A COMPARATIVE STUDY ON NUTRITIONAL STATUS OF VEGETARIANS AND NON – VEGETARIANS

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

CHRISTEENA BRIGHTS

Register No. AM23HFN006

DEPARTMENT OF HOMESCIENCE AND CENTRE FOR RESEARCH

APRIL 2025

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'Certified as bonafide research work'

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DECLARATION

I hereby declare that the thesis entitled **'A Comparative study on nutritional status of Vegetarians and Non-vegetarians'** is a bonafide record work done by me during the course of the study, under the supervision and guidance of Dr. Anu Joseph, Associate Professor, Department of Home Science and Centre for Research, St. Teresa's College, Ernakulam.

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CERTIFICATE

This is to certify that the thesis entitled ***'A Comparative study on nutritional status of Vegetarians and Non-vegetarians'*** is an authentic record of the original research work carried out by **Ms. Christeena Brights** with **Reg.No -AM23HFN006** under my supervision and guidance during the academic year 2023-25.

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CHAPTER 1
INTRODUCTION

Health is a common factor among all the individuals where it is influenced by a number of factors such as lifestyle habits, dietary patterns, physical activities and the environment we live in. Among these, diet patterns of the individual play an important role shaping an individual's overall well-being and risk of developing non-communicable illnesses like obesity, diabetes, cardiovascular disease and certain cancers.

In the past decades, there has been a rising global trend towards the increased consumption of ultra processed foods and animal-based products which were driven by convenience, flavour and taste preferences and eye catchy marketing strategies (Monteiro et al., 2020). Additionally, the survey conducted between the years 2019 and 2021 by the National Family Health Survey (NFHS-5) suggested that the consumption of meat by Indian adults has increased significantly from 74% in 2006 – 80% in 2021.

But the consumption rates have been reported higher among men (87%) compared to women (75%), suggesting a gendered pattern in dietary choices (NFHS-5, 2019-21). This growing preference for animal-based foods among the younger generation along with their regular intake of fast food and sugary drinks. The modern trend toward consuming high quantities of processed meat alongside other food products has led to a deterioration of dietary quality that causes non-communicable diseases including diabetes, obesity and cardiovascular issues to increase. The Global Nutrition Report (2021) declares that health issues from improper eating habits affect more than fifty percent of people across the globe. Scientific evidence shows that dietary plans based on plants reduces risk of cardiovascular disease, diabetes, hypertension as well as cancer (Wang et al., 2023).Food consumption studies show these diets enhance both oxidative balance, lipid profile and glucose homeostasis (Rosario et al., 2016).

A significant percentage of the world's population follow a vegetarian diet, but in most countries, vegetarians form only a negligible percentage of the population. India is the exception as a significant percentage of the population, maybe around 38%, follow a vegetarian diet (World Atlas,2023). Also, the National Family Health Survey (NFHS-5)

conducted between 2019 and 2020 indicates that nearly 29.4% of women and 16.6% of men in India never consume chicken, fish or meat (NFHS,2019-2021).

During the last few decades, vegetarianism has been a popular trend among individuals globally (Wang et al, 2015). Improved physical and mental well-being as evidenced by reduced risk of chronic non communicable diseases and mortality risk and care and compassion for animals are the reasons why people opt for a vegetarian diet (Melina et al, 2016).

A vegetarian diet is thought to offer health advantages. Research results show that people who eat vegetarian diets experience lower BMI and body fat percentages in comparison to those who do not follow vegetarianism thus affecting their body composition (Wang et al., 2015). Higher fiber consumption with fewer saturated fats in vegetarian diets leads to lower body weight and decreased body fat and improved insulin sensitivity (Tonstad et al., 2013). A diet focused on vegetarian foods contains higher levels of dietary fiber, phytoestrogens, phytochemicals, antioxidants, n-3 fatty acids and minimal saturated fat and cholesterol content thereby reducing the risks for non-communicable health problems such as diabetes, cardiovascular diseases and obesity (Pilis et al., 2014; Vanacore et al., 2018). Research shows that the vegetarian diet helps decrease cancer diseases by 8% (Dinu et al., 2017) while simultaneously enhancing the psychological component of life (Conner et al., 2017). Scientific evidence indicates that limiting foods based on meat and its products, fish, and poultry may enhance certain indicators of individuals' mental health status (Aslanifar et al., 2014). In addition, in line with WHO guidelines, it is linked to enhanced mental health, lower rate of depression and anxiety, increased satisfaction with life, and increased emotional well-being (Pem et al., 2015; Mujcic & Oswald, 2016; Conner et al., 2015). This improved quality of life can be due to the presence of vitamin C, folic acid, and carotenoids. These compounds in vegetables and fruits act as cofactors of neurotransmitters like dopamine (May et al., 2012).

While vegetarian and vegan diets are known for their many health benefits, they can also come with certain nutritional challenges. The nutritional advantages of vegetarian and vegan diets are widely recognized but the diets present specific poses many nutritional challenges. Vegetarian diets fail to consistently deliver EPA, DHA together with vitamin B12, vitamin D and essential nutrients such as iron and zinc and iodine and calcium. Research demonstrates that vegans typically consume the least amount of vitamin B12 alongside calcium and iodine.

Neufingerl & Eilander (2022) found that limited iodine intake along with diminished bone mineral density can raise the possibility of experiencing fractures.

Mixing both plant and animal proteins in a balanced diet allows people to obtain their entire amino acid requirements for maintaining and repairing muscle structure. When adhering to a balanced mixed diet, individuals will receive essential micronutrients like vitamin B12, iron and omega-3 fatty acids.

Moderation and careful eating are, however, the prime precepts in healthy living on a mixed diet. Inclusion of lean protein foods like fish, chicken, and eggs in combination with whole grains, pulses, fruits, and vegetables will make a diet not only disease-free but healthy as well. In order to avoid dietary ailments like obesity, diabetes, and cardiovascular disease, portion control and consumption of foods rich in nutrients are important. Additionally, avoiding processed meats, saturated fats, refined carbohydrates and increasing the intake of fresh whole foods can go a long way in helping maintain a balanced, healthier diet. Using steam or grill and bake as alternative cooking techniques instead of deep-frying allows people to prepare nutritious meals that maintain their original taste. Consuming a balanced combination of different foods enables people to gain complete dietary advantages with minimal safety hazards from excessive dietary habits.

A well-balanced diet that includes both plant- and animal-based foods in appropriate proportions is ideal, as it promotes optimal health while minimizing the risks associated with extreme dietary patterns.

Relevance of the Study

A person’s diet plays a powerful role in shaping their health by influencing body composition and disease risk. While numerous studies have explored the differences between vegetarian and non-vegetarian diets, there is still a need for more focused research on how these dietary patterns impact health outcomes in specific populations. This study includes a general sample of men and women aged 18 to 80, providing insight into broader dietary trends, morbidity profiles, and lifestyle habits across the adult population.

Within this broader context, special attention is given to women between the ages of 40 and 59, a group that undergoes significant physiological changes due to perimenopause and menopause. These changes such as reduced estrogen levels can alter fat distribution, calcium

absorption, and overall metabolic regulation. As a result, women in this age group become more susceptible to weight gain, osteoporosis, cardiovascular conditions, and insulin resistance. Given these heightened risks, it is crucial to understand how different diets, particularly vegetarian and non-vegetarian diets, influence nutritional status, body composition, and disease vulnerability during this life stage.

There is a common belief that vegetarians experience better health outcomes, such as lower mortality rates and reduced body fat, compared to non-vegetarians. Although vegetarian diets are often associated with improved metabolic health and lower BMI, this is not always the case. A poorly balanced vegetarian diet high in refined carbohydrates, sugars, or fried foods can also lead to adverse health effects.

This study, conducted in Ernakulam, aims to bridge this knowledge gap by comparing anthropometric measurements, morbidity profiles, dietary patterns, and lifestyle choices between vegetarians and non-vegetarians. By focusing on a specific subgroup of 30 women following each dietary pattern, the study specifically aims to evaluate the impact of different diets on body composition in middle-aged women. While body composition is not measured in the general sample, its inclusion adds relevance by offering broader context and helping to identify population-level trends. It also challenges common beliefs, such as the idea that vegetarians are always the healthier option.

Objectives of the Study

1. To compare the anthropometric measurements between vegetarian and non-vegetarian subjects
2. To compare the body composition parameters between vegetarian and non-vegetarian women aged 40-59 years.
3. To compare the morbidity profile, dietary pattern and lifestyle factors between vegetarian and non-vegetarian subjects
4. To identify the relationship between diet type and body composition parameters, morbidity profile, nutrient intake and lifestyle factors

CHAPTER II

REVIEW OF LITERATURE

The review of literature for the project titled " A Comparative study on nutritional status of vegetarian and non vegetarians" is discussed under following topics:

2.1 Dietary habits and consumption patterns within the population

2.2 Body composition in relation to varying dietary patterns

2.3 Vegetarian versus Non- vegetarian and their health implications.

2.4 Emerging dietary trends in Kerala

2.1 Dietary habits and consumption patterns within the population

Nutrition plays a vital role in maintaining overall health, preventing diseases, and ensuring the proper functioning of the body. The dietary choices an individual makes can have a significant impact on their nutritional status, body composition, and the risk of developing various health conditions (Liu & Zhao, 2019). Over recent decades, food habits have changed significantly, but the changes have not been uniform. While the consumption of some foods has increased, others have declined, resulting in a relative balance in overall energy supply (Vitale et al., 2021). In India, dietary patterns are diverse, with a large portion of the population still following predominantly vegetarian diets. A study examining twenty-nine different dietary patterns found that most of them were based on fruits, vegetables, pulses, and cereals, particularly rice. Many of these patterns also included varying amounts of dairy products, meat, and eggs. The most commonly included food groups were vegetables (16 patterns), cereals (13 patterns), fruits (10 patterns), meat (9 patterns), pulses (8 patterns), and dairy products (8 patterns) (Green et al., 2016).

Research on Indian dietary trends revealed that while dairy and added fats are consumed in excess, the intake of vegetables and fruits is often lower than recommended by the EAT-Lancet guidelines. The poorest households and those living in rural areas typically

consume fewer whole grains and vegetables, while dairy and added fats are over-consumed (Ganpule et al., 2023). A similar study in Kolkata pointed to a high consumption of energy-dense, nutrient-poor foods, coupled with a deficiency in vegetables, pulses, and animal-based proteins. This dietary imbalance raises concerns about nutrient inadequacies and the increased risk of lifestyle-related diseases (Kotecha et al., 2013).

Urbanization and globalization have further shaped dietary habits. The consumption of processed, energy-dense, and nutrient-poor foods, such as sugar-sweetened beverages, has risen sharply, especially in urban areas (Dietary Guidelines for Indians, NIN, 2010). These non-essential foods have become a dominant part of adolescents' diets in economically developed regions, largely due to their convenience, taste, and ready-to-eat nature (Monteiro et al., 2013).

While cereals remain the staple diet for many Indians, their consumption has declined in recent years. A significant portion of the population now falls short of meeting recommended cereal intake levels (Misra et al., 2011; Rathi et al., 2017). Even among wealthier households, the intake of non-cereal proteins, fruits, and vegetables remains insufficient. In fact, processed foods now contribute more calories than fruits in the average Indian diet (Sharma et al., 2020).

These dietary shifts have contributed to declining food quality and are closely linked to rising rates of obesity, diabetes, and cardiovascular diseases (Srinivasan et al., 2020). A meta-analysis of Asian populations further highlighted that diets rich in fruits, vegetables, whole grains, and quality proteins are associated with a reduced risk of cardiovascular conditions, underscoring the importance of maintaining balanced dietary patterns (Gladys, 2024).

2.2 Body composition in relation to varying dietary patterns

Body composition refers to the distribution of fat, muscle, bone, and other tissues in the body, serving as a key indicator of overall health, nutritional status, and the risk of chronic diseases (Kyle et al., 2011). The dietary patterns an individual follows play a significant role in shaping these parameters, with many studies showing notable differences between plant-based and non-vegetarian diets.

Vegetarian and vegan diets are often associated with lower body weight, reduced fat mass, and improved insulin sensitivity. This is likely due to higher fiber intake and a lower consumption of saturated fats (Tonstad et al., 2013). Research by Kwiatkowska et al. (2022) found that individuals following omnivorous diets generally had the highest body mass, BMI, body fat mass, waist-to-hip ratio, and visceral adipose tissue levels. On the other hand, vegans exhibited the lowest levels of adipose tissue, including body fat percentage and visceral fat. Interestingly, vegans also showed comparable mineral and muscle content to omnivores, suggesting that a well-balanced plant-based diet can support a healthy body composition.

Research by Fernández-Alvira et al. (2017) highlighted that a "processed" dietary pattern, which includes frequent consumption of snacks and fast food, was linked to higher BMI, waist circumference, and fat mass. Similarly, a "sweet" dietary pattern high in sugary foods and drinks was associated with similar adverse outcomes. In contrast, a "healthy" dietary pattern, rich in fruits, vegetables, and whole grains was correlated with better body composition metrics. These findings remained significant even after adjusting for factors such as age, gender, socioeconomic status, and physical activity.

However, not all studies indicate significant differences purely based on the type of diet. For instance, Sofi et al. (2018) found no major differences in weight loss, BMI, or fat mass between low-calorie and control groups in a calorie-controlled intervention. Similarly, Shah et al. (2018) reported no notable variation in BMI or waist circumference between participants on vegan diets and those following American Heart Association guidelines. These findings suggest that total caloric intake and overall diet quality may play just as important a role as the specific type of diet followed (Fontes, 2022).

2.3 Vegetarian versus Non- vegetarian and their health implications.

An individual’s diet is typically centered around either a vegetarian or non-vegetarian eating pattern. A non-vegetarian diet includes food from animal sources, such as meat, fish, and poultry, and combines both plant and animal-based foods. In contrast, vegetarians avoid animal based products and may follow various forms of vegetarianism, such as lacto-ovo vegetarian (eats plant-based foods and dairy/eggs), lacto vegetarian (eats plant-based foods and dairy), ovo vegetarian (eats plant-based foods and eggs), pesco-vegetarian (eats

plant-based foods and fish), or vegan (excludes all animal products) (Chen & Choudhary, 2019; Tonstad et al., 2013).

Non-vegetarian diets are rich in high-quality proteins, essential amino acids, vitamin B12, iron, and omega-3 fatty acids from fish. These nutrients are vital for muscle maintenance, neurological function, and overall metabolic health. On the other hand, vegetarian diets are typically abundant in fruits, vegetables, whole grains, nuts, legumes, and seeds, with occasional inclusion of dairy and eggs. These diets are often associated with a range of health benefits due to their high fiber content, low levels of cholesterol and saturated fats, and the presence of antioxidants and phytonutrients (Marsh et al., 2012).

Research suggests that vegetarian diets may help reduce the risk of several chronic conditions. They are linked to lower levels of LDL cholesterol and triglycerides, along with a normal body mass index (BMI) (Antoniazzi et al., 2022). Additionally, a vegetarian diet has been associated with a reduced risk of cardiovascular disease, diabetes, and obesity (Pilis et al., 2014; Vanacore et al., 2018). Studies also indicate that vegetarian diets may lower the risk of kidney stones due to their alkalizing effect on urine pH (Heilberg & Goldfarb, 2013) and reduce the risk of cataracts (Appleby et al., 2011). Furthermore, adopting a vegetarian diet has been shown to improve psychological well-being, lower the incidence of depression and anxiety, and enhance overall life satisfaction (Conner et al., 2017; Pem et al., 2015).

Despite these benefits, vegetarians must be cautious about nutrient deficiencies. Iron, zinc, vitamins B12 and D, calcium, iodine, omega-3 fatty acids, and protein may be harder to obtain from a vegetarian diet (Marsh et al., 2019). Vitamin B12, which is only found in animal-derived foods, is a key nutrient of concern. Vegetarians, especially vegans, often have lower serum vitamin B12 levels, which can lead to elevated homocysteine levels, inflammation, anemia, neurological problems, and increased risks of cardiovascular disease (Green et al., 2017; Rizzo et al., 2016).

Iron is another critical nutrient, as vegetarians may have lower serum ferritin levels, increasing the risk of anemia (Haider et al., 2018). Additionally, vegans may experience lower bone mineral density and higher fracture rates due to insufficient calcium intake (Iguacel et al., 2018). Selenium and iodine are also nutrients of concern, as plant-based diets may not provide enough of these essential elements (Shreenath et al., 2023; Eastman & Zimmermann, 2018). Vegans, in particular, are at greater risk of selenium and iodine

deficiencies, which have been linked to cardiovascular diseases, cognitive decline, and various other health issues.

Animal-based proteins, such as those found in meat, fish, and poultry, are rich in essential micronutrients like vitamin B12, omega-3 fatty acids, and iron, and they support muscle growth, repair, and metabolic health (Ghosh et al., 2021; Mozaffarian & Wu, 2020). They are also more satiating, helping with weight management and muscle retention, particularly in older populations (Smith et al., 2022). However, excessive consumption of red and processed meats is associated with negative health outcomes, including higher cholesterol, hypertension, and an increased risk of cardiovascular disease (Willett et al., 2021). The World Health Organization (WHO) has classified processed meats as carcinogenic, and excessive red meat consumption has been linked to colorectal cancer (Larsson & Wolk, 2021).

Non-vegetarian foods also pose a risk of foodborne illnesses such as salmonella, E. coli, and listeria, especially if not properly handled or cooked (CDC, 2021). Therefore, while both vegetarian and non-vegetarian diets have their health implications, careful planning and balance are essential to ensure adequate nutrient intake and minimize potential health risks.

2.4 Emerging dietary trends in Kerala

Kerala’s food landscape has undergone a noticeable transformation in recent years, shaped largely by urbanization, globalization, and the fast pace of modern life. The traditional Keralite diet, once centered around wholesome meals of rice, coconut-based curries, seasonal vegetables, and fresh seafood, is gradually being replaced by processed and convenience foods. With increasingly busy lifestyles and changing work routines, especially in urban areas, people are turning more towards ready-to-eat meals, instant noodles, and packaged snacks. These foods, often high in refined carbohydrates, salt, and unhealthy fats, have been linked to the growing incidence of lifestyle-related diseases across the state (Ramesh, 2016).

Dietary habits are also shifting across economic groups. A study by Retheesh, Santhosh, and Karunakaran (2021) revealed a clear decline in cereal consumption, particularly among urban households. While middle-income families show the most diverse food choices, high-income groups are leaning more toward processed and packaged options. Even lower income households, though still relying on staples like rice and lentils, are increasingly including

processed foods in their diets, pointing to a wider nutrition transition. Ironically, this growing variety in food choices has also increased the risk of micronutrient deficiencies and reduced overall dietary quality.

The changing role of women, especially with more entering the workforce, has also reshaped how food is prepared and consumed. Homemade meals are becoming less frequent, as they are replaced by supermarket-bought items, restaurant takeaways, and convenience foods. As Nabeesa and Prasanna (2022) observed, food today is often viewed not just as sustenance but also as a status symbol, influencing choices across both urban and rural households. Young people, especially in cities, show a clear tilt toward fast foods, sugary beverages, and branded snacks driven in part by aggressive advertising and peer influence. Unfortunately, this has led to a dietary imbalance, where oils, sugars, and processed items dominate the plate, pushing aside traditional nutrient-rich staples (Ramesh, 2016).

However, Kerala is also witnessing a positive shift. There's a rising wave of health consciousness sweeping through, especially among the younger generation. Organic produce, millets, jackfruit flour, and cold-pressed oils are gaining popularity, and even traditional superfoods are making a comeback. Fermented foods like kanji and pickles are returning to the table though often in commercial forms, reducing the natural probiotic benefits once gained from home fermentation (Ramesh, 2016; Nabeesa & Prasanna, 2022).

Plant-based lifestyles, including vegetarianism and veganism, are also on the rise which is driven by ethical concerns, environmental awareness, and personal health goals. This has led to greater availability of dairy alternatives like almond milk and soy products. At the same time, fitness trends such as ketogenic diets and intermittent fasting are catching on, with many swapping out rice for cauliflower rice and using almond flour in place of wheat. While these diets are popular, their long-term health impacts remain an area for further research (Ramesh, 2016).

Another interesting trend is the creative blending of Kerala’s rich culinary heritage with global cuisines. From curry-flavored pizzas to Kerala-style sushi, fusion dishes are gaining a foothold in the urban food scene. There's also a renewed appreciation for traditional cooking methods like grilling, steaming, and air-frying, which aim to preserve nutrition while keeping oil use to a minimum.

In short, Kerala’s dietary landscape today is a complex blend of tradition and modernity. While convenience and global influences are reshaping eating habits, the revival of native foods and cooking styles offers a promising counterbalance. With non-communicable diseases on the rise, there's a pressing need for greater nutrition awareness and informed choices, making the return to Kerala’s roots more relevant than ever (Ramesh, 2016; Nabeesa & Prasanna, 2022).

CHAPTER III
METHODOLOGY

Research methodology is the scientific method of carrying out research, including the tools, methods, and procedures employed in gathering and analyzing the data in an effort to answer particular research hypotheses and questions (Kothari, 2004). The methodological approach adopted for the study, titled "A Comparative Study on Nutritional Status of Vegetarians and Non-Vegetarians" is elaborated in following sections.:

3.1 Selection of Area

3.2 Selection of the Sample

3.3 Selection of the Tool

3.4 Conduct of the Study

3.5 Analysis of data

3.6 Research Design

3.1 Selection of Area

The area selected for the study was Ernakulam district. This particular area was chosen primarily due to the accessibility and convenience of the researcher.

3.2 Selection of the Sample

In statistical research, a sample represents a carefully chosen subset of a larger population, the characteristics of which are studied to make inferences about the whole group (Webster, 1985). Sampling, therefore, refers to the process of selecting a representative portion from a more comprehensive population to explore its attributes and then make generalizations of the observed results back to the superordinate population (Kothari, 2004).

A total of 150 subjects were selected for the study from Ernakulam district. 70 of the subjects were vegetarians and 80 subjects were non-vegetarians. Both male and female between the

age group of 18-80 years were included in the study. Subjects were classified into the following age groups.

Table 1: Age group classification

Age group	Age interval (in years)
Young adult	18-39
Adult	40-59
Late adult	60-80

(*The standard age group classification as per HD McCarthy et al, International Journal of Obesity, Vol. 30, 2006, and by Gallagher et al., American Journal of Clinical Nutrition, Vol. 72, Sept. 2000)

The subjects were selected using purposive sampling. Purposive sampling is a non-probability sampling technique where researchers intentionally select participants with particular characteristics relevant to the objectives of the study. This method facilitates the gathering of rich and qualitative information relevant to study's focus. (Etikan et al., 2016).

As part of the study design, a diverse sample of male and female participants aged 18 to 80 years was chosen, representing both vegetarian and non-vegetarian dietary groups. This broad sampling strategy was utilized to explore general trends of dietary practices, morbidity, and lifestyle patterns within the population.

During data collection, it was observed that many men from vegetarian families eat non vegetarian foods now and then especially when attending work meetings, social events and other gatherings. In contrast, women seemed to follow the vegetarian diet more strictly due to personal or cultural commitment.

We also observed that younger adults, especially between the ages of 18 and 39, were less likely to adhere strictly to their family's dietary practices. Their eating habits were mostly influenced by social groups, dining out with friends, and a general shift in tastes seen among the younger generation, regardless of whether they were vegetarians or not.

Based on the patterns we observed, we decided to focus more closely on a specific group of women aged 40 to 59 from both vegetarian and non-vegetarian backgrounds. This age group was chosen because they were more likely to stick to their dietary habits consistently over

time, giving us a clearer picture of the long-term effects of these diets. Also, a large portion of our participants happened to fall within this age range, making it a practical choice for a more detailed analysis. For this subgroup, we went beyond the general assessment of diet, lifestyle, and health conditions by also examining their body composition. This provided a more complete picture of how long-term dietary habits may influence overall nutritional status.

Inclusive criteria for selection of sample:

1. **General**

- Subjects between the age group of 18 and 80 years were selected.
- Both male and female participants were included.
- The subjects were drawn from vegetarian and non-vegetarian diet groups to allow for comparison.

2. **Subsample**

- Females aged 40 to 59 years were selected.
- Equal number of participants were selected from both vegetarian and non-vegetarian groups (30 each).

3.3 Selection of the tool

In a research study, choosing appropriate tools is extremely important. The interview approach was used as a qualitative data gathering strategy, where researchers held purposeful conversations with respondents to gather specific information pertaining to the study (Kvale, 1996). Together with that body composition of subjects within the subsample category was measured using OMRON HBF-222T body composition analyzer.

3.4 Conduct of the study

Using an interview schedule, details such as socio-demographic profile (kuppuswamy scale), anthropometric measurements, physical activity patterns, morbidity profile, dietary patterns (through food frequency questionnaire and 24-hour recall), lifestyle factors of the subjects were obtained. Body composition measurements for subsample subjects were collected using OMRON HBF-222T body composition monitor.

Anthropometric measurements refer to quantitative noninvasive body measurements (CDC,2022). It is a simple method of estimating the nutritional status of a person (CDC,2021). Body measurements of height, weight, body mass index (BMI), body circumferences (waist, hip, and limbs), and skinfold thickness in adults are important indicators used to determine nutrition status and to predict potential future health problems (Gonzalez et al., 2017). The following anthropometric parameters were measured in this study:

- Height
- Weight
- BMI
- Waist circumference
- Hip circumference
- W/H ratio

Table 2: BMI classification

BMI	Nutritional status
<18.5	Underweight
18.5-24.9	Normal
25-29.9	Overweight
30-34.9	Obese class I
35-39.9	Obese class II
>40	Obese class III

(*As per WHO, 2004)

Table 3: Waist-to-Hip Ratio classification

Group	W/H ratio	
	Male	Female
Normal	<0.90	<0.85
Risk	>0.90	>0.85

(*As per WHO,2008)

Body composition is the relative proportions of fat, muscle, bone, and other body tissues. It's an important indicator of overall health and plays a key role in designing nutrition plans, fitness routines, and understanding the risk of certain diseases (Kyle et al., 2011). Bioelectrical Impedance Analysis (BIA) measures body composition by measuring resistance of body tissues to electricity, as lean tissue is a better conductor than fat tissue, but measurement can be affected by hydration status (Kushner et al., 2012). Body composition measurements of a person are influenced by genetics, diet, and lifestyle. As people age, they tend to accumulate more body fat while losing skeletal muscle mass. High body fat percentage increases the risk of cardiovascular disease, type 2 diabetes, various cancers, and early mortality. Reduced skeletal muscle mass raises the risk of sarcopenia, while significant loss in bone mineral density can lead to osteopenia and osteoporosis (Holmes & Racette, 2021).

The WHO has defined physical activity as any movement of the body caused by the skeletal muscles and leading to energy expenditure (WHO, 2010). It encompasses all movements such as transport, work, leisure, and domestic activity. Both moderate- and high-intensity physical activities are beneficial for health. Physical activities are everyday activities like play, active recreation, sports, cycling, and walking, and anyone can perform them regardless of skill (WHO, 2020).

Physical exercise is an important factor to ensure healthy and disease-free living. In adults, it prevents and treats NCDs like cardiovascular disease, cancer, and diabetes. Physical exercise diminishes depression and anxiety symptoms at the same time it enhances brain operation and improves total health (WHO, 2020). An estimated 80% of adolescents together with 31% of adults around the world are not meeting recommended physical activity levels (WHO, 2020).

Nutrition plays a vital role in shaping a person’s overall health. The participants' dietary habits were measured using a food frequency table and the 24-hour dietary recall. The Food Frequency Questionnaire (FFQ) is a widely used tool that helps capture long-term eating patterns by asking individuals how often they consume specific foods over a set period, usually ranging from a month to a year (Willett, 2013). On the other hand, the 24-hour recall method gives a more detailed, short-term snapshot. In this method, participants are asked to recall everything they ate and drank over the past day. It helps in estimating the average daily food intake more accurately (Thompson & Subar, 2013).

Morbidity patterns of the participants were also measured to evaluate the role of diet in morbidity patterns of the participants. Perceptions of the participants on vegetarian diet, supplements, and junk food consumption were also evaluated.

Data on lifestyle factors such as sleep duration, stress levels and alcohol and tobacco consumption were also recorded. Lifestyle plays a pivotal role in the well-being and overall health of an individual. These factors play an important role in contributing to the risk of developing chronic diseases such as cardiovascular disease, diabetes, obesity, and certain cancers. Healthy lifestyle patterns lead to better life quality together with better mental health and extended lifespan (WHO, 2018) although unhealthy lifestyles can initiate disease formation and speed up disease progression and decrease longevity.

3.5 Analysis of data

The collected data was tabulated, analysed and presented. The 24-hr recall data of the subjects were calculated based on Indian Food Composition Tables (IFCT), 2017 with the help of Ntutive nutrient calculator application. For statistical analysis, following statistical tools were used:

- Chi-square test
- Spearman's rank correlation test
- Point-biserial correlation test
- Welch's t-test

3.6 Research design

The collected data was analyzed and presented.

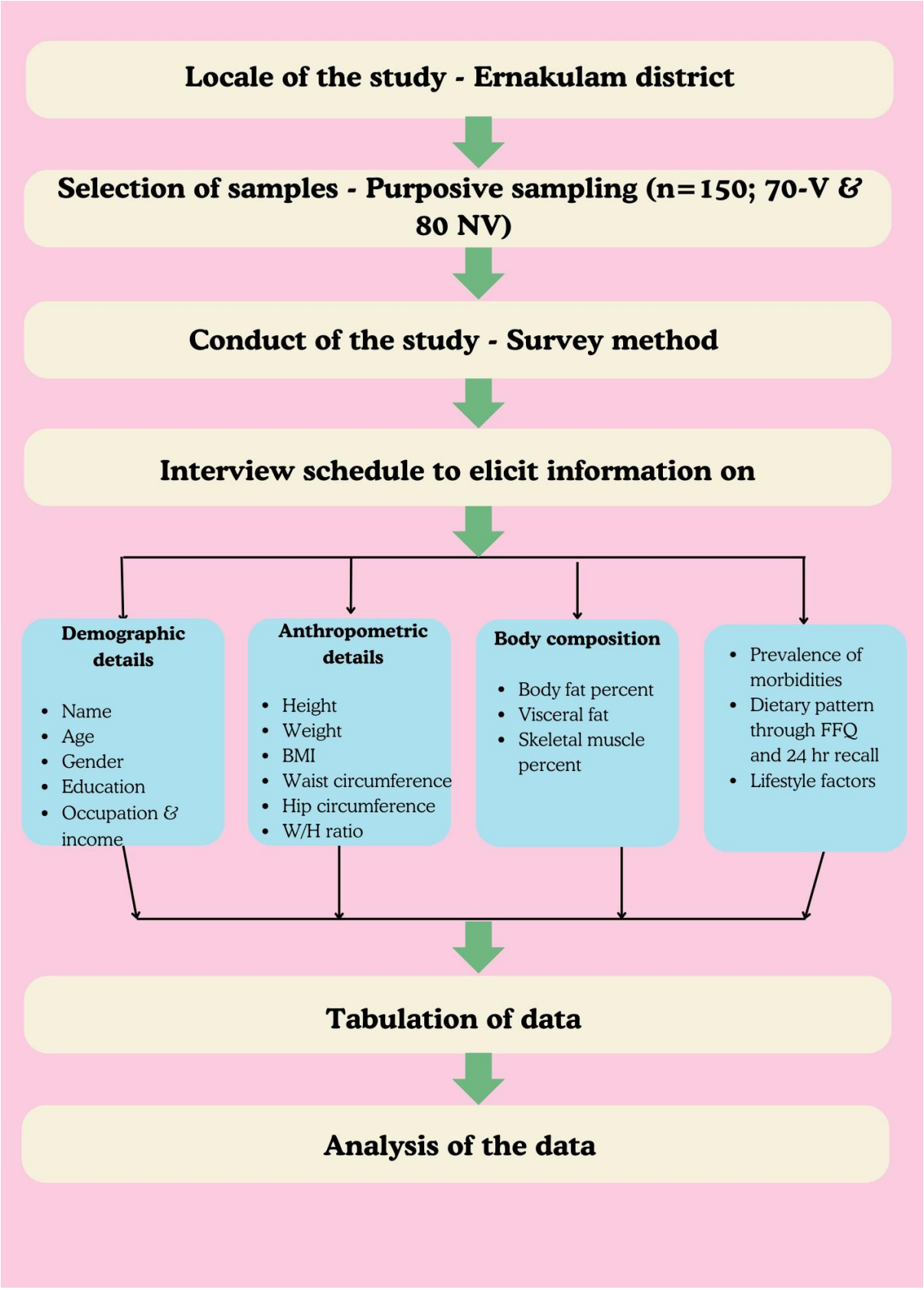

Figure 1: Research Design

CHAPTER IV
RESULTS AND DISCUSSION

The results and discussion of the study entitled "A Comparative study on nutritional status of vegetarian and non-vegetarians" is discussed under following headings:

4.1 General profile of the subjects

4.1.1 Socio Demographic profile of the subjects

4.1.2 Genetic predisposition to obesity among subjects

4.2 Anthropometric profile of vegetarians versus non vegetarians

4.3 Body Composition measurements of vegetarians versus non vegetarians

4.4 Morbidity profile of vegetarians versus non vegetarians

4.5 Dietary patterns of vegetarians versus non vegetarians

4.6 Lifestyle factors of vegetarians versus non vegetarians

4.1 General profile of the subjects

4.1.1 Socio Demographic profile of the subjects

The table below gives the socio-demographic profile of the subjects.

Table: 4 Socio-demographic profile of the subjects

Particulars	No of subjects (N=150)	%
Age (in years)		
18-39	36	24
40-59	81	54
60-80	33	22
Gender		
Male	66	44
Female	84	56

Type of diet		
Vegetarian	70	47
Non – vegetarian	80	53
Education		
Profession or honours	7	5
Graduate	42	28
Intermediate or diploma	45	30
High school certificate	47	31
Middle school certificate	8	5
Primary school certificate	1	1
Illiterate	0	0
Occupation		
Legislators, senior officials and manger	20	13
Professionals	19	13
Technicians and associate professionals	23	15
Clerks	4	3
Skilled workers and shop and market sales workers	38	25
Skilled agricultural and fishery workers	4	3
Craft and related trade workers	11	7
Plant and machine operators and assemblers	0	0
Elementary occupation	29	19
Unemployed	2	1

Income		
Less than or equal to 10,702	16	11
10,703-31,977	64	43
31,978-53,360	42	28
53,360-80,109	13	9
80,110-1,06,849	6	4
1,06,850-2,13,813	4	3
2,13,814 and above	5	3
Socioeconomic status (kuppuswamy score)		
Lower	0	0
Upper lower	39	26
Lower middle	56	37
Upper middle	47	31
Upper	8	5

The majority of the participants (54%) belonged to the age group 40-59 indicating that middle-aged individuals were more represented. Younger adults aged 18-39 accounted for 24%, while older adults aged 60-80 made up the remaining 22%.

In terms of gender, most of the participants were females (56%) when compared to males (44%) based on their higher willingness of women to participate in the survey. Among the subjects, 53% followed a non-vegetarian diet, while 47% were vegetarians.

Majority of the subjects had completed high school (31%), while only 1% had completed primary school and none were illiterate. According to profession, the highest number belonged to sales personnel and skilled workers (25%), while plant and machine operators were entirely unrepresented, and just 1% were unemployed. Income data revealed that the most prevalent income range was ₹10,703–₹31,977/month, which encompassed 43% of respondents, while a meager 3–4%, belonged to the highest income range above ₹80,000/month.

4.1.2 Genetic predisposition to obesity among subjects

Table 5: Genetic predisposition to obesity among subjects

Particulars	Vegetarian (N=70)	%	Non vegetarian (N=80)	%	Total (N=150)	%
Yes	4	6	13	16	17	11
No	66	94	67	84	133	89

From the above table, it was observed that the majority of vegetarians (94%) and non-vegetarians (84%) did not have a genetic predisposition to obesity. Overall, only 11% of the total population had a genetic tendency for obesity, with a marginal excess in non-vegetarians.

4.2 Anthropometric profile of vegetarians versus non vegetarians

Table 6: Anthropometric profile of vegetarians versus non vegetarians BMI

Particulars	Vegetarian (N=70)	%	Non vegetarian (N=80)	%	Total (N=150)	%
BMI						
Underweight	3	4	3	4	6	4
Normal	30	43	35	44	65	43
Overweight	32	46	28	35	60	40
Obese class 1	4	6	12	15	16	11
Obese class 2	0	0	2	3	2	1
Obese class 3	1	1	0	0	1	1
W/H ratio						
Normal	27	39	26	33	53	35
At risk	43	61	54	68	97	65

Vegetarians showed higher rates of being overweight at 46% as opposed to 35% of non-vegetarians. Non-vegetarians demonstrated a higher proportion of people with normal BMI (44%) when compared to vegetarians (43%). The non-vegetarian population exhibited higher occurrences of Obese class 1 (15%) than vegetarians (6%) but showed no cases of Obese class 3 which exclusively affected vegetarian individuals (1%). Vegetarian participants showed no cases of obese class 2 but non-vegetarian participants consisted of 3% obese in this category. Both groups contained equal percentages of underweight subjects.

This suggests that a significant percentage of both groups lie in the overweight or obese categories. Non-vegetarians have a slightly higher prevalence of severe obesity classes (class 1 and 2), and this may be due to differences in fat intake or food choices high in energy.

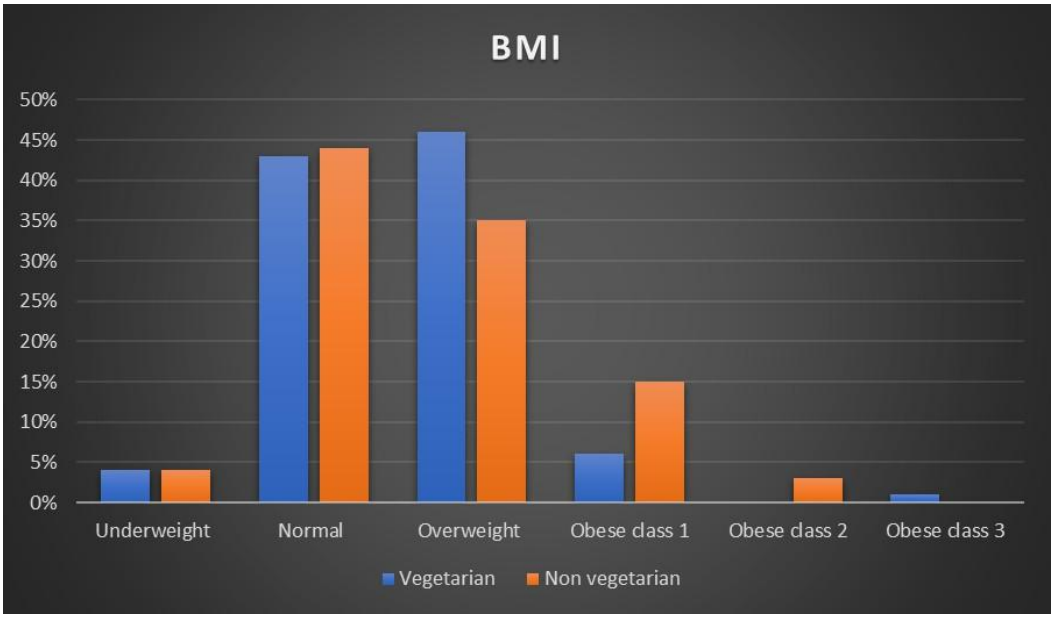

Figure 2: BMI of Vegetarians versus Non-vegetarians

Waist-to-Hip Ratio (WHR)

It was seen from the table that 61% of vegetarians were found to be at risk while a slightly higher percentage (68%) of non vegetarians fell into the same category. In contrast, 39% of vegetarians and 33% of non-vegetarians were within normal range. When total population is considered, 65% were at risk, suggesting that central obesity is a significant concern.

This is in accordance with the findings of Kwiatkowska et al. (2022), who found that participants consuming an omnivorous diet had greater BMI and waist-to-hip ratio than those consuming vegetarian diets.

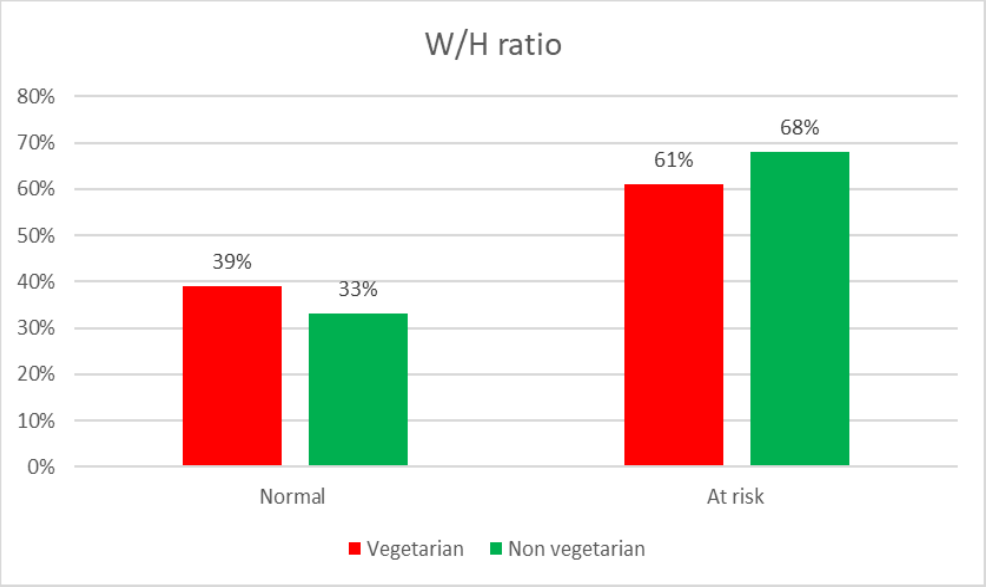

Figure 3: W/H ratio of Vegetarians versus Non-vegetarians

Table 7: Fat distribution of vegetarian versus non-vegetarians

Fat distribution	Vegetarian (N=70)	%	Non vegetarian (N=80)	%	Total (N=150)	%
More on upper body	1	1	0	0	1	1
More on lower body	1	1	0	0	1	1
Abdominal obesity	50	71	61	76	111	74
Overall balanced	18	26	19	24	37	25

These results underscore that abdominal obesity is the most common pattern of fat distribution in both vegetarians and non-vegetarians, with very slightly higher percentages found among non-vegetarians (76%) than among vegetarians (71%). A smaller percentage, 26%, had a generally balanced fat distribution, and just 1% demonstrated fat deposition mostly in the upper or lower body, which seems to be uncommon. Approximately 24% presented with a balanced distribution, and none were observed with fat localized on either

the upper or lower body. Taking the overall population into account, abdominal obesity was seen in 74% of the subjects.

4.3 Body composition measurements of vegetarians versus non vegetarians

From the total number of subjects, a subsample from each dietary groups were selected and the following body composition parameters were assessed

- Body fat
- Visceral fat
- Skeletal muscle

Table 8: Total Body fat percent of vegetarians versus non vegetarians (subsample)

Category	Vegetarian (N=70)	%	Non vegetarian (N=80)	%	Total (N=150)	%	Chi square test
Low	1	1	0	0	1	2	Statistic = 4.07 | p-value = 0.254
Normal	6	9	3	4	9	15	
High	16	23	23	29	39	65	
Very high	7	10	4	5	11	18	

When comparing body fat levels between the two groups, a slightly higher proportion of non-vegetarians (29%) were found to have high body fat percent compared to vegetarians (23%). Interestingly, very high levels of body fat percent were more common among vegetarians (10%) than non-vegetarians (5%). On the other end, only 9% of vegetarians and just 4% of non-vegetarians had body fat percent within the normal range. A small portion of vegetarians (1%) had low body fat percent, while none of the non-vegetarians fell into this category. These numbers suggest that elevated body fat percent is a concern in both groups, with a slightly higher prevalence in non-vegetarians.

Overall, 65% of all participants were found to have high body fat percent, pointing to a worrying trend that cuts across dietary preferences.

This agrees with the findings of kim et al, (2012) which revealed that vegetarians had a significantly lower percentage of body fat than omnivores.

Although trends were observed in the data, statistical analysis with the Chi-square test did not show any significant relationships between diet type and body fat percent.

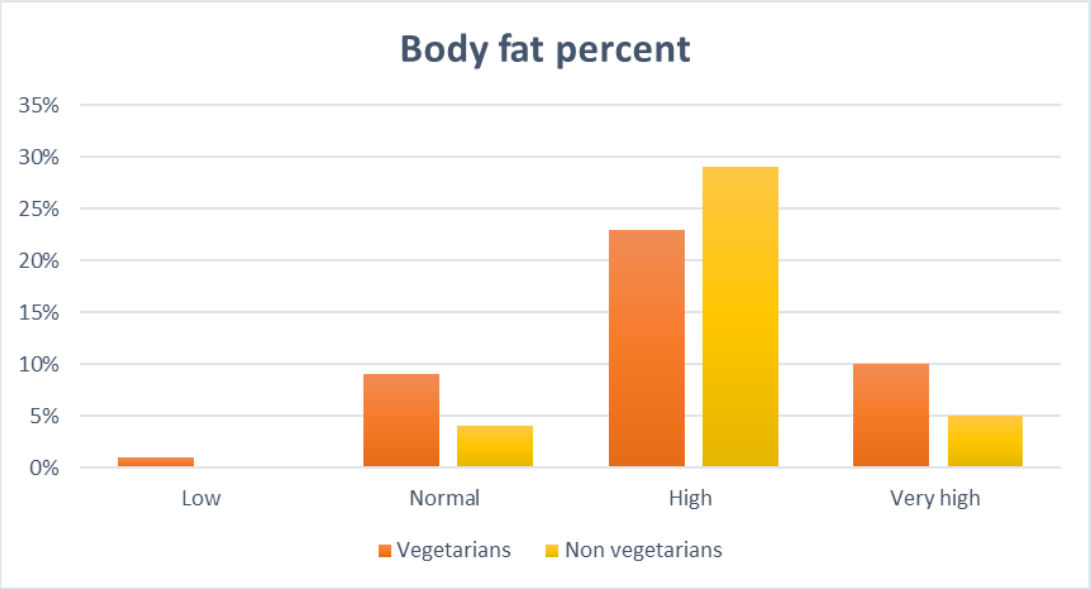

Figure 4: Body fat percent of vegetarians versus non vegetarians (Subsample)

Table 9: Visceral fat level of vegetarians versus non vegetarians (Subsample)

Category	Vegetarian (N=70)	%	Non vegetarian (N=80)	%	Total (N=150)	%	Chi square test
Normal	9	13	13	16	22	37	Statistic = 0.418 | p-value = 0.811
High	16	23	10	13	26	43	
Very high	5	7	7	9	12	20	

A high proportion of vegetarians (23%) had elevated visceral fat while this condition was present in just 13% of non-vegetarians. It also revealed that 7% of vegetarians and 9% of non-vegetarians had very high visceral fat levels. The results showed that 16% of non-vegetarians along with 13% of vegetarians maintained normal levels of visceral fat. High

levels of visceral fat appeared more often in vegetarians while very high levels predominantly occurred in non-vegetarians.

This is in contrast to the results of Vij et al. (2025), who found that plant-predominant-based diets (PPBDs) are related to decreased visceral fat and better metabolic health.

Statistical analysis with the Chi-square test did not show any significant relationships between diet type and visceral fat.

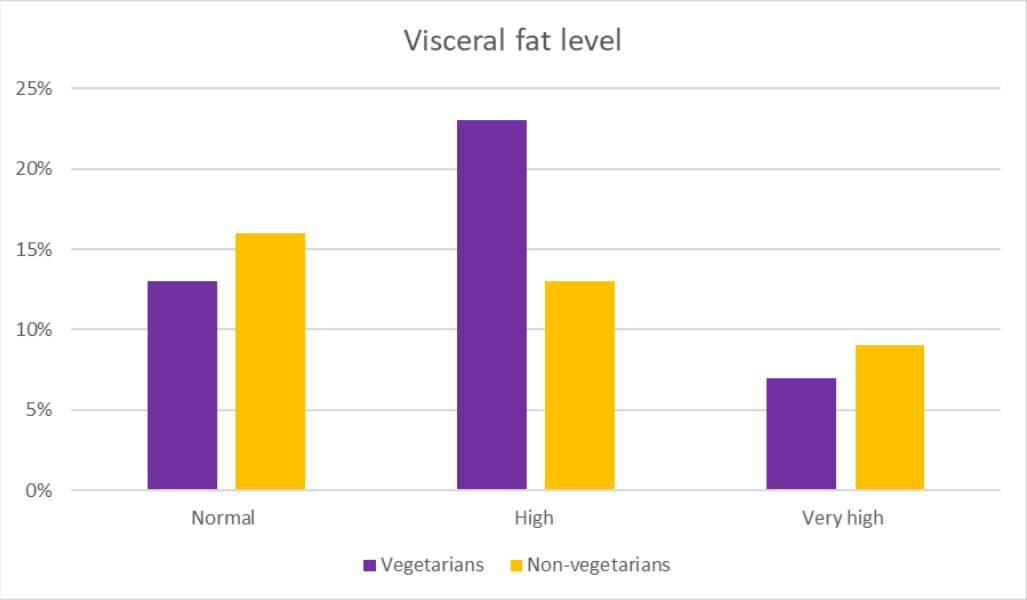

Figure 5: Visceral fat level of vegetarians versus non vegetarians (Subsample)

Table 10: Skeletal muscle percent of vegetarians versus non vegetarians (Subsample)

Category	Vegetarian (N=70)	%	Non vegetarian (N=80)	%	Total (N=150)	%	Chi square test
Low	24	34	28	35	52	87	Statistic = 0.418 | p-value = 0.811
Normal	5	7	2	3	7	12	
High	1	1	0	0	1	2	

From the above table, it was observed that 34% of vegetarians had low skeletal muscle mass with slightly higher percent (35%) among non vegetarians. These results indicate that both

dietary groups have relatively low skeletal muscle mass even in the case of non-vegetarians who consume animal-based foods on a regular basis. This may be due to greater sedentary behaviour among subjects.

This contrasts with the findings of Aubertin-Leheudre and Adlercreutz (2009), who observed that individuals on vegetarian diets had lower skeletal muscle mass compared to those on omnivorous diets, despite similar overall protein intake.

Statistical analysis with the Chi-square test did not show any significant relationships between diet type and skeletal muscle percent.

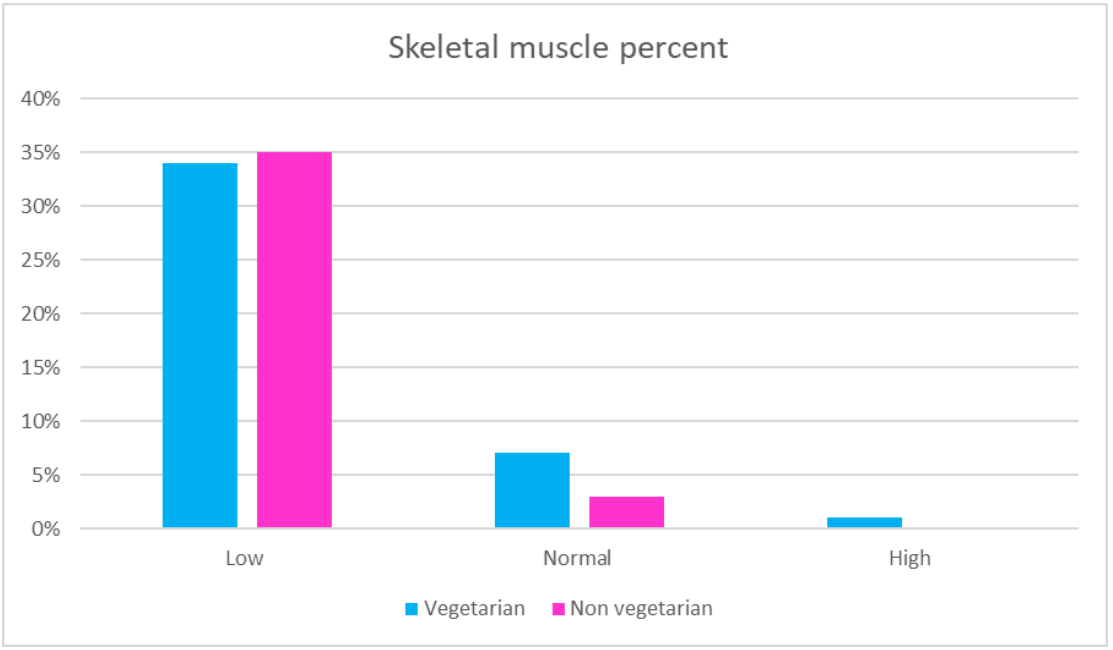

Figure 6: Skeletal muscle percent of vegetarians versus non vegetarians (Subsample)

4.4 Morbidity profile of vegetarians versus non vegetarians

Table 11: Morbidity profile of vegetarians versus non vegetarians

Diseases /Disorders		Vegetarian (N=70)	%	Non vegetarian (N=80)	%	Total (N=150)	%
Diabetes	Yes	13	19	12	15	25	17
	No	57	81	68	85	125	83
Hypertension	Yes	14	20	16	20	30	20
	No	56	80	64	80	120	80
Dyslipidemia	Yes	7	10	14	18	21	14
	No	63	90	66	83	129	86
Liver disease	Yes	0	0	3	4	3	2
	No	70	100	77	96	147	98
Kidney disease	Yes	0	0	0	0	0	0
	No	70	100	80	100	150	100
Osteoporosis/ Arthritis	Yes	2	3	3	4	5	3
	No	68	97	77	96	145	97
Anaemia	Yes	0	0	1	1	1	1
	No	70	100	79	99	149	99
Thyroid	Yes	4	6	13	16	17	11
	No	66	94	67	84	133	89
Breathing difficulty	Yes	2	3	1	1	3	2
	No	68	97	79	99	147	98
Gastrointestinal disorders	Yes	1	1	1	1	2	1
	No	69	99	79	99	148	99

It can be seen from the above table that Diabetes was reported by 19% vegetarians and 15% non-vegetarians with a total prevalence of 17%. Hypertension was observed in 20% of vegetarians and non-vegetarians alike, with no difference between the two groups, with a total prevalence of 20%. Dyslipidemia was significantly different, being reported in 10% of vegetarians and 18% of non-vegetarians, totaling 14%.

Liver disease was seen only in non-vegetarians (4%), whereas there were no cases reported among vegetarians, possibly due to less alcohol usage among vegetarians. Kidney disease had no reported cases in either group. Osteoporosis and arthritis occurred in 3% of the vegetarians and 4% of the non-vegetarians, adding up to a total of 3%.

Anaemia was noted in 1% of non-vegetarians, but none among vegetarians, giving a total prevalence of 1%. This is rather surprising, as vegetarians are generally thought to be at increased risk of iron-deficiency anaemia. This could be due to higher use of green leafy vegetables and proper supplementation among vegetarians. Thyroid disorders were more common in non-vegetarians (16%) than in vegetarians (6%), with a total prevalence of 11%.

Difficulty in breathing was observed in 3% of vegetarians and 1% of non-vegetarians, making a total of 2%. Disorders such as gastrointestinal disorders occurred with an extremely low frequency of 1% in both groups.

Non-vegetarians had a higher incidence of some ailments like dyslipidemia, thyroid, and liver disease. Vegetarians, however, had comparatively higher incidences of diabetes and difficulty in breathing.

Statistical analysis with chi square revealed no significant relationships were found between diet type and morbidity profile.

Table 12: Frequency of infection in vegetarians versus non vegetarians

Category	Vegetarian (N=70)	%	Non vegetarian (N=80)	%	Total (N=150)	%
Yes	6	9	13	16	19	13
No	64	91	67	84	131	87

The information shows that 9% of vegetarians and 16% of non-vegetarians reported having frequent infection thus indicating non-vegetarians experience more frequent infections than vegetarians. This may be due to higher consumption of fruits and vegetables in vegetarian diets which are packed with vitamin A and C that help strengthen the immune system.

4.5 Dietary patterns of vegetarians versus non vegetarians

Table 13: Dietary pattern of vegetarians versus non vegetarians

Dietary pattern	Vegetarian (N=70)	%	Non vegetarian (N=80)	%	Total (N=150)	%
Number of meals/day						
2	3	4	4	5	7	5
3	38	54	34	43	72	48
4	28	40	36	45	64	43
More than 4	1	1	6	8	7	5
Meal skipping						
Yes	8	11	27	34	35	23
No	62	89	53	66	115	77
Meal type						
Breakfast	8	100	12	44	20	57
Lunch	0	0	9	34	9	26
Dinner	0	0	6	22	6	17

Table shows clear differences in how vegetarians and non-vegetarians handle their meal frequency along with meal skipping habits. It was observed that most people eat three meals a day since 48% of the whole research group follow the same. Three-meal eating is more prevalent among vegetarians as their population shows a 54% frequency rate whereas non-vegetarians show 43%. The study shows that 5% of the general population eats food beyond four times per day however this behavior is more frequent among non-vegetarians

who eat more than four times per day (8%) when compared to only 1% of vegetarians reporting the same habit.

The research findings establish that 77 percent of people do not skip meals. The data shows that vegetarians tend to follow a consistent eating pattern since 89 percent of them maintain eating all their scheduled meals yet non-vegetarian eaters achieve this level only at 66 percent. Breakfast is the most commonly omitted meal (57 percent).

Table 14: Snacking pattern vegetarians versus non vegetarians

Type of snack	Vegetarian (N=70)	%	Non vegetarian (N=80)	%	Total (N=150)	%
Fried items	39	56	48	60	87	58
Fruits	44	63	30	38	74	49
Nuts	36	51	21	26	57	38
Junk food	6	9	21	26	27	18

(*Multiple response)

Fried items stand out as the snack preference of choice among most of them since it accounts for 58 percent. Vegetarians consume these snacks at a rate of 56 percent and non-vegetarians do so at a rate of 60 percent. Fruits are ranked second for most popular snacks yet vegetarians prefer them at a rate of 63 percent versus 38 percent for non-vegetarians. The data indicates that people also snack on nuts since 51% of vegetarians and 26% of non-vegetarians include nuts as part of their diets. A higher number of non-vegetarians (26%) tend to consume junk food compared to vegetarians (9%) indicating better snack choices among vegetarians.

Table 15: Dietary modification of vegetarians versus non vegetarians

Diet modification	Vegetarian (N=70)	%	Non vegetarian (N=80)	%	Total (N=150)	%
Low sugar	10	14	5	6	15	10
Low salt	4	6	5	6	9	6
Low oil	6	9	3	4	9	6
High protein	0	0	2	3	2	1
Low carb	0	0	3	4	3	2
No	59	84	69	86	128	85

The general population does not adhere to specific diets since 85 percent of the entire population states they have no dietary restrictions. 14 percent of vegetarians follow low-sugar diets while 6 percent of non-vegetarians follow this dietary approach. People generally avoid dietary restrictions yet the practices of both low-salt and low-oil diets are occasionally followed while high-protein and low-carbohydrate diets remain almost non-existent.

Table 16: Specific dietary practices followed by vegetarians versus non vegetarians

Specific dietary practices	Vegetarian (N=70)	%	Non vegetarian (N=80)	%	Total (N=150)	%
Eat more salads	0	0	1	1	1	1
Eat more fruits	0	0	1	1	1	1
Eat more nuts	0	0	1	1	1	1
Eat more greens	1	1	0	0	1	1
More millets	0	0	1	1	1	1
Eats less junk food	1	1	0	0	1	1
Eat sprouts	1	1	0	0	1	1
Nothing	68	97	76	95	144	96

A large majority of both vegetarians (97%) and non-vegetarians (95%) reported not following any specific healthy dietary practices. Only about 1% from each group said they made conscious efforts to include foods like fruits, salads, green leafy vegetables, or sprouts in their diet. These numbers suggest that intentional healthy eating habits are quite rare in both groups, pointing to a need for better awareness and guidance on balanced nutrition.

Usage of fortified foods

It was observed that 86% of vegetarians and 89% of non-vegetarians use fortified food products. In total, the survey shows that 87% of respondents use fortified foods but 13% do not.

Table 17: Comparison of cooking oil preferences between vegetarians and non-vegetarians

Type of oil	Vegetarian (N=70)	%	Non vegetarian (N=80)	%	Total (N=150)	%
Coconut oil	69	99	77	96	146	97
Sunflower oil	15	21	25	31	40	27
Palm oil	8	11	6	8	14	9
Rice bran oil	2	3	4	5	6	4
Sesame oil	1	1	0	0	1	1
Olive oil	0	0	1	1	1	1

(*Multiple response)

The usage of coconut oil stands as the preferred oil choice for both vegetarians and non-vegetarians since 69% of vegetarians and 99% of non-vegetarians rely on this oil. A vast majority of 77% respondents selected coconut oil as their essential oil choice. On the other hand, the least used oil is sesame oil, with only 1% of vegetarians using it and none of the non-vegetarians preferring it. In total, just 1% of respondents use sesame oil, making it the least favored option. The survey showed sunflower oil ranks as the second most widely used cooking oil at 21% following palm oil at 9% and rice bran oil at 5%.

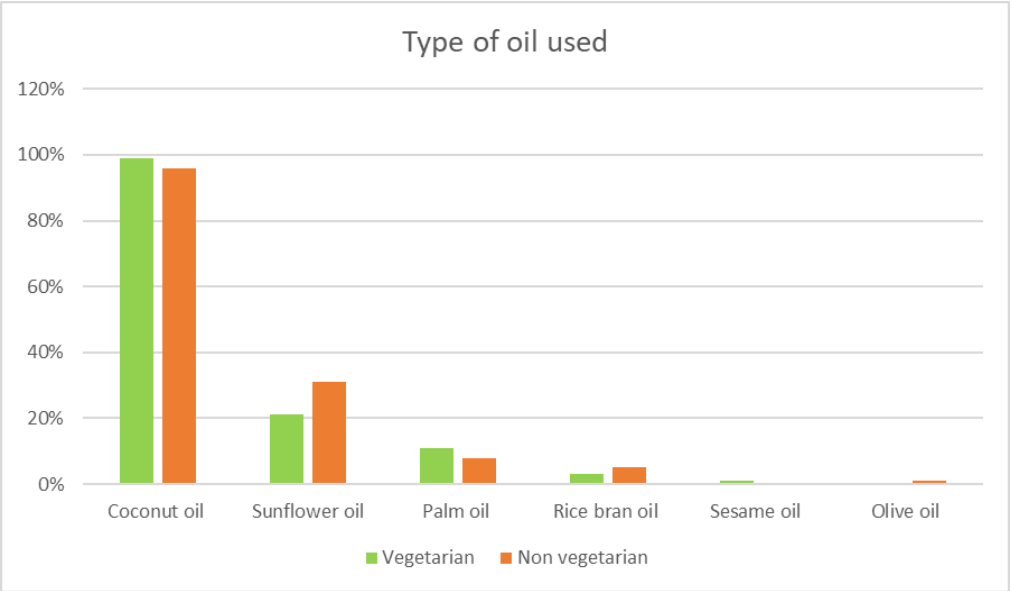

Figure 7: Comparison of cooking oil preferences between vegetarians and non-vegetarians

Table 18: Food frequency of vegetarians versus non-vegetarians

Category		Vegetarian (N=70)	%	Non vegetarian (N=80)	%	Total (N=150)	%
Cereals	Daily	70	100	80	100	150	100
Whole pulses	Daily	24	34	16	20	40	27
	Several times a week	41	59	60	75	101	67
	Weekly	6	9	4	5	10	7
Dals	Daily	24	34	4	5	28	19
	Several times a week	32	46	42	53	74	49
	Weekly	12	17	29	36	41	27
	Several times a month	1	1	3	4	4	3
	Monthly	1	1	0	0	1	1

	Never	0	0	2	3	2	1
Sprouts	Daily	1	1	1	1	2	1
	Several times a week	16	23	1	1	17	11
	Weekly	18	26	1	1	19	13
	Several times a month	5	7	2	3	7	5
	Monthly	17	24	5	6	22	15
	Rarely	8	11	9	11	17	11
	Never	2	3	61	76	63	42
Green leafy vegetables	Daily	1	1	2	3	3	2
	Several times a week	37	53	21	26	58	39
	Weekly	27	39	27	34	54	36
	Several times a month	2	3	10	13	12	8
	Monthly	1	1	6	8	7	5
	Rarely	3	4	4	5	7	5
	Never		0	10	13	10	7
Roots and tubers	Daily	20	29	12	15	32	21
	Several times a week	35	50	20	25	55	37
	Weekly	7	10	35	44	42	28
	Several times a month	2	3	11	14	13	9
	Monthly	4	6	2	3	6	4
	Rarely	3	4	0	0	3	2
	Daily	20	29	10	13	30	20

Other vegetables	Several times a week	43	61	49	61	92	61
	Weekly	4	6	13	16	17	11
	Several times a month	1	1	2	3	3	2
	Monthly	1	1	4	5	5	3
	Rarely	1	1	2	3	3	2
Fruits	Daily	40	57	21	26	61	41
	Several times a week	21	30	34	43	55	37
	Weekly	8	11	18	23	23	15
	Several times a month	1	1	2	3	3	2
	Monthly	1	1	4	5	5	3
	Rarely	0	0	1	1	1	1
Milk	Daily	61	87	60	75	121	81
	Several times a week	3	4	5	6	8	5
	Weekly	0	0	3	4	3	2
	Several times a month	0	0	2	3	2	1
	Monthly	0	0	2	3	2	1
	Rarely	3	4	1	1	4	3
	Never	3	4	7	9	10	7
Paneer	Weekly	2	3	2	3	4	3
	Several times a month	9	13	5	6	14	9
	Monthly	25	36	14	18	39	26

	Rarely	17	24	13	16	30	20
	Never	16	23	46	58	62	41
Cheese	Several times a week	0	0	1	1	1	1
	Weekly	0	0	2	3	2	1
	Several times a month	3	4	3	4	6	4
	Monthly	7	10	12	15	19	13
	Rarely	5	7	18	23	23	15
	Never	55	79	44	55	99	66
Curd	Daily	26	37	11	14	37	25
	Several times a week	13	19	21	26	34	23
	Weekly	9	13	25	31	34	23
	Several times a month	1	1	5	6	6	4
	Monthly	2	3	4	5	6	4
	Rarely	0	0	4	5	4	3
	Never	3	4	10	13	13	9
Ghee	Daily	4	6	1	1	5	3
	Several times a week	4	6	8	10	12	8
	Weekly	5	7	18	23	23	15
	Several times a month	3	4	17	21	20	13
	Monthly	11	16	13	16	24	16
	Rarely	13	19	12	15	25	17
	Never	20	29	11	14	31	21

Egg	Daily	0	0	6	8	6	4
	Several times a week	0	0	18	23	18	12
	Weekly	0	0	21	26	21	14
	Several times a month	0	0	8	10	8	5
	Monthly	0	0	14	18	14	9
	Rarely	0	0	7	9	7	5
	Never	0	0	6	8	6	4
Poultry	Daily	0	0	19	24	19	13
	Several times a week	0	0	29	36	29	19
	Weekly	0	0	16	20	16	11
	Several times a month	0	0	10	13	10	7
	Monthly	0	0	3	4	3	2
	Rarely	0	0	1	1	1	1
	Never	0	0	2	3	2	1
Processed meat	Daily	0	0	2	3	2	1
	Several times a week	0	0	11	14	11	7
	Weekly	0	0	22	28	22	15
	Several times a month	0	0	6	8	6	4
	Monthly	0	0	3	4	3	2
	Rarely	0	0	7	9	7	5
	Never	0	0	29	36	29	19
Beef	Daily	0	0	1	1	1	1

	Several times a week	0	0	5	6	5	3
	Weekly	0	0	12	15	12	8
	Several times a month	0	0	9	11	9	6
	Monthly	0	0	10	13	10	7
	Rarely	0	0	10	13	10	7
	Never	0	0	33	41	33	22
Pork	Daily	0	0		0	0	0
	Several times a week	0	0	9	11	9	6
	Weekly	0	0	16	20	16	11
	Several times a month	0	0	10	13	10	7
	Monthly	0	0	6	8	6	4
	Rarely	0	0	18	23	18	12
	Never	0	0	21	26	21	14
Mutton	Daily	0	0	0	0	0	0
	Several times a week	0	0	1	1	1	1
	Weekly	0	0	0	0	0	0
	Several times a month	0	0	1	1	1	1
	Monthly	0	0	6	8	6	4
	Rarely	0	0	30	38	30	20
	Never	0	0	42	53	42	28
Organ meat	Daily	0	0		0	0	0
	Several times a week	0	0		0	0	0

	Weekly	0	0	5	6	5	3
	Several times a month	0	0	2	3	2	1
	Monthly	0	0	10	13	10	7
	Rarely	0	0	25	31	25	17
	Never	0	0	38	48	38	25
Lean fish	Daily	0	0	11	14	11	7
	Several times a week	0	0	12	15	12	8
	Weekly	0	0	6	8	6	4
	Several times a month	0	0	4	5	4	3
	Monthly	0	0	13	16	13	9
	Rarely	0	0	8	10	8	5
	Never		0	26	33	26	17
Fatty fish	Daily	0	0	22	28	22	15
	Several times a week	0	0	15	19	15	10
	Weekly	0	0	10	13	10	7
	Several times a month		0	14	18	14	9
	Monthly	0	0	7	9	7	5
	Rarely	0	0	11	14	11	7
	Never	0	0	1	1	1	1
Shellfish and crustaceans	Daily	0	0	1	1	1	1
	3-4 times/week	0	0	11	14	11	7
	Weekly	0	0	20	25	20	13

	Several times a month	0	0	11	14	11	7
	Monthly	0	0	15	19	15	10
	Rarely	0	0	17	21	17	11
	Never	0	0	5	6	5	3
Coconut	Daily	32	46	23	29	55	37
	Several times a week	29	41	43	54	72	48
	Weekly	7	10	11	14	18	12
	Several times a month	0	0	1	1	1	1
	Monthly	1	1	2	3	3	2
	Never	1	1	0	0	1	1
Nuts and dry fruits	Daily	20	29	13	16	33	22
	Several times a week	15	21	20	25	35	23
	Weekly	12	17	22	28	34	23
	Several times a month	5	7	8	10	13	9
	Monthly	8	11	13	16	21	14
	Rarely	7	10	3	4	10	7
	Never	3	4	1	1	4	3
Sugar and sweet foods	Daily	15	21	15	19	30	20
	Several times a week	6	9	16	20	22	15
	Weekly	15	21	16	20	31	21
	Several times a month	4	6	7	9	11	7

	Monthly	7	10	10	13	17	11
	Rarely	16	23	15	19	31	21
	Never	7	10	1	1	8	5
Fried foods	Daily	13	19	18	23	31	21
	Several times a week	18	26	25	31	43	29
	Weekly	13	19	17	21	30	20
	Several times a month	2	3	6	8	8	5
	Monthly	12	17	7	9	19	13
	Rarely	11	16	7	9	18	12
	Never	1	1	0	0	1	1
Fast foods	Daily	3	4	8	10	11	7
	Several times a week	1	1	6	8	7	5
	Weekly	8	11	17	21	25	17
	Several times a month	4	6	8	10	12	8
	Monthly	14	20	19	24	33	22
	Rarely	23	33	16	20	39	26
	Never	7	10	6	8	13	9

From the above table, it was observed that, cereals serve as regular dietary components for every subject since all 100% of vegetarians and non-vegetarians consume them daily. Whole pulses appear in daily meals of 34% of non-vegetarians and 24% of vegetarians while numerous people eat them multiple times per week. The data indicate that sprouts are the foodstuff that receives the least consumption frequency among everyone regardless of their dietary choices. Most vegetarians have occasional sprout consumption while many of them eat them several times per month or less frequently. Sprouts are rarely featured in the diets of

non-vegetarians at least since a large percentage of this population does not include these foods in their meal plan.

Green leafy vegetables appear regularly in the diets of vegetarians to a greater extent than they do in the diets of non-vegetarians. Vegetarians eat green leafy vegetables on a regular basis but non-vegetarians avoid these types of vegetables in their diet. The dietary pattern shows vegetarians consume roots and tubers regularly but non-vegetarians also consume them occasionally. A comparable pattern occurs between other vegetable consumption where vegetarians eat them more times than non-vegetarians do. Both groups show different patterns for fruit consumption because vegetarians eat them frequently but non-vegetarians do not.

Milk is consumed daily by 87% of non-vegetarians, while 61% of vegetarians consume it daily. Milk is generally more common in the daily diet for both groups. Vegetarians show a regular pattern of paneer consumption but the intake of this dairy product remains lower for non-vegetarians. The diet of vegetarians includes curd as a fundamental food component which they consume at higher frequencies than non-vegetarians. Vegetarian diets include ghee more often than non-vegetarian diets yet the frequency of all diet intake remains lower.

The plant-based diet practices of vegetarians prevent them from eating eggs, fish, poultry, beef and mutton. Non-vegetarians consume their animal-based foods frequently but they eat fish as well as poultry in higher numbers than beef or mutton.

Vegetarians consume coconut more regularly than non-vegetarians though it is still a common food for both. The consumption pattern of nuts and dry fruits happens with similar regularity among vegetarians and non-vegetarians although vegetarians show higher levels of consumption frequency. Both community groups eat sweet foods including sugar but such foods make up only a minor share of their dietary intake. Non-vegetarians consume fried foods regularly but vegetarians enjoy fried foods only sometimes during their meals. Non-vegetarians favor fast foods more than vegetarians since they consume fast food at greater rates than vegetarians do.

Table 19: Comparison of mean nutrient intake of vegetarians versus non vegetarians (Subsample)

Nutrient	Vegetarians Mean ± SD	Non vegetarians Mean ± SD	P- value
Energy (KCal)	1242.58 ±132.68	1367.53±240.29	0.016 (5% sig)
Carbohydrates (g)	190.45±28.18	184.64±31.84	0.458 (NS)
Protein (g)	32.46±6.26	44.52±13.21	0.000 (1% sig)
Fat (g)	33.20±8.54	45.72±13.15	0.000 (1% sig)
Fiber (g)	384.65±177.61	261.16±150.17	0.005 (1% sig)
Calcium (mg)	14.51±4.89	11.55±3.44	0.009 (1% sig)
Iron (mg)	7.33±2.61	6.57±1.62	0.182 (NS)
Vitamin C (mg)	31.22±22.27	30.74±22.60	0.935 (NS)

From the above table it is understood that energy intake differs significantly at the 5% level, suggesting that non-vegetarians consume more calories than vegetarians, likely due to the inclusion of more calorie-dense animal-based foods.

Protein and fat intake show a 1% level of significance, indicating highly significant differences, with non-vegetarians having greater intake of both nutrients. This is consistent with the presence of protein- and fat-rich animal products in non-vegetarian diets.

Fiber intake is also significantly different at the 1% level, with vegetarians consuming more fiber, which is expected due to their higher intake of plant-based foods. Calcium intake shows a significant difference at the 1% level as well, suggesting better calcium intake among vegetarians.

In contrast, carbohydrate, iron, and vitamin C intakes show no significant differences, indicating that these nutrients are consumed in similar amounts by both dietary groups.

Table 20: Percent RDA met (Subsample)

Nutrient	RDA (sedentary female adult)	Vegetarians	% RDA met	Non vegetarian	%RDA met
Energy (KCal)	1660	1242.58 ±132.68	74.8	1367.53±240.29	82.3
CHO ((g)	130	190.45±28.18	146.5	184.64±31.84	142
Protein (g)	46	32.46±6.26	70.6	44.52±13.21	96.7
Fat (g)	20	33.20±8.54	166	45.72±13.15	228.5
Fiber (g)	25	384.65±177.61	58	261.16±150.17	46.4
Calcium (g)	1000	14.51±4.89	38.4	11.55±3.44	26.1
Iron (mg)	29	7.33±2.61	25.1	6.57±1.62	22.7
Vitamin C (mg)	65	31.22±22.27	48	30.74±22.60	47.2

It can be observed from the table that both vegetarians and non-vegetarians fall short of the RDA for energy intake (1660 Kcal), with vegetarians meeting 74.8% and non-vegetarians 82.3%. Although non-vegetarians are closer to meeting the requirement, an overall energy deficit is evident in both groups.

For carbohydrates, both dietary groups significantly exceed the RDA of 130 g. Vegetarians meet 146.5% and non-vegetarians 142%, indicating adequate to high intake of carbohydrate-rich foods across both groups, regardless of dietary preference.

The protein intake shows a notable difference. Vegetarians meet only 70.6% of the RDA (46 g), while non-vegetarians achieve 96.7%, suggesting that vegetarian diets may be relatively lower in protein. Fat intake is well above the RDA of 20 g in both groups, with vegetarians consuming 166% and non-vegetarians reaching 228.5% of the recommended value.

With respect to fiber, both groups fall short of the RDA (25 g), with vegetarians meeting 58% and non-vegetarians only 46.4%. Calcium intake is particularly low in both groups compared to the RDA of 1000 mg. Vegetarians meet 38.4%, and non-vegetarians only 26.1% of the requirement.

Iron intake also falls significantly below the RDA (29 mg), with vegetarians meeting 25.1% and non-vegetarians 22.7%. Vitamin C intake is also insufficient, with vegetarians meeting 48% and non-vegetarians 47.2% of the RDA (65 mg).

Table 21: Perceptions of subjects regarding vegetarian diet, junk food and multivitamins

Particulars		**Vegetarian (N=70)**	**%**	**Non vegetarian (N=80)**	**%**	**Total (N=150)**	**%**
Perception on vegetarian diet							
No		3	4	18	23	21	**14**
Yes	No reason	40	57	39	49	79	53
	No fat	0	0	4	5	4	3
	Rich in micronutrients	6	9	9	11	15	10
	Easily digested	7	10	9	11	16	11
	Fiber rich	1	1	1	1	2	1
	Protects from diseases	13	19	0	0	13	8
Attitude towards junk foods							
Good		1	1	7	9	8	5
Not good		65	93	71	89	136	91
Not good not bad		4	6	2	2	6	4
Attitude about multivitamin							
Good		31	44	39	49	70	47
Not good		39	56	41	51	80	53

Both vegetarians and non-vegetarians agree that vegetarian diets bring advantages according to 57% and 49% respectively but do not elaborate on the reasons behind their opinions. Yet certain participants pointed out that eating vegetarian foods provides disease protection which was supported by 19% of non-vegetarians and 13% of vegetarians. Some respondents from smaller groups understood that vegetarian diets contain easy-to-digest foods combined with many micronutrients.

Both vegetarians and non-vegetarians share predominantly unfavorable opinions about junk food. Most participants from vegetarian groups (93%) along with their non-vegetarian counterparts (89%) reported observing junk food negatively due to its health risks.

It can be seen from the table that 42% of vegetarians along with 50% of non-vegetarians considered multivitamins beneficial yet more than half of vegetarians (56%) as well as non-vegetarians (51%) rejected their essentiality. A substantial portion of the population shows doubt about the need for vitamin supplementation which goes beyond what a balanced diet provides.

4.6 Lifestyle factors of vegetarians versus non vegetarians

Table 22: Physical activity level of vegetarians versus non vegetarians

Activity level	Vegetarian (N=70)	%	Non vegetarian (N=80)	%	Total (N=150)	%
Sedentary	51	73	55	69	106	71
Moderately active	16	23	25	31	41	27
Heavy	3	4	0	0	3	2

In the vegetarian group, the majority (73%) of the subjects were self reported to follow a sedentary activity pattern. Only 23% were moderately active, while a very small proportion (4%) engaged in heavy physical activity.

Out of non-vegetarians, 69% reported being sedentary. 31% of non-vegetarians described themselves as being moderately active but none were found in the heavy category.

From the overall sample, 71% were self-reported to follow sedentary activity, 27% were moderately active, and only 2% belonged to the heavy activity group. The above results suggest the inactive lifestyle for both vegetarians and non-vegetarians, which may be a major determinant for the very high prevalence rates of abdominal obesity as observed previously.

Table 23: Exercise frequency of vegetarians versus non-vegetarians

Frequency of physical activity		**Vegetarian (N=70)**	**%**	**Non vegetarian (N=80)**	**%**	**Total (N=150)**	**%**
Walking	Never	9	13	12	15	21	14
	Daily	61	87	63	79	124	83
	Weekly	0	0	5	6	5	3
	Monthly	0	0	0	0	0	0
Brisk walking	Never	63	90	75	94	138	92
	Daily	6	9	4	5	10	7
	Weekly	1	1	1	1	2	1
	Monthly	0	0	0	0	0	0
Jogging	Never	65	93	76	95	141	94
	Daily	4	6	1	1	5	3
	Weekly	1	1	2	3	3	2
	Monthly	0	0	1	1	1	1
Cycling	Never	66	94	74	93	140	93
	Daily	2	3	1	1	3	2
	Weekly	2	3	3	4	5	3
	Monthly	0	0	2	3	2	1
	Never	67	96	69	86	136	91
	Daily	2	3	0	0	2	1

Swimming	Weekly	1	1	1	1	2	1
	Monthly	0	0	0	0	0	0
Lifting weight	Never	64	91	69	86	133	89
	Daily	5	7	9	11	14	9
	Weekly	1	1	1	1	2	1
	Monthly	0	0	1	1	1	1
Workout	Never	59	84	68	85	127	85
	Daily	10	14	8	10	18	12
	Weekly	1	1	2	3	3	2
	Monthly	0	0	2	3	2	1
Yoga	Never	57	81	75	94	132	88
	Daily	11	16	5	6	16	11
	Weekly	2	3	0	0	2	1
	Monthly	0	0	0	0	0	0

Daily walking-related exercise is practiced by the majority of vegetarians (87%) along with the majority of non-vegetarians (79%). Most individuals from both vegetarian and non-vegetarian groups avoid brisk walking or jogging or swimming as exercise but vegetarians demonstrate marginally higher participation in daily brisk walking activities (9% compared to 5% in non-vegetarians).

The non-vegetarian population demonstrates higher participation in cycling along with weightlifting measurements yet both groups practice these activities at slightly different rates Among non-vegetarians, weightlifting remains more popular since 11% of them practice it every day whereas only 7% of vegetarians perform this exercise.

Daily practice of yoga is especially common among vegetarians since they make up 16% while non-vegetarians represent only 6%. The bulk of people across both vegetarian and non-vegetarian groups refrain from participating in regular physical exercise past walking according to studies despite vegetarian participants showing some differences. Overall it

indicates that non-vegetarians tend to engage more in strenuous activities whereas vegetarians do mild activities more often.

Table 24: Exercise duration of vegetarians versus non-vegetarians

Duration of physical activity		Vegetarian (N=70)	%	Non vegetarian (N=80)	%	Total (N=150)	%
Walking	15 mins	28	40	27	34	55	37
	30 mins	17	24	17	21	34	23
	45 mins	6	9	2	3	8	5
	1-2 hour	10	14	21	26	31	21
	>2 hours	2	3	1	1	3	2
Brisk walking	15 mins	1	1	3	4	4	3
	30 mins	6	9	0	0	6	4
	45 mins	0	0	0	0	0	0
	1-2 hour	0	0	1	1	1	1
	>2 hours	0	0	0	0	0	0
Jogging	15 mins	2	3	3	4	5	3
	30 mins	0	0	0	0	0	0
	45 mins	0	0	0	0	0	0
	1-2 hour	0	0	1	1	1	1
	>2 hours	0	0	0	0	0	0
Cycling	15 mins	0	0	3	4	3	2
	30 mins	1	1	1	1	2	1
	45 mins	0	0	1	1	1	1
	1-2 hour	2	3	1	1	3	2
	>2 hours	0	0	1	1	1	1
	15 mins	0	0	0	0	0	0

Swimming	30 mins	0	0	0	0	0	0
	45 mins	0	0	0	0	0	0
	1-2 hour	0	0	1	1	1	1
	>2 hours	0	0	1	1	1	1
Lifting weight	15 mins	1	1	3	4	4	3
	30 mins	1	1	2	3	3	2
	45 mins	0	0	0	0	0	0
	1-2 hour	0	0	5	6	5	3
	>2 hours	3	4	3	4	6	4
Workout	15 mins	7	10	6	8	13	9
	30 mins	2	3	2	3	4	3
	45 mins	0	0	2	3	2	1
	1-2 hour	0	0	2	3	2	1
	>2 hours	0	0	2	3	2	1
Yoga	15 mins	3	4	3	4	6	4
	30 mins	5	7	1	1	6	4
	45 mins	2	3	0	0	2	1
	1-2 hour	4	6	0	0	4	3
	>2 hours	0	0	1	1	1	1

The data shows that the majority in both vegetarian and non-vegetarian groups engage in walking for 15–30 minutes daily, with a slightly higher percentage of vegetarians walking for 15 minutes (40%) compared to non-vegetarians (34%). However, a greater number of non-vegetarians (26%) walk for 1–2 hours, compared to only 14% of vegetarians, indicating longer duration walking is more common among non-vegetarians.

Overall, the majority in both groups perform only short-duration exercise activities, particularly walking. Non-vegetarians are more involved in longer duration and

strength-based activities, whereas vegetarians show a slight preference for yoga and moderate-duration walking.

Table 25: Sleep duration of vegetarians versus non-vegetarians

Sleep duration	Vegetarian (N=70)	%	Non vegetarian (N=80)	%	Total (N=150)	%	Chi square test
Less than 5 hours	3	4	16	20	19	12	Statistic:1.36 | P-value: 0.505
5-7 hours	52	74	55	69	107	71	
More than 7 hours	15	21	9	11	24	16	

It can be seen from the above table that 74% of vegetarians along with 69% of non-vegetarians sleep between 5 to 7 hours daily. Non-vegetarians (20%) exceed vegetarians (4%) in numbers who sleep less than five hours.

Overall, it indicates that vegetarians tend to achieve longer sleep durations than non-vegetarians who report insufficient sleep patterns regularly.

Statistical analysis with chi square test revealed that there is no significant difference in sleep patterns and dietary group though sleep pattern was slightly higher for vegetarians.

Table 26: Alcohol and tobacco consumption of vegetarians versus non-vegetarians

Particulars	Vegetarian (N=70)	%	Non vegetarian (N=80)	%	Total (N=150)	%	Chi square test
Alcohol consumption							
Yes	1	1	40	50	41	27	Statistic: 53.50 | P-value< .05
No	69	99	40	50	109	73	

Tobacco consumption							
Yes	0	0	10	13	10	7	
No	70	100	70	87	140	93	

It was observed from the above table that vegetarians abstain from alcohol consumption in 99% of cases yet non-vegetarians demonstrate 50% alcohol use which shows a distinctive variation in daily routines.

Statistical analysis using the Chi-square test revealed a strong significant relationship between alcohol consumption and dietary group at the 5% level of significance.

It revealed that vegetarians never engage in tobacco usage but non-vegetarians showed a tobacco usage rate of 13%.

Overall, it indicates that vegetarians avoid alcohol and tobacco completely as part of their cleaner lifestyle whereas non-vegetarians engage more frequently with these substances.

Table 27: Stress level of vegetarians versus non vegetarians

Stress	**Vegetarian (N=70)**	**%**	**Non vegetarian (N=80)**	**%**	**Total (N=150)**	**%**	**Chi square test**
No	25	36	12	15	37	25	Statistic: 13.72 | P-value: 0.001
Mild	11	16	9	11	20	13	
Moderate	15	21	28	35	43	29	
Severe	19	27	31	39	50	33	

Most vegetarians and non-vegetarians face some degree of stress yet severe stress is more prevalent among non-vegetarians since their proportion at 39% exceeds the 27% of vegetarians. A significant number of vegetarians (36%) did not experience stress while the percentage of non-vegetarians without stress reached only 15%.

The results indicate vegetarians suffer from less stress than non-vegetarians who exhibit heightened rates of moderate to severe stress levels.

Statistical analysis using the Chi-square test revealed a strong and significant relationship between stress levels and dietary group at the 1% level of significance, with vegetarians reporting milder stress and non-vegetarians experiencing higher levels of moderate stress.

CHAPTER V
SUMMARY AND CONCLUSION

A healthy state includes physical as well as mental and social aspects. The prevalence of lifestyle diseases including obesity and diabetes alongside cardiovascular conditions together with stress-related problems has surged in recent times. Diet plays a big role in the development of many of these conditions. Research on nutrition focuses on the crucial comparison of vegetarian diets versus non-vegetarian diets because these two options create different long-term impacts on health.

This research included 150 participants in Ernakulam district consisting of 70 vegetarians and 80 non-vegetarians who were between 18 and 80 years old. The respondents were chosen through purposive sampling. A self-structured questionnaire and interview schedule was employed to collect vital data about socio-demographic factors, dietary habits, morbidity profile as well as lifestyle activities.

A subgroup of women aged 40–59 years from both dietary groups was chosen for more detailed analysis. This age group was selected because they are more likely to maintain consistent dietary practices, giving a clearer view of long-term dietary impact. For these participants, body composition measurements were taken using the OMRON HBF-222T body composition monitor, which provided data on body fat percentage, visceral fat, and muscle mass. The data was analysed using statistical methods such as the Chi-square test, Spearman's rank correlation, point-biserial correlation, and Welch's t-test.

The findings of the study are summarised as follows:

- Majority of the subjects in the study (54%) belonged to the age group 40-59
- Females comprised a higher percentage of the study subjects at 56% while males comprised 44%.
- Majority of the subjects were non vegetarians (53%)
- The majority of respondents had finished high school education (31%).
- Skilled and market workers represented the largest occupational group (25%)
- Majority of the subjects had a monthly income between ₹10,703–₹31,977.

- Majority of the subjects fell into the lower-middle (37%) and upper-middle (31%) socio-economic categories.
- The majority of vegetarians (94%) alongside non-vegetarians (84%) did not exhibit genetic susceptibility to obesity.
- A slightly larger number of vegetarians reported being overweight at 46% compared to non-vegetarians who comprised 35% in this category based on BMI.
- A higher number of individuals with obesity class I and II were found among the non-vegetarian population.
- Majority of the vegetarians (61%) were found to be at risk, based on waist to hip ratio while a slightly higher percentage (68%) of non-vegetarians fell into the same category.
- Majority of the non vegetarians had high body fat levels compared to vegetarians.
- High levels of visceral fat appeared more often in vegetarians while very high levels predominantly occurred in non-vegetarians.
- A significant number of participants belonging to both dietary groups (34–35%) revealed low skeletal muscle mass.
- Statistical analysis revealed no significant association between diet and body composition parameters measured.
- Non-vegetarians had a higher incidence of some ailments like dyslipidemia, thyroid, and liver disease. Vegetarians, however, had comparatively higher incidences of diabetes and difficulty in breathing.
- Statistical analysis revealed no significant association between diet and any disease.
- Non-vegetarians experienced infections more often compared to vegetarians since 16% of them reported frequent infections while 9% of vegetarians did.
- Three-meal consumption patterns existed within 54% of vegetarians along with 43% of non-vegetarians.
- Non-vegetarians skipped their meals more than vegetarians did and breakfast is the most skipped meal
- Vegetarian snacks contained higher levels of fruits at 63% and nuts at 51% but non-vegetarians preferred junk food at 26%.
- Members of both dietary groups abstained from most prescribed healthy eating patterns.
- 87% of participants used fortified foods.

- Majority of the vegetarians and non- vegetarians use coconut oil for their cooking needs.
- Vegetarians consumed more fruits, green leafy vegetables, nuts, pulses, and dairy products regularly.
- Non-vegetarians consumed more fast food, fried foods, and processed meat.
- Energy, protein, fat, fiber, and calcium intakes show significant differences between vegetarians and non-vegetarians. Carbohydrate, iron, and vitamin C intakes do not show significant differences between the two groups.
- Carbohydrate and fat intakes were found to be adequate in both vegetarians and non-vegetarians, exceeding the RDA. In contrast, energy, protein, fiber, calcium, iron, and vitamin C intakes were inadequate in both groups, falling below the recommended dietary allowances.
- A total of 57% of vegetarians together with 49% of non-vegetarians believes that vegetarian diets brought beneficial effects.
- The majority of vegetarians along with 89% of non-vegetarians revealed negative opinions toward junk food.
- About half in group supported multivitamin use, though many still felt they were unnecessary.
- A majority of people from both vegetarians (73%) and non-vegetarian groups (69%) spent their days being inactive.
- Walking served as the principal regular daily physical exercise.
- Non-vegetarians tend to engage more in strenuous activities like weight lifting whereas vegetarians do mild activities more often like yoga.
- A sleep duration between 5 and 7 hours was reported by 74% of vegetarians together with 69% of non-vegetarians. A larger proportion of non-vegetarians (20%) experiences limited sleep of less than five hours. Vegetarian people kept better sleeping hours than others in their group.
- 99 percent of vegetarians did not consume alcohol but alcohol usage was reported by 50 percent of non-vegetarians and statistical analysis showed significant association between alcohol use and diet.
- Among the total subjects, 13% of non-vegetarians admitted to using tobacco but vegetarians did not use tobacco at all.

- ❖ The frequency of severe stress among respondents was higher in the non-vegetarian group who made up 39% compared to 27% in the vegetarian group. statistical analysis showed significant association between stress levels and diet.

Conclusion

The present study compared vegetarian and non-vegetarian individuals in terms of sociodemographic background, body composition, morbidity profile, dietary pattern, and lifestyle behaviors.

The study highlights that while vegetarians and non-vegetarians differ in nutrient intake patterns, both groups failed to meet recommended nutrient requirements, indicating a need for overall dietary improvement. Although vegetarians showed slightly better body composition and healthier lifestyle habits such as improved sleep and lower stress and alcohol use, the differences were not statistically significant in terms of body composition or disease occurrence.

From the present study it was inferred that the consumption of vegetarian diet as against non-vegetarian diet did not have a significant impact on health. The overall quality, variety, and balance of the diet, combined with positive lifestyle choices like regular physical activity, good sleep, stress management, and avoiding harmful habits plays a key role.

Limitations of the study

- Sample size of the study was restricted to 150, it can be expanded to enhance the depth and accuracy of the analysis.
- Study was limited to a specific geographic region which may affect the generalizability of the findings to broader population.
- The study did not include biochemical assessments which would have more accurate insights.
- The assessment of body composition was done exclusively within a smaller part of subjects from the 40 to 59 years age group which affected our ability to compare body composition data between age brackets or genders.

Recommendations

- One recommendation is to conduct the study as a longitudinal study. This would allow for a better understanding of how dietary patterns affect individuals over time.
- Another recommendation is to apply the same study approach to other dietary patterns, such as the Mediterranean diet or the keto diet. This would help compare the effects of various diets on nutritional status, body composition, and overall health outcomes.

BIBLIOGRAPHY

1. Alexy, U., Fischer, M., Weder, S., Längler, A., Michalsen, A., Sputtek, A., & Keller, M. (2021). Nutrient Intake and Status of German Children and Adolescents Consuming Vegetarian, Vegan or Omnivore Diets: Results of the VeChi Youth Study. *Nutrients*, *13*(5), Article 5. https://doi.org/10.3390/nu13051707

2. Appleby, P. N., Allen, N. E., & Key, T. J. (2011). Diet, vegetarianism, and cataract risk. *American Journal of Clinical Nutrition*, *93*(5), 1128–1135. https://doi.org/10.3945/ajcn.110.000372

3. Aubertin-Leheudre, M., & Adlercreutz, H. (2009). Relationship between animal protein intake and muscle mass index in healthy women. *The British Journal of Nutrition*, *102*(12), 1803–1810. https://doi.org/10.1017/S0007114509991310

4. Bakaloudi, D. R., Halloran, A., Rippin, H. L., Oikonomidou, A. C., Dardavesis, T. I., Williams, J., Wickramasinghe, K., Breda, J., & Chourdakis, M. (2021). Intake and adequacy of the vegan diet. A systematic review of the evidence. *Clinical Nutrition*, *40*(5), 3503–3521. https://doi.org/10.1016/j.clnu.2020.11.035

5. Basheer Nabeesa, S., & and Karunakaran Prasanna, C. (2023). Consumerism and gendering in food culture: A study of urban Kerala. *Food, Culture & Society*, *26*(5), 1250–1267. https://doi.org/10.1080/15528014.2022.2154089

6. Cao, Y., Huynh, Q., Kapoor, N., Jeemon, P., Mello, G. T. de, Oldenburg, B., Thankappan, K. R., & Sathish, T. (2022). Associations between Dietary Patterns and Cardiometabolic Risk Factors—A Longitudinal Analysis among High-Risk Individuals for Diabetes in Kerala, India. *Nutrients*, *14*(3), Article 3. https://doi.org/10.3390/nu14030662

7. Dalili, D., Bazzocchi, A., Dalili, D. E., Guglielmi, G., & Isaac, A. (2020). The role of body composition assessment in obesity and eating disorders. *European Journal of Radiology*, *131*, 109227. https://doi.org/10.1016/j.ejrad.2020.109227

8. Dawczynski, C., Weidauer, T., Richert, C., Schlattmann, P., Dawczynski, K., & Kiehntopf, M. (2022). Nutrient Intake and Nutrition Status in Vegetarians and Vegans in Comparison to Omnivores—The Nutritional Evaluation (NuEva) Study. *Frontiers in Nutrition*, *9*. https://doi.org/10.3389/fnut.2022.819106

9. Desmond, M. A., Sobiecki, J. G., Jaworski, M., Płudowski, P., Antoniewicz, J., Shirley, M. K., Eaton, S., Książyk, J., Cortina-Borja, M., De Stavola, B., Fewtrell, M., & Wells, J. C. (2021). Growth, body composition, and cardiovascular and nutritional risk of 5- to 10-y-old children consuming vegetarian, vegan, or omnivore diets. *The American Journal of Clinical Nutrition*, *113*(6), 1565–1577. https://doi.org/10.1093/ajcn/nqaa445

10. Dinu, M., Abbate, R., Gensini, G. F., Casini, A., & Sofi, F. (2017). Vegetarian, vegan diets and multiple health outcomes: A systematic review with meta-analysis of observational studies. *Critical Reviews in Food Science and Nutrition*, *57*(17), 3640–3659. https://doi.org/10.1080/10408398.2016.1138447

11. Eshete, T. S., Mekonen, W., & Derseh, H. (2019). Comparative Assessment of Vegetarian and Non-Vegetarian Diets with Physical Fitness on Body Composition and Lipid Profiles among Students at School of Medicine, College of Health Sciences, Addis Ababa University. *Asian Journal of Medicine and Health*, *13*(4), 1–15. https://doi.org/10.9734/AJMAH/2018/45246

12. Fernández-Alvira, J. M., Bammann, K., Eiben, G., Hebestreit, A., Kourides, Y. A., Kovacs, E., Michels, N., Pala, V., Reisch, L., Russo, P., Veidebaum, T., Moreno, L. A., & Börnhorst, C. (2017). Prospective associations between dietary patterns and body composition changes in European children: The IDEFICS study. *Public Health Nutrition*, *20*(18), 3257–3265. https://doi.org/10.1017/S1368980017002361

13. Ferreira-Pêgo, C., Giacomelli Tavares, R., Lopes, S., Fontes, T., & Monteiro Rodrigues, L. (2021). Body composition assessment of vegetarian-vegan and omnivore young women – an exploratory study: Body composition assessment of vegetarian-vegan and omnivore young women – an exploratory study. *Journal Biomedical and Biopharmaceutical Research*, *18*(1), 15. https://doi.org/10.19277/bbr.18.1.258

14. Fontes, T., Rodrigues, L. M., & Ferreira-Pêgo, C. (2022). Comparison between Different Groups of Vegetarianism and Its Associations with Body Composition: A Literature Review from 2015 to 2021. *Nutrients*, *14*(9), Article 9. https://doi.org/10.3390/nu14091853

15. Ganpule, A., Dubey, M., Pandey, H., Green, R., Brown, K. A., Srinivasapura Venkateshmurthy, N., Jarhyan, P., Maddury, A. P., Khatkar, R., Prabhakaran, D., & Mohan, S. (2023). Dietary patterns in North and South India: A comparison with EAT-Lancet dietary recommendations. *Journal of Human Nutrition and Dietetics: The Official Journal of the British Dietetic Association*, *36*(6), 2170–2179. https://doi.org/10.1111/jhn.13222

16. Godos, J., Grosso, G., Castellano, S., Galvano, F., Caraci, F., & Ferri, R. (2021). Association between diet and sleep quality: A systematic review. *Sleep Medicine Reviews*, *57*, 101430. https://doi.org/10.1016/j.smrv.2021.101430

17. Gomez-Delgado, F., Katsiki ,Niki, Lopez-Miranda ,Jose, & and Perez-Martinez, P. (2021). Dietary habits, lipoprotein metabolism and cardiovascular disease: From individual foods to dietary patterns. *Critical Reviews in Food Science and Nutrition*, *61*(10), 1651–1669. https://doi.org/10.1080/10408398.2020.1764487

18. Green, R., Milner, J., Joy, E. J. M., Agrawal, S., & Dangour, A. D. (2016). Dietary patterns in India: A systematic review. *The British Journal of Nutrition*, *116*(1), 142. https://doi.org/10.1017/S0007114516001598

19. Haider, L. M., Schwingshackl, L., Hoffmann, G., & Ekmekcioglu, C. (2018). The effect of vegetarian diets on iron status in adults: A systematic review and meta-analysis. *Critical Reviews in Food Science and Nutrition*, *58*(8), 1359–1374. https://doi.org/10.1080/10408398.2016.1259210

20. Hargreaves, S. M., Rosenfeld, D. L., Moreira, A. V. B., & Zandonadi, R. P. (2023). Plant-based and vegetarian diets: An overview and definition of these dietary patterns.

European Journal of Nutrition, *62*(3), 1109–1121. https://doi.org/10.1007/s00394-023-03086-z

21. Heilberg, I. P., & Goldfarb, D. S. (2013). Optimum Nutrition for Kidney Stone Disease. *Advances in Chronic Kidney Disease*, *20*(2), 165–174. https://doi.org/10.1053/j.ackd.2012.12.001

22. Hoeflich, J., Hollenbach, B., Behrends, T., Hoeg, A., Stosnach, H., & Schomburg, L. (2010). The choice of biomarkers determines the selenium status in young German vegans and vegetarians. *British Journal of Nutrition*, *104*(11), 1601–1604. https://doi.org/10.1017/S0007114510002618

23. Holler, S., Cramer, H., Liebscher, D., Jeitler, M., Schumann, D., Murthy, V., Michalsen, A., & Kessler, C. S. (2021). Differences Between Omnivores and Vegetarians in Personality Profiles, Values, and Empathy: A Systematic Review. *Frontiers in Psychology*, *12*. https://doi.org/10.3389/fpsyg.2021.579700

24. Holmes, C. J., & Racette, S. B. (2021). The Utility of Body Composition Assessment in Nutrition and Clinical Practice: An Overview of Current Methodology. *Nutrients*, *13*(8), Article 8. https://doi.org/10.3390/nu13082493

25. Iguacel, I., Miguel-Berges, M. L., Gómez-Bruton, A., Moreno, L. A., & Julián, C. (2018). Veganism, vegetarianism, bone mineral density, and fracture risk: A systematic review and meta-analysis. *Nutrition Reviews*, *77*(1), 1–18. https://doi.org/10.1093/nutrit/nuy045

26. Jakše, B., Jakše, B., Godnov, U., & Pinter, S. (2021). Nutritional, Cardiovascular Health and Lifestyle Status of 'Health Conscious' Adult Vegans and Non-Vegans from Slovenia: A Cross-Sectional Self-Reported Survey. *International Journal of Environmental Research and Public Health*, *18*(11), Article 11. https://doi.org/10.3390/ijerph18115968

27. Jedut, P., Glibowski, P., & Skrzypek, M. (2023). Comparison of the Health Status of Vegetarians and Omnivores Based on Biochemical Blood Tests, Body Composition Analysis and Quality of Nutrition. *Nutrients*, *15*(13), Article 13. https://doi.org/10.3390/nu15133038

28. Joy, E. J., Green, R., Agrawal, S., Aleksandrowicz, L., Bowen, L., Kinra, S., Macdiarmid, J. I., Haines, A., & Dangour, A. D. (2017). Dietary patterns and non-communicable disease risk in Indian adults: Secondary analysis of Indian Migration Study data. *Public Health Nutrition*, *20*(11), 1963–1972. https://doi.org/10.1017/S1368980017000416

29. Karunakaran, N., Retheesh, P. K., & Santhosh, R. (2021). Diversity in food consumption: Evidences from urban Kerala. *Journal of Management Research and Analysis*, *8*(3), 122–126. https://doi.org/10.18231/j.jmra.2021.025

30. Kayode, O. O., Oyebade, A., Oshineye, A. O., Olarinmoye, A. T., & Akinpelu, A. A. (2024). Anthropometric Characteristics of Vegetarian and Non- Vegetarian Adults in a Selected Local Government Area In Osun State, Nigeria. *Pan-African Journal of Health and Environmental Science*, *3*(1), Article 1. https://doi.org/10.56893/ajhes2024v03i01.03

31. Kwiatkowska, I., Olszak, J., Formanowicz, P., & Formanowicz, D. (2022). Nutritional Status and Habits among People on Vegan, Lacto/Ovo-Vegetarian, Pescatarian and Traditional Diets. *Nutrients*, *14*(21), Article 21. https://doi.org/10.3390/nu14214591

32. Lee, Y., & Park, K. (2017). Adherence to a Vegetarian Diet and Diabetes Risk: A Systematic Review and Meta-Analysis of Observational Studies. *Nutrients*, *9*(6), Article 6. https://doi.org/10.3390/nu9060603

33. Lemale, J., Mas, E., Jung, C., Bellaiche, M., & Tounian, P. (2019). Vegan diet in children and adolescents: Recommendations from the French-speaking Pediatric Hepatology, Gastroenterology and Nutrition Group (GFHGNP). *Archives de Pédiatrie*, *26*(8), 442–450. https://doi.org/10.1016/j.arcped.2019.09.001

34. Mapp, C. (n.d.). *Examining body composition differences between vegetarian and non-vegetarian women*.

35. Marsh, K., Zeuschner, C., & Saunders, A. (2012). Health implications of a vegetarian diet. *American Journal of Lifestyle Medicine*, *6*(3), 250–267. https://doi.org/10.1177/1559827611425762

36. McEvoy, C. T., Temple, N., & Woodside, J. V. (2012). Vegetarian diets, low-meat diets and health: A review. *Public Health Nutrition*, *15*(12), 2287–2294. https://doi.org/10.1017/S1368980012000936

37. Melina, V., Craig, W., & Levin, S. (2016). Position of the Academy of Nutrition and Dietetics: Vegetarian diets. *Journal of the Academy of Nutrition and Dietetics*, *116*(12), 1970–1980. https://doi.org/10.1016/j.jand.2016.09.025

38. Menzel, J., Abraham, K., Stangl, G. I., Ueland, P. M., Obeid, R., Schulze, M. B., Herter-Aeberli, I., Schwerdtle, T., & Weikert, C. (2021). Vegan diet and bone health—Results from the cross-sectional RBVD study. *Nutrients*, *13*(2), 685. https://doi.org/10.3390/nu13020685

39. Naik, S., Mahalle, N., & Bhide, V. (2018). Identification of vitamin B12 deficiency in vegetarian Indians. *British Journal of Nutrition*, *119*(6), 629–635. https://doi.org/10.1017/S0007114518000090

40. Neufingerl, N., & Eilander, A. (2022a). Nutrient Intake and Status in Adults Consuming Plant-Based Diets Compared to Meat-Eaters: A Systematic Review. *Nutrients*, *14*(1), Article 1. https://doi.org/10.3390/nu14010029

41. Neumark-Sztainer, D., Wall, M. M., Chen, C., Larson, N. I., Christoph, M. J., & Sherwood, N. E. (2018). Eating, Activity, and Weight-related Problems From Adolescence to Adulthood. *American Journal of Preventive Medicine*, *55*(2), 133–141. https://doi.org/10.1016/j.amepre.2018.04.032

42. Pattar, S., Shetty, P., & Shetty, G. B. (2023). Impact of vegetarian versus non-vegetarian diet on health outcomes in male individuals: A comparative study. *Advances in Integrative Medicine*, *10*(1), 1–7. https://doi.org/10.1016/j.aimed.2023.02.001

43. Ramesh Chandran, N. S. (2016). *Food habits and the changing social scenario in urban Kerala*. *Rajagiri Journal of Social Development*, *8*(1), Article 1.

44. Rathi, N., Riddell, L., & Worsley, A. (2017). Food consumption patterns of adolescents aged 14–16 years in Kolkata, India. *Nutrition Journal*, *16*(1), 50. https://doi.org/10.1186/s12937-017-0272-3

45. Rizzo, G., Laganà, A. S., Rapisarda, A. M. C., La Ferrera, G. M., Buscema, M., Rossetti, P., Nigro, A., Muscia, V., et al. (2016). Vitamin B12 among vegetarians: Status, assessment and supplementation. *Nutrients*, *8*(12), 767. https://doi.org/10.3390/nu8120767

46. Saintila, J., Lozano López, T. E., Ruiz Mamani, P. G., White, M., & Huancahuire-Vega, S. (2020). Health-Related Quality of Life, Blood Pressure, and Biochemical and Anthropometric Profile in Vegetarians and Nonvegetarians. *Journal of Nutrition and Metabolism*, *2020*(1), 3629742. https://doi.org/10.1155/2020/3629742

47. Satija, A., Hu, F. B., Bowen, L., Bharathi, A. V., Vaz, M., Prabhakaran, D., Reddy, K. S., Ben-Shlomo, Y., Davey Smith, G., Kinra, S., & Ebrahim, S. (2015). Dietary patterns in India and their association with obesity and central obesity. *Public Health Nutrition*, *18*(16), 3031–3041. https://doi.org/10.1017/S1368980015000312

48. Savva, S. C., & Kafatos, A. (2014). Is red meat required for the prevention of iron deficiency among children and adolescents? *Current Pediatric Reviews*, *10*(3), 177–183. https://doi.org/10.2174/157339631130900008

49. Sela, I., Yaskolka Meir, A., Brandis, A., Krajmalnik-Brown, R., Zeibich, L., Chang, D., et al. (2020). *Wolffia globosa-Mankai* plant-based protein contains bioactive vitamin B12 and is well absorbed in humans. *Nutrients*, *12*(10), 3067. https://doi.org/10.3390/nu12103067

50. Sharma, M., Kishore, A., Roy, D., & Joshi, K. (2020). A comparison of the Indian diet with the EAT-Lancet reference diet. *BMC Public Health*, *20*(1), 812. https://doi.org/10.1186/s12889-020-08951-8

51. Shreenath, A. P., Hashmi, M. F., & Dooley, J. (2023). Selenium Deficiency. In *StatPearls [Internet]*. StatPearls Publishing. https://www.ncbi.nlm.nih.gov/sites/books/NBK482260/

52. Vij, V., Deshmukh, K., Vijayageetha, M., Goyal, C., Gumashta, J., & Gandhi, A. P. (2025). Effect of Predominantly Plant-Based Diets on Visceral Fat: A Systematic Review and Meta-Analysis. *Journal of Human Nutrition and Dietetics*, *38*(2), e70055. https://doi.org/10.1111/jhn.70055

53. Vitale, M., Giosuè, A., Vaccaro, O., & Riccardi, G. (2021). Recent Trends in Dietary Habits of the Italian Population: Potential Impact on Health and the Environment. *Nutrients*, *13*(2), Article 2. https://doi.org/10.3390/nu13020476

54. Wang, F., Zheng, J., Yang, B., Jiang, J., Fu, Y., & Li, D. (2015). Effects of vegetarian diets on blood lipids: A systematic review and meta-analysis of randomized controlled trials. *Journal of the American Heart Association*, *4*(10), e002408. https://doi.org/10.1161/JAHA.115.002408

55. Wang, T., Masedunskas, A., Willett, W. C., & Fontana, L. (2023). Vegetarian and vegan diets: Benefits and drawbacks. *European Heart Journal*, *44*(36), 3423–3439. https://doi.org/10.1093/eurheartj/ehad436

APPENDIX-I

Questionnaire to assess the nutritional status of vegetarians

I. Socioeconomic status

1 A. Name:

B. Age:

C. Gender: Male/ Female

D. Marital status: Single/married

E. Phone number:

F. Educational qualification (Head):

a) Profession or honours
b) Graduate
c) Intermediate or diploma
d) High school certificate
e) Middle school certificate
f) Primary school certificate
g) Illiterate

G. Occupation (Head):

a) Legislators, senior officials and managers
b) Professionals
c) Technicians and associate professionals
d) Clerks
e) Skilled workers and shop and market sales workers
f) Skilled agricultural and fishery workers
g) Craft and related trade workers
h) Plant and machine operators and assemblers
i) Elementary occupation
j) Unemployed

H. Family monthly income:

a) ≤10,702
b) 10,703-31,977
c) 31,978-53,360
d) 53,361-80,109
e) 80,110-1,06,849
f) 1,06,850-2,13,813
g) 2,13,814 and above

II. Anthropometric Assessment

2 A. Height:

B. Weight:

C. BMI:

D. Waist circumference:

E. Hip circumference:

F. W/H ratio:

III. Body Composition

3. Do you have genetic predisposition to overweight or obesity?
a) Yes b) No

4. How would you describe your current body fat distribution?
a) More on the upper body c) Abdominal obesity
b) More on the lower body d) Overall balanced

5. Body composition measurements

A. Body fat% %: C. Skeletal Muscle%:

B. Visceral fat level:

IV. Physical Activity

6. How would you describe your overall activity level?
a) Heavy b) Moderately active c) Sedentary

7. Do you engage in any of the following activities? If yes mention the frequency & duration

Type of activity	Frequency	Duration
Walking		
Brisk walking		
Jogging		
Cycling		
Swimming		
Weight training		
Workout		
Yoga		
Any other, specify		

V. Health profile

8. Do you have any of these following diseases/disorders? If yes, mention the results of latest biochemical test and since when?

Disease/disorder	Yes/No
Diabetes	
Hypertension	

Dyslipidemia	
Liver diseases	
Kidney disease	
Osteoporosis/Arthritis	
Anemia	
Hormonal imbalances	
Breathing difficulty	
Gastrointestinal disorders (peptic ulcer, IBS, GERD)	
Any other-specify	

9. Do you experience frequent infections or a weakened immune response?

a) Yes
b) No

VI. Dietary pattern

10. How many meals do you eat daily?

a) 2
b) 3
c) 4
d) More than 4

11. Do you skip meals; if yes which meal?

a) Yes
b) No

12. Do you snack between meals? If yes, what do you usually snack on? How often?

a) Fruits
b) Nuts
c) Fried items
d) Junk food

13. Do you follow any specific dietary restrictions (e.g., gluten-free, high protein)? If yes, specify:

14. What are the healthy dietary practices followed in your diet?

15. Do you include fortified foods in your diet (e.g., B12-fortified)?

a) Yes
b) No

16. What type of oil do you use?

a) Coconut oil
b) Palm oil
c) Sunflower oil
d) Rice bran oil
e) Olive oil
f) Others, specify

17. Food frequency table

Food item	Daily	Several times a week	Weekly	Several times a month	Monthly	Rarely	Never
Cereals (rice, wheat, oats etc)							
Whole pulses (Bengal gram, chickpeas, green gram)							
Dals							
Sprouts							
Green leafy vegetables							
Roots and tubers							
Other vegetables							
Fruits							
Milk							
Paneer							
Cheese							
Curd							
Ghee							
Coconut							
Nuts and dry fruits							
Sugar and sweet foods							
Fried foods							
Fast foods							

VII. Dietary perception among the subjects

18. Do you think vegetarian diets are healthier and why?

19. What do you think about using supplements (like multivitamins) as part of your daily diet?
20. What is your attitude towards fast food or junk food consumption?

VIII Lifestyle and Other Factors

21. What is your average daily sleep duration?
a) Less than 5 hours
b) 5–7 hours
c) More than 7 hours

22. Do you feel stressed?
a) Yes
b) No

If yes,
a) Mild
b) Moderate
c) Severe

23. Do you consume alcohol?
a) Yes
b) No

B. If yes, how often?
a) Daily
b) Regularly (1–3 times a week)
c) Frequently (4+ times a week)
d) Occasionally

24. Do you smoke or use tobacco products?
a) Yes
b) No

24 HOUR RECALL

Time	**Food item**	**Ingredients**	**Quantity (no / cup / ml)**
Early morning			
Breakfast			
Midmorning			
Lunch			
Evening snack			
Dinner			
Miscellaneous			

APPENDIX-II

Questionnaire to assess the nutritional status of non-vegetarians

I. Socioeconomic status

1 A. Name:

B. Age:

C. Gender: Male/ Female

D. Marital status: Single/married

E. Phone number:

F. Educational qualification (Head):

h) Profession or honours
i) Graduate
j) Intermediate or diploma
k) High school certificate
l) Middle school certificate
m) Primary school certificate
n) Illiterate

G. Occupation (Head):

k) Legislators, senior officials and managers
l) Professionals
m) Technicians and associate professionals
n) Clerks
o) Skilled workers and shop and market sales workers
p) Skilled agricultural and fishery workers
q) Craft and related trade workers
r) Plant and machine operators and assemblers
s) Elementary occupation
t) Unemployed

H. Family monthly income:

h) ≤10,702
i) 10,703-31,977
j) 31,978-53,360
k) 53,361-80,109
l) 80,110-1,06,849
m) 1,06,850-2,13,813
n) 2,13,814 and above

II. Anthropometric Assessment

2 A. Height:

B. Weight:

C. BMI:

D. Waist circumference:

E. Hip circumference:

F. W/H ratio:

III. Body Composition

3. Do you have genetic predisposition to overweight or obesity?

c) Yes
d) No

4. How would you describe your current body fat distribution?

e) More on upper body
f) More on lower body
g) Abdominal obesity
h) Overall balanced

5. Body composition measurements

A. Body fat %: C. Skeletal Muscle %:

B. Visceral fat level:

IV. Physical Activity

6. How would you describe your overall activity level?

d) Heavy e) Moderately active f) Sedentary

7. Do you engage in any of the following activities? If yes mention the frequency & duration

Type of activity	Frequency	Duration
Walking		
Brisk walking		
Jogging		
Cycling		
Swimming		
Weight training		
Workout		
Yoga		
Any other, specify		

V. Health profile

8. Do you have any of these following diseases/disorders? If yes, mention the results of latest biochemical test and since when?

Disease/disorder	Yes/No
Diabetes	
Hypertension	
Dyslipidemia	
Liver diseases	
Kidney disease	
Osteoporosis/Arthritis	
Anemia	
Hormonal imbalances	

Breathing difficulty	
Gastrointestinal disorders (peptic ulcer, IBS, GERD)	
Any other-specify	

9. Do you experience frequent infections or a weakened immune response?

c) Yes
d) No

VI. Dietary pattern

10. How many meals do you eat daily?

e) 2
f) 3
g) 4
h) More than 4

11. Do you skip meals, if yes which meal?

c) Yes
d) No

12. Do you snack between meals? If yes, what do you usually snack on?

a) Fruits
b) Nuts
c) Fried items
d) Junk foods

13. Do you follow any specific dietary restrictions (e.g., gluten-free, low-carb)? If yes, specify:

14. What are the healthy dietary practices followed to meet the nutritional needs?

15. Do you include fortified foods in your diet (e.g., B12-fortified)?

a) Yes
b) No

16. What type of oil do you use? Mention the brand and quantity used per month.

g) Coconut oil
h) Groundnut (peanut) oil
i) Sesame oil
j) Sunflower oil
k) Olive oil
l) Others, specify

17. Food frequency table

Food item	Daily	Several times a week	Weekly	Several times a month	Monthly	Rarely	Never
Cereals (rice, wheat, oats etc)							

Whole pulses (Bengal gram, chickpeas, greengram)							
Dals							
Sprouts							
Green leafy vegetables							
Roots and tubers							
Other vegetables							
Fruits							
Milk							
Paneer							
Cheese							
Curd							
Egg							
Poultry							
Processed meats							
Beef							
Pork							
Mutton							
Organ meat							
Lean fishes							
Fatty fishes							
Shellfish and crustaceans							
Ghee							
Coconut							
Nuts and dry fruits							
Sugar and sweet foods							
Fried foods							
Fast foods							

VII. Dietary perception among the subjects

18. Do you think vegetarian diets are healthier and why?

19. What do you think about using supplements (like multivitamins) as part of your daily diet?
20. What is your attitude towards fast food or junk food consumption?

VIII Lifestyle and Other Factors

21. What is your average daily sleep duration?
d) Less than 5 hours
e) 5–7 hours
f) More than 7 hours

22. Do you feel stressed? If yes,
d) Mild
e) Moderate
f) Severe

23. Do you consume alcohol?
c) Yes
d) No
B. If yes, how often?
a) Daily
b) Regularly (1–3 times a week)
c) Frequently (4+ times a week)
d) Occasionally

24. 24. Do you smoke or use tobacco products?
a) Yes
b) No

24 HOUR RECALL

TIME	**FOOD ITEM**	**INGREDIENTS**	**QUANTITY (no / cup / ml)**
Early morning			
Breakfast			
Midmorning			
Lunch			
Evening snack			
Dinner			
Miscellaneous			