visceral fat, the majority belonged to the normal category .
- Out of 85 male subjects majority of them have a low skeletal mass , in female category 60 percent of them were also low skeletal mass
- Statistical analysis revealed that the body composition factors have significant differences between supplement users and non-users. The mean difference indicates that the supplement users have better body composition than non-users.

CONCLUSION

The present study examined training patterns, supplement usage, dietary habits, and body composition among regular gym-goers. The findings indicated that a majority of participants had been attending the gym daily for a period of 6 to 12 months. Approximately half of the individuals reported using dietary supplements, while the other half did not. Among supplement users, protein powders—particularly whey protein—were the most commonly consumed, followed by creatine. Notably, most users had not received any form of professional counseling regarding supplement intake.

In terms of body composition, while the majority of participants had a normal BMI, many exhibited high body fat percentages, normal visceral fat levels, and low skeletal muscle mass. Statistical analysis revealed a significant difference in body composition parameters between supplement users and non-users. However, a considerable number of participants lacked awareness about recommended dietary allowances and daily protein requirements.

Limitation of the study :

- Sample size of the study restricted to 100, it can be expanded to enhance the depth and accuracy of the analysis.
- The data were collected through a self structured questionnaire, this can influence the subjects answers, recall bias and their accuracy.
- The study did not take the food frequency of the subjects. Body composition may vary according to the type of food.

Recommendation of the study:

- Promote awareness programs by certified nutritionists or dietitians should help the individuals according to their need.
- Encourage the gym-goers to use dietary supplements based on scientific evidence rather than myths or surrounding influences.

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APPENDIX

SOCIO-ECONOMIC BACKGROUND

Name:

Age:

Gender:

Phone no:

Email id:

Locality:

Education:

Occupation:

Income/month:

Marital status:

Educational qualification of gym trainer :

TRAINING PATTERNS

1) How long have you been going to the gym?

a) 1-2 months b) 6-12 months c) 1-2 years d) more than 2 years

2) How often do you workout at the gym each week?

a) Twice a day b)Daily c) Weekly trice d) Weekly twice

3) How long do you workout in the gym?

a) 1-2hr b) 2-3hr c) 3-4hr d) more than 3hr

4) Do you engage in any workout or physical activity outside the gym(eg; cycling, running, home workout..)

a) Yes b) No

5) What is your primary aim at the gym?

a) strength training b) cardio c) flexibility d) weight loss e)weight gain

i)Do you feel the goals have been realised/achieved?

……

6) Who suggested going to the gym?

a) Dietitian/Nutritionist b) Friend c) Any social media influence d) own decision

7)What are the benefits you get while doing workout?

…….

NUTRITIONAL SUPPLEMENT CONSUMPTION

8) What is your opinion on taking nutritional supplements?

a) Good for health b) Bad for health c)neutral d) None

9) Do you use any kind of nutritional supplements?

a) Yes b) No

if yes which of the following

Supplements	Quantity	Daily	Thrice a week	Twice a week	Some times	Never
Protein supplements (whey protein)						
Any carbs (energade,po weade)						
Vitamins (A,B,B12,C, D,E)						
Caffeine (red bull, guarana)						
Creatine supplements						
Fish						

oils(omega3-tablets						
BCAA						

10)Do you think protein supplements are a necessity when you start training?

a) Yes b) No

If yes , why ?

11) What was your age when you first consumed dietary/nutritional supplements?

a) high school(16-18 years) b) adulthood(above 18 years) c) started workouts in gym

12) Do you know about the solute- solution load?

a) Yes b) No

13) Who prescribed your supplements?

a) professional dietitian b) gym trainer c) friends d) online advertisements e) books/magazines

14) Do you know the required dietary allowance according to your lifestyle recommended by any health organization?

a)Yes b)No c) Never Knew

15) Do you know about the required dietary allowance of protein in Indians?

a) Yes b) No

16)Have you been given counseling regarding nutrient supplements?

a) Yes b) No

17) How many liters of water do you drink a day?

a) Less than 1 litre b) Less than 2 litre c) 2-3 litre d) More than 3 litre

18) Do you have the habit of drinking water in between workouts?

a) Yes b) No

19) Are you aware of the adverse effects of taking supplements ?

a) Yes b) No
If yes, what will be it; .....

20) From where do you purchase the supplements?

a) Online shopping b) From shops c) Providing through gym

21) How much will be the average cost of buying the supplements per month?

a) below 1000 b) 1000-2000 c) 2000-3000 d) above 3000
(if it has more than 2 items specify cost)

22) What were the improvements you felt after taking supplements?

a) more confidence b)started gaining more muscles faster than normal c) weight gain d)weight loss
e) increase muscle tone f) none

23)Do you feel any problems while using supplements

a) Yes b)No
if yes, what it is .....

24)if you are skipping your supplement a day for any reason, is there any particular emotion that you feel on working out that day?

a) Lack of energy b)lack of confidence c)lack of feeling a hype d)none

25)What are the post workout issues that you feel everyday? (sparin, strain, dehydration)

a) Yes b) No
If yes, what it will be …….

DIETARY PATTERN

26) Do you follow any specific diet plan?

a) keto diet b) vegan diet c) intermittent fasting d) high protein diet e)normal

27)Do you consume any pre-workout/post-workout food?

a)Yes b) No
If yes , what it will be.....

28) Do you intake sufficient calories including protein powder?

a) Yes b) No c)don’t know d) will be higher

If yes, What are the dietary sources that you include in the diet

	Daily	Weekly	Monthly	Occasionally	Reason
Meat					
Egg					
Milk					
Fish					
Legumes					
Nuts					
Others					

29) Have you heard about bigorexia?

a) Yes b) No

LIFE STYLE

30) Do you have any health issues?

.....

31)Do you have the habit of smoking?

a) Yes b) No

32) Do you consume alcohol?

a) Yes b) No c) Occasionally

BODY COMPOSITION

1) Height :
2) Weight :
3) BMI:
4) Skeletal mass:
5) Visceral fat :
6) Subcutaneous fat :
7) Body age:
8) Calorie :
9) Body fat percentage :

ABSTRACT

The increasing popularity of dietary supplements among fitness enthusiasts has raised questions about their actual impact on health and body composition. The study aimed to compare body composition parameters between supplement users and non-users among regular gym-goers in Ernakulam North. A total of 100 subjects were selected using purposive sampling, evenly divided into 50 supplements users and 50 non-users. Data collection was conducted through a self-structured questionnaire. Body composition was also assessed using the OMRON HBF-375 analyzer. Most subjects reported consistent gym attendance, with a majority engaged in daily workouts over the past 6 to 12 months. Among the supplement users, 86% consumed whey protein and 75% reported experiencing indigestion as a side effect. Gym trainers were identified as the most common source of supplement recommendations, pointing to a lack of nutritional advice. Independent samples t-tests performed using SPSS version 20 revealed statistically significant differences in several body composition parameters between the two groups. These include Body Mass Index (BMI) ($p = 0.008$), body fat percentage ($p = 0.001$), visceral fat ($p = 0.008$), skeletal muscle mass ($p = 0.045$), and subcutaneous fat ($p = 0.000$).

Key words: Gym-goers, Fitness enthusiasts, Supplements, Body composition, BMI, Body fat percentage, visceral fat, skeletal muscle mass, subcutaneous fat