CONSUMPTION PATTERN OF LEAFY VEGETABLES IN KOCHI

ST. TERESA'S COLLEGE
(AUTONOMOUS)

PROJECT SUBMITTED

In Partial Fulfilment of the Requirement for the Award of the Degree of

B.Sc NUTRITION AND DIETETICS

BY

APARNA MUKESH : SB22ND011

FATHIMA NITHUNA: SB22ND015

IARISA RYMMAI : SB22ND023

NANDANA SIJI : SB22ND033

UDITHA D NAIK : SB22ND048

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS
ST. TERESA 'S COLLEGE (AUTONOMOUS)
ERNAKULAM

APRIL 2025

CERTIFIED AS BONAFIDE RESEARCH WORK

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CERTIFIED AS BONAFIDE RESEARCH WORK

Signature of Internal Examiner

ST. TERESA'S COLLEGE (AUTONOMOUS) DEPT. OF CLINICAL NUTRITION AND DIETETICS ERNAKULAM

Signature of External Examiner

2/5/25

DECLARATION

I hereby declare that the project entitled **"CONSUMPTION PATTERN OF LEAFY VEGETABLES IN KOCHI"** submitted in partial fulfilment of the requirement for the award of the degree of B.Sc Nutrition and Dietetics is a record of original research work done by us under the supervision and guidance of **DR ABHINA B**, Assistant Professor, Department of Clinical Nutrition and Dietetics, Women's Study Centre, St. Teresa's College (Autonomous), Ernakulam and has not been submitted in part or full of any other degree/diploma/fellowship or the similar titles to any candidate of any other university.

Place: ERNAKULAM

Date : 2/5/2025

Aparna Mukesh

Fathima Nithuna

Iarisa Rymmai

Nandana Siji

Uditha D Naik

CERTIFICATE

I hereby certify that the project entitled **"CONSUMPTION PATTERN OF LEAFY VEGETABLES IN KOCHI"** submitted in partial fulfilment of the requirement for the award of the degree of B.Sc Nutrition and Dietetics is a record of original work done by **Ms Aparna Mukesh,Ms Fathima Nithuna, Ms Iarisa Rymmai, Ms Nandana Siji, and Ms Uditha D Naik,** during the period of the study under my guidance and supervision.

Signature of the HOD

Signature of the Research Guide with designation

Dr. Abhina B

Assistant Professor

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LIST OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER-I
INTRODUCTION

Green leafy vegetables form an essential part of a healthy and balanced diet, yielding an abundance of vital vitamins, vital minerals, dietary fiber, and powerful antioxidants that play an important role in adding to health and well-being. The regular consumption of such nutrient dense food has been associated with a significant decrease in the risk of long-term illness such as diabetes and heart disease while also enhancing better digestive function and greater energy levels throughout the day [Julia Coriss,2021]. However, even though green leafy vegetables certainly have much to give, the trends of consumption and the extent of awareness of their significance can quite considerably differ from one place to another. This variability is mostly determined by an assortment of factors, including cultural practices, socioeconomic status, and environmental factors influencing preference and availability. [Jianing Du,Yun-tao Zhao,2023]

In India, GLVs are an integral part of the country's culinary and cultural traditions. They are referred to locally as saag or shaak in most parts of the country and appears to be derived from the Sanskrit nomenclature for all edible greens and are frequently used in various regional cuisines. They are also celebrated during festivals. Although they are rich in nutrients and have cultural importance, their consumption is usually restricted because of factors such as shifting food habits, urbanization, and the use of exotic vegetables instead of indigenous ones. This trend emphasizes the necessity to raise awareness regarding the health advantages of GLVs and how they can combat nutritional deficiencies. [Pragya , JK Ranjan, BK Singh,2020]

Kochi, an energetic city in Kerala with rich food habits, presents a good opportunity to understand the consumption habits of GLVs. The people in Kochi represent a combination of traditional and contemporary dietary habits. In the cosmopolitan city of Kochi, the urban population follows a diverse set of consumption patterns that are significantly influenced by a number of lifestyle determinants along with the availability of various food items. While green leafy vegetables are readily available from local markets, organic stores, and even online ordering services like Swiggy Instamart, research studies suggest that there are significant gaps in the proper consumption of vegetables among the adult population. A systematic crosssectional study in Kochi highlights that the improper consumption of fruits and vegetables is one of the most significant dietary risk factors for the occurrence of non-communicable diseases among its citizens. Awareness of the underlying reasons and motives for people's food

choices can go a long way in bridging these identified gaps and ultimately promote the development of healthier eating habits among the population. [Shilpa Sara Abraham & K Sree Lakshmi Mohandas,2024].

Green leafy vegetables in Kochi are supplemented by efforts like organic shops in Kakkanad, where vegetables free of pesticides are directly sold by farmers to consumers. Such shops have become popular among residents who are looking for healthier food at a higher price. [Rajeesh Niranjan,2023] Efforts like the "Daily Green Challenge" in Mangaluru also focus on cultivating edible greens at home to make consumption sustainable. [Deepthi Sanjiv,2021].

Worldwide, and within a few communities at the local level, several studies have been undertaken that have identified that traditional knowledge related to wild leafy vegetables is slowly disappearing. This is due to changes in social values and a significant reduction in active involvement by people in the practice of harvesting and preparing these healthy vegetables.

However, even in the face of this loss of traditional knowledge, there remains a high level of awareness regarding the nutritional value provided by these wild leafy vegetables. [Shalini Misra& CP Kala ,2008] Indeed, a study carried out in Kerala, and studies carried out within other parts of the world, identifies that income levels, levels of education, occupation choices, and seasonal cycles play a central role in impacting the consumption levels of these vegetables. [Shilpa Sara Abraham & K Sree Lakshmi Mohandas,2024].

The main aim of this thesis is to study and analyze in depth the different levels of awareness, unique consumption habits, and the overall market presence of green leafy vegetables in Kochi city. Through qualitative analysis of various socio-demographic groups, along with consumer requirements, and complex market dynamics, this study hopes to provide crucial insights towards enriching food habits. It also hopes to further enhance sustainable vegetable consumption in urban regions and thus contribute positively towards the health of the individual and environmental sustainability.

This study aims to understand the consumption habits of green leafy vegetables in Kochi based on availability, preferences, nutritional awareness, and hindrances to consumption. Through understanding these dynamics, the study aims to support plans that can maximize the dietary intake of GLVs in urban areas, ultimately bettering public health. The study examines the consumption pattern of Leafy Vegetables in Kochi. This study aims to assess the food consumption pattern and preferences and influencing factors of leafy vegetable consumption

in Kochi. The research will also examine the impact of socioeconomic status, awareness, and accessibility on dietary choices. Data will be collected through surveys and analyzed to determine key patterns and correlations among the youth in Kochi.

By shedding light on local dietary habits, this study seeks to contribute valuable insights to the field of public health and nutrition, ultimately encouraging healthier eating behaviors among Kochi's residents.

The primary objective of this thesis is to conduct an in-depth analysis of the levels of awareness, unique consumption habits, and the overall market presence of green leafy vegetables in Kochi. This study seeks to understand the consumption habits of GLVs based on their availability, consumer preferences, nutritional awareness, and the barriers to regular intake. By examining the impact of socio-economic status, awareness, and accessibility on dietary choices, the research aims to identify key factors influencing GLV consumption among different socio-demographic groups in Kochi.

Through the collection and analysis of survey data, this study will explore the consumption patterns and preferences for leafy vegetables among Kochi's residents, with a particular focus on the youth. The findings are expected to provide valuable insights into the determinants of GLV consumption and inform strategies to promote healthier and more sustainable dietary behaviors in urban settings. Ultimately, this research aspires to contribute to the fields of public health and nutrition by encouraging increased intake of green leafy vegetables and supporting the development of interventions that enhance both individual health and environmental sustainability

CHAPTER-II

REVIEW OF LITERATURE

The review of the study entitled "**Consumption Pattern of Leafy Vegetables in Kochi"** is discussed under the following headings:

2.1 Demographics and Socioeconomic Influence on Consumption

2.2 Consumption Patterns

2.3 2.3Awareness and Health Benefits

2.4 Preference of Consumption

2.1 Demographics and Socioeconomic Influence on Consumption

Lakshmi et al, (2003) conducted a study on the dietary habits of fisherwomen in Kerala and found that their average daily intake of green leafy vegetables was only 12 grams per day. This is considerably lower than the recommended dietary intake, indicating a serious gap in micronutrient consumption. The low intake of green leafy vegetables can be attributed to several socio-economic and cultural factors, including limited access to fresh vegetables, dietary preferences, and the prioritization of other food groups, such as fish and staple grains, in daily meals.

Sreenivasa et al, (2019) conducted a study on micro greens: a new initiative and harmonizing approach for promoting livelihood and nutritional security-India. Micronutrient malnutrition (MNM) is one of the major public health and socioeconomic problem at global level. It is severely affecting to third world countries particularly weaker sections in the population, together with pregnant and lactating mothers, children and adolescent girls. Globally greater parts of the community are consuming persistently fewer nutritional foods when compare to recommended levels. The nutritional gap is too high in emergent nations. The most important dietary harms in underdeveloped countries include protein-energy malnutrition (PEM), iodine deficiency (ID), vitamin A deficiency (VAD) and

iron deficiency anemia (IDA). Though the green leafy vegetables (GLV) are in concert an important role to prevent the diet related nutritional disorders, the extensive literature explored that there is a huge gap of knowledge in the proper consumption of glv and its benefits to human. From past decade, microgreens (MGs) have gained attractiveness because of changes in way of living and healthiness of consumers.

The nutritional values of microgreens are four times superior to the matured greens. Owing to their favourable concentration of antioxidants and micronutrients includes vitamins, minerals and low nitrate content, microgreens have great potential to be a positive and simple way to reduce the mineral malnutrition problems to meet the requirements for elementary dietary intake.

Mungofa et al, (2019) conducted a study on prospective role of indigenous leafy vegetables as functional food ingredients. Indigenous leafy vegetables (ILVs) play a pivotal role in sustaining the lives of many people of low socio-economic status who reside in rural areas of most developing countries. Such ILVs contribute to food security since they withstand harsher weather and soil conditions than their commercial counterparts and supply important nutrients such as dietary fibre, vitamins and minerals. Furthermore, ILVs contain bioactive components such as phenolic compounds, flavonoids, dietary fibre, carotene content and vitamin C that confer health benefits on consumers. Several studies have demonstrated that regular and adequate consumption of vegetables reduces risks of chronic conditions such as diabetes, cancer, metabolic disorders such as obesity in children and adults, as well as cardiovascular disease. However, consumption of ILVs is very low globally as they are associated with unbalanced and poor diets, with being food for the poor and with possibly containing toxic heavy metals. Therefore, this paper reviews the role of ILVs as food security crops, the biodiversity of ILVs, the effects of processing on the bioactivity of ILVs, consumer acceptability of food derived from ILVs, potential toxicity of some ILVs and the potential role ILVs play in the future of eating.

Weiche et al, (2024) conducted a study on socioeconomic factors influencing the adoption of leafy vegetable technologies for increased vegetable production in Akwa Ibom State, Nigeria. Modern technology and innovation in agriculture is seen in farming, planting,

harvesting, processing, packaging of crops fruits, cereal, root crops, vegetables (fruits and leafy), amongst others. According to Abuba et al. (2011), tropical leafy vegetables are those vegetables that can grow in tropical soils with their natural habitat in the sub-Saharan Africa. Leafy vegetable farms are very common in the agricultural zones of Akwa Ibom State. Leafy vegetables are well adopted for their nutritional values, rich in vitamins, fibre and other essential minerals. A diet rich in vegetables can lower blood pressure, control the risk of obesity, reduce the risk of heart disease and digestive problems also; have a positive effect upon blood sugar (Slavin and Lloyd, 2012). Leafy vegetables most often, come from short-lived herbaceous plants such as; African spinach, bitter leaf, eggplant leaf, fluted pumpkin, garden parsley, wild spinach, scent leaf, water leaf, wild letus, cabbage, etc. The benefits of leafy vegetables include; profit making, food for the teaming population, employment, dietary needs, medicinal uses, income generation, animal feed amongst others. Indigenous leafy vegetables have been found to be as good as conventional vegetables to provide essential nutrients to sustain human health. Vegetables are common in the market and command affordable prices. Studies by Mungofa et al, (2018) revealed that some leafy vegetables can be fermented because fermentation can be a preferred to processing method in order to preserve the nutritional component of leafy vegetable. A variety of techniques including organic production methods are used to manage leafy vegetable crops. The types of leafy vegetable grown can depend on environmental conditions, market demands and preference. Some leafy vegetable crops have a limited growth range depending on temperatures, available water supply, pests, and other factors. Others may be cultivated in a wider range of conditions. Leafy vegetable farmers test the soil and assess their land to determine what kind of products they can grow that would be commercially viable. The key constraints to increasing productivity per farmer are mainly inadequate use of yieldenhancing technology as reflected by non-use of mechanization, inadequate use of agrochemicals as well as inadequate investments in irrigation.

Martha et al, (2018) conducted a study on nutrients and bio actives in green leafy vegetables and cognitive decline. To increase understanding of the biological mechanisms underlying the association, we investigated the individual relations to cognitive decline of the primary nutrients and bio actives in green leafy vegetables, including vitamin K (phylloquinone), lutein, β-carotene, nitrate, folate, kaempferol, and α-tocopherol. In a

linear mixed model adjusted for age, sex, education, participation in cognitive activities, physical activities, smoking, and seafood and alcohol consumption, consumption of green leafy vegetables was associated with slower cognitive decline. Higher intakes of each of the nutrients and bio- actives except βcarotene were individually associated with slower cognitive decline. Consumption of approximately 1 serving per day of green leafy vegetables and foods rich in phylloquinone, lutein, nitrate, folate, α-tocopherol, and kaempferol may help to slow cognitive decline with aging.

2.2 General Consumption Patterns

Krishnendu and Prasannakumari (2015) conducted a study on the positive impact of nutrition education programs on green leafy vegetable consumption among rural women in Thiruvananthapuram, Kerala. The study found that targeted awareness campaigns and educational interventions significantly improved the dietary habits of women, leading to a notable increase in their daily intake of green leafy vegetables. The impact of this programme was assessed after three months by conducting a post test. The results showed that there was a significant gain in knowledge and change in attitude of the respondents thus pointing out the positive impact of the nutrition education programme. The post test revealed a significant change in the consumption of green leafy vegetables by the respondents. Locally available leafy vegetables were found to be included in the supplementary feeding program of the five selected Anganwadi centres. The study proved that this programme can be successfully implemented in all the Anganwadi centers of the state. The increase in the actual green leafy vegetable consumption will surely help to alleviate the micronutrient deficiency prevalent in the state especially among women and children.

Lahade et al, (2011) conducted a study on the consumption practices of green leafy vegetables among selected households. The socio-economic background, frequency of consumption of green leafy vegetables and storage practices of selected green leafy vegetables were studied. The results revealed that the majority of the surveyed housewives were of middle aged and were from nuclear families. The literacy level of housewives as well as heads of families was good. Most of them were primary school educated and were

from the middle-income group. This may be due to the reasons that the surveyed households were urban and rural residents. It was also noticed that a very low percent of subjects used to consume green leafy vegetable leaves in powder form whereas the majority of them consumed green leafy vegetables in cooked form. On the other hand, the majority of the families did not have an awareness regarding nutrient content and medicinal value of green leafy vegetables.

Lakshmi et al, (2020) conducted a study on the consumption pattern of green leafy vegetables among different income groups in Guntur Town of Andhra Pradesh. Green leafy vegetables (GLVs) are the most commonly consumed vegetables and are found ubiquitously in Indian cuisine. They are mainly consumed for their nutrients such as high dietary fibre, low lipids and rich folic acid, ascorbic acid, vitamin K, magnesium and potassium. From the data collected the commonly consumed green leafy vegetables by respondents were found to be amaranth, spinach, gogu, fenugreek leaves, rumex leaves, basella leaves, ponnanganni, tamarind leaves, drumstick leaves, mint, coriander and curry leaves. Coriander and curry leaves were being used by all the respondents along with seasonings and for making chutney. Green leafy vegetables are also consumed in the form of value-added powders. Among all the green leafy vegetable powders, curry leaf powder was the most commonly used one. Green leafy vegetables are processed to make dhal by adding red gram dhal to green leafy vegetables apart from other ingredients, curry and pulusu are prepared by simmering the green leafy vegetables. They are also consumed after frying in fat along with seasonings. All the respondents were consuming green leafy vegetables dhal. All of the respondents were aware of the benefits of GLVs. Majority of the respondents were aware of a carotene content in green leafy vegetables. Statistical analysis showed that the educational levels, monthly income and socio-economic class has no impact on the frequency of consumption of green leafy vegetables.

Pradeepkumar et al, (2013) conducted a study on nutritional evaluation of wild leafy vegetables consumed by tribals in the Wayanad district of Kerala. Wayanad, one of the high range districts of the southernmost state of Kerala is a biodiversity hotspot region with rich endemic flora and fauna. It is well known for a wide variety of crops including specially scented rice, spices, ornamental plants, medicinal plants, subtropical fruits and vegetables. The district has been the home for majority of tribal population in Kerala. These tribal groups

consume a large variety of wild leaves endemic to the area as a regular food supplement. Widely consumed leaves include those of alternanthera sessilis, talinum portulacifolium, boerhaavia diffusa, cassia tora, colocasia esculenta, achyranthes bidentata, achyranranthus aspera, alternanthera dentata, amaranthus spinosus, amaranthus viridis, cyathula prostrata and solanum nigrum. A comparison of the nutrient content of these non-domesticated leaves with amaranth (Amaranthus tricolour), the most commonly used leafy vegetable of Kerala has been attempted. Among all the WLVs studied, C. tora L. exhibited higher protein, fibre and vitamin C content than amaranth with significantly low nitrate and oxalate content. Different macro minerals like calcium, phosphorus, potassium, magnesium and micro minerals like copper, zinc, iron and manganese were also found to be higher in most of these wild leafy vegetables as compared to those of amaranth. Since the wild leaves consumed by the tribal communities are rich in various nutrients especially the micro nutrients, attempts should be taken to conserve and promote these wild leaves for their sustainable utilization and to achieve nutritional security.

Prabha et al, (2010) conducted a study on consumption pattern of green leafy vegetables among selected urban households in Bangalore, India to understand the consumption pattern of green leafy vegetables among the selected households. A list of all recipes commonly prepared incorporating green leafy vegetables was collected from respondents. The recipes were standardized in the laboratory. Nutritive value of green leafy vegetables consumed by the respondents was calculated by taking an average of all the commonly consumed greens. Curry and coriander leaves were mainly used daily as the ingredients for seasoning and also in chutney powder etc. Amaranth, spinach was also used by 90 per cent of the respondents. Majority of the respondents (51%) consumed greens twice a week and immediately after purchase or within one day. Only 10 per cent of respondents stored greens for more than a day and used polythene bags with refrigeration as common and major method of storage. Per capita consumption of greens ranged between 48-66 g for the adult and adolescents as against a figure of 100 g recommended by ICMR. The prevalence of nutritional deficiencies like anaemia among women in reproductive age vitamin ‘A’ deficiency among pre-school children may easily be prevented by incorporating a handful of greens in their daily diets. One of the methods of combating these deficiencies is through non formal nutrition education to all the members of the

family and specially of the women folk, who are mainly involved in managerial aspects of household; purchase and preparation of food for the family.

2.3Awareness and Health Benefits

Joglekar et al, (2014) conducted a study on assessed the awareness, knowledge, and attitudes toward green leafy vegetables among 100 urban women in Raipur City. Leafy greens are an important part of any diet. They provide fibre, essential vitamins and minerals like iron, calcium and magnesium and add to any meal. They provide protection against diseases like high cholesterol, heart disease, and diabetes etc. Indian cuisine is noted for its use of leafy greens that are commonly called as "Saag". Saag is a generic term used for a variety of greens like spinach, mustard leaves, amaranth etc. This study aimed to assess women's knowledge and consumption pattern of green leafy vegetables (GLVs) and factors influencing the buying behaviour. This study was carried out on 100 women of Raipur City. A self-designed interview schedule including information on demographic data and knowledge about green leafy vegetables has been used to collect the data. 82% women said that they consume green leafy vegetables and 27% of women consume green leafy vegetables because they are cost effective, 25% of women consume green leafy vegetables due to perceived nutritional value.

Barooah et al, (2023) conducted a study on nutritional potential of some underutilized leafy vegetables of Assam. Vegetables are the important component of balanced human diet and also the main factors in achieving global nutritional security by providing nutrients, vitamins and minerals. The growth in vegetable production has increased substantially and this was mainly due to development of hybrids, adoption of improved production and protection technologies long with large scale cultivation by the farmers. However, this remarkable growth in vegetable sector was contributed by only few major vegetables. The diverse agroclimatic condition of India is suitable for growing different underutilized vegetable crops yet not much attention is given on these crops, because of inadequate scientific knowledge on their nutritional potentials. The underutilized leafy vegetables are important source of balanced human diet as they provide different valuable micronutrients, vitamins

and minerals. Underutilized leafy vegetables have local or regional importance, but they are not explored commercially and thereby they lack national or global recognition. The underutilized vegetable crops are the plant species that are traditionally used for culinary or for medicinal purpose. Underutilized or indigenous vegetables are characterized by a high nutritional value compared with commercially important major vegetables like tomato and cabbage. Most of the leafy vegetables used by local people of Assam are indigenous and are not known their potential value. In this context, there is an urgent need to take up research on genetic resources exploration, management, utilization and improvement of underutilized vegetable crops to ensure food and nutritional security for future and also to increase the income of rural people which will finally contribute the national economy.

Gupta et al, (2020) conducted a study on prevention of anaemia with underutilized green leafy vegetables. Iron is essential to virtually all living organisms and is integral to multiple metabolic functions. Anaemia is defined as a condition in which the blood is deficient in red blood cells, haemoglobin, or both or deficient in total volume. Iron deficiency anaemia is the lack of iron to form normal red blood cells. Green leafy vegetables (GLV) are micronutrient dense nature's gift to mankind that provides more vitamins per mouthful than any other food. Green leafy vegetables are known to be rich sources of micronutrients such as vitamin A, iron, total carotene, etc. and utilizing them is one way of ensuring the micronutrient intake. In India, maternal thinness and moderate or severe anaemia among women of the poorest urban quartile was higher than the rest of urban population. Receipt of pre-and postnatal nutrition and health education and compliance to iron folic acid tablets during pregnancy was low across all quartiles. The highest iron content was observed in celosia argentea. In general, amaranth leaves, Colocasia leaves, mustard leaves, bathua leaves are commonly consumed iron rich leafy vegetables. Iron content in most of the selected underutilized leafy vegetable in the present study is comparable to the commonly consumed iron rich vegetables, therefore these identified underutilized vegetables like lahsun, sarwari, pathri, chirchita and kohar can be popularized as iron rich food sources. Better communication methods and awareness about underutilized plants and their nutrient content can raise their acceptance and adoption levels as well as improve the nutritional quality of daily diets.

Tyagi and Chaturvedi, (2021) conducted a study on appraisal of antioxidant profile of two underutilized green leafy vegetables: kasuri methi and chaulai. Various exogenic substances and endogenic metabolic activities produce free radicals, or highly reactive oxygen species in the human body. These are capable of oxidizing biomolecules and can cause neurological problems such as emphysema, cirrhosis, atherosclerosis, arthritis, and other degenerative diseases. Antioxidants are the substances that stop free radicals from attacking cells, lowering the risk of metabolic and degenerative diseases. Free radical damage is fought by enzymes like superoxide dismutase and catalase, as well as antioxidant substances such ascorbic acid, tocopherol, phenolic acids, polyphenols, flavonoids, and glutathione. Natural antioxidants are currently receiving a lot of interest as a way to protect the human body, particularly brain regions, from oxidative damage caused by free radicals. Antioxidant capabilities in plants are a prominent topic of study, particularly for lesser-known and underutilized plants and vegetables. Plant phenolic compounds have antioxidant properties that help protect cells from oxidative damage produced by free radicals. One of the furthermost significant recommendations for minimizing the risk of several diseases caused by elevated levels of free radicals is to eat a diet rich in vegetables.

Kasuri methi (Trigonella corniculata) belongs to a family Fabaceae and is used as a green vegetable (pot herb) especially in northern parts of India. It is used as flavouring agent and also known as protective food which reflects its significance in supplying of vital nutrients for good health. It is known for its functional and nutraceutical properties such as-antibacterial, anticancer, antiulcer, hypocholesterolaemia, hypoglycaemic, antioxidants and antidiabetic agent. Chaulai (Amaranthus cruentus) is a fast-growing plant that belongs to the Amaranthaceae family and is found all over the world. β-carotene, vitamins B6 and C, riboflavin, and folate, as well as vital minerals including calcium, iron, magnesium, phosphorus, potassium, zinc, copper, and manganese, are all plentiful in chaulai. It also contains lysine, an essential amino acid that is commonly lacking in starch-based diets like cereals and tubers both underutilized leafy vegetables (kasuri methi and chaulai) have excellent antioxidant quality. Kasuri methi leaf aqueous extract had significantly higher antioxidant content as well as DPPH scavenging activity when compared to extract of chaulai leaf. Kasuri methi can be a valuable source of antioxidants in combination of chaulai

that can be exploited for the production of nutraceuticals or alternatively, they can be used as a functional food ingredient.

Kamble et al, (2013) conducted a study on traditional leafy vegetables: a future herbal medicine. Traditional medicine system plays an important role in rural areas. It is based on knowledge, skills and information about the plants or plant parts to be used for different purposes. Ethnobotanical investigation has renewed interest in traditional medicine, particularly the herbal medicines. The present paper focus on ethnomedicinal properties of some non-cultivated green leafy vegetables from various regions of Kolhapur district of Maharashtra. On the basis of collected ethnobotanical information through field survey and literature studies, it is observed that they are used as tonics, antioxidants, cooling, digestive, laxative, diuretic etc. by rural people. It is due to that green leafy vegetables are cheap source of proteins, carbohydrates, iron, some other essential minerals etc. and used in regular diet. Thus, indirectly they act as an alternative source of medicinal drugs, which are easily available in natural habitat. Hence during upcoming time by analysing these plants for available bioactive contents they may be introduced as future herbal medicine.

2.4Preference of Consumption

Sheela et al, (2022) conducted a study titled "preferences of willingness to consumption of green leafy vegetables among rural and urban school children in Madurai district of Tamil Nadu, India" investigates the factors influencing the consumption of green leafy vegetables (GLVs) among school children aged 9 to 11 years in both rural and urban settings. Children all around the world are fonder about the consumption of junk food in the current scenario. The advertisements on the colour of food, the taste and the flavour in the junk food always appetize the children mainly in among the urban community and create an urge to consume them frequently. Though tastes of children might vary there is always an importance of green leafy vegetables given in our Indian diet. Green leafy vegetables are a rich source of calcium, beta carotene and vitamin C. Leafy vegetables are particularly rich in mineral nutrients and iron. The deficiency of iron leads to anemia, a common health problem in children. The recommended dietary allowance of green leafy vegetables for pre-school children (4-6 yrs)

and for boys and girls beyond 10 years of age is 50g/day (RDA, 2010). The effect of green leafy vegetables on nutrition and the consumption pattern of the school children of green leafy vegetables majorly depend on the environment and family preferences of food pattern. Food preferences are the evaluative attitudes that people express toward foods. Food preferences include the qualitative evaluation of foods, and also how much people like and dislike them. A study on the preferences of willingness of consumption of green leafy vegetables among rural and urban school children was carried out in Madurai district of Tamil Nadu. Thirty school children belonging to age group of 9-11 years were selected purposively in both rural and urban population each. The quantitative data was collected using verbal response from the children and the qualitative data was collected using the observation technique through photo elicitation responses. The height (cm) and weight (kg) were recorded and revealed that there was about 16% among urban and 13% among rural children were in the weight range between 36 to 42 Kg, which is a serious concern about obesity development in childhood. The preference of children on the ten major attributes was recorded and revealed that significant association among appearance and taste of the greens among the rural and urban children. Thus, the study hereby reveals the importance of consumption of greens and the aspect in which the greens are being influenced for consumption among the school children.

Jun et al, (2019) conducted a study on the consumption and preference for sprouts and leafy vegetables of 823 people over 20 years of age in Seoul and Gyeonggi province. The preference for sprouts was higher in men than in women, whereas the preference for leafy vegetables was higher in women than in men. Based on age, the respondents in their 40s or above had high preferences for sprouts and leaf vegetables due to the importance that they accorded to health and nutrition. The sprouts and leafy vegetables were purchased mainly for their high nutritional value. The purchase frequency of once a month or more for leafy vegetables was higher than that for sprouts. The consumers purchased sprouts and leafy vegetables mainly from a large discount store. The respondents in their 20s showed the highest percentage of purchasing from a local store whereas the older ones showed a high preference for traditional markets. The reason for the choice of the place of purchase was convenience. The freshness and price were important factors in the consumption of sprouts and leafy vegetables. In the case of leafy vegetables, the consumers preferred to buy them

using the conventional weight measurement system rather than in small packages. On the other hand, mixed small packages were preferred for sprouts. The purchase frequency was correlated with the preferences, need for improvement and purchase intent for sprouts and leafy vegetables. The aspects that require improvement for producing high-quality sprouts and leafy vegetables were the nutritional and functional properties. To increase the consumption of sprouts and leafy vegetables, there is need for variations and improvement of the quality and safety of the products.

Samek et al, (2021) conducted a study on consumers' preferences and their reasons for vegetable consumption with the aim to provide useful information to increase the consumption of these food items. Consumers consider vegetables as tasty, easy to use and healthy for consumption. The main drawbacks for vegetable consumption are safety issues, short shelf-life and high price. In order to increase the consumption of these foodstuffs, each type of fresh and processed vegetable should have a specifically designed campaign, emphasizing its specific attribute. Obtained results might provide an insight into the current state of consumers' behaviour in Serbia and might be useful for creating specific promotional programs and more appropriate communication strategies aiming to increase consumers' knowledge about the importance of regular vegetable consumption. They should raise consumers' awareness by emphasizing the importance of adequate daily vegetable consumption. This, in turn, should improve public health and reduce the health and economic costs of massive chronic diseases caused by inadequate diet.

Kumar et al, (2013) conducted a study on south Indian edible leafy vegetables. The overlapping nutritional and medicinal benefits of green leafy vegetables provide a better support for human wellbeing. There are hundreds of edible herbs which are used in day-to-day kitchen in different forms. The usages of green leafy vegetables are limited to a specific geographical location. The chemical constituents present in green leafy vegetables are of great pharmacological or medicinal importance. Phytonutrients present in green leafy vegetables produce many common health benefits like protection from eye problems, oxidative stress, iron deficiency etc., Consumption of green leafy foods benefits human health by improving nutritional status and reducing risks of specific diseases like diabetes, cancer and hepatotoxicity. Green leafy vegetables (GLV), either locally gathered or cultivated are diversified sources of nutrients and phytochemicals. Green leafy vegetables

are sources of nutrients and micronutrients of great interest to nutritionists such as iron and vitamin C, which are lacking from staple foods. In addition, green leafy vegetables are primary sources of lutein and zeaxanthine6,7, which have been identified as important eye protective agents. Green leafy vegetables (GLV) consumption has been reported to contribute to lowering the risk of agerelated cataract. These are known to contain antioxidants necessary in neutralizing free radicals which are known human chemical hazards. Green leafy vegetables have been identified as good sources of natural antioxidants such as tocopherols, vitamin C and polyphenols which are responsible for maintaining good health and protect against coronary heart diseases and cancer. Consumption of herbs is as old as human race itself. Green leafy vegetables represent an excellent component of the habitual diet in the tropical and temperate countries. Green leafy vegetables in our country are known to be the most inexpensive source of several vital nutrients. Leafy vegetables are appreciated because they not only supply the protective nutrients and add variety to a monotonous diet, but also have an alternative taste, pleasing appearance and aroma. Oxidative damage being an important feature of age-related cataract. Green leafy vegetables are also used to combat the problem of Iron deficiency or anemia which may cause many symptoms like vertigo, blurred vision or spots before the eyes ('floaters'), fatigue and lassitude, insomnia, poor muscle tone, muscle tightness and cramping, numbness in the extremities, pallor, dry skin and hair, green leafy vegetables found in south India, used as a source of food have many health benefits like protection from eye problems, iron deficiency and oxidative damage. They are most inexpensive sources of several phytonutrients like pro-vitamin A, vitamin C, folic acid and minerals like calcium, iron, phosphorus, sodium and potassium. Green leafy vegetables are of great medical importance due to the health benefits produced. Green Leafy Vegetables contain several chemical constituents which are pharmacologically important as they are been proved to be beneficial in many specific diseases like cancer, diabetes, hepatotoxicity, nephrotoxicity and many microbial activities.

Razzak et al, (2023) conducted a study on effect of cooking methods on the nutritional quality of selected vegetables at Sylhet city, to analyse the impacts of boiling, steaming, and microwave cooking on the physicochemical properties, the content of bioactive compounds, and boiling effect on mineral and heavy metal content of six widely consumed vegetables in Bangladesh's north-eastern region. In comparison to raw, boiled,

and microwave-cooked vegetables, those that are steam-cooked retain a higher percentage of β-carotene with the exception of carrots. Boiling vegetables led to the most substantial reduction in ascorbic acid content, with spinach experiencing the greatest decline. In contrast, microwaving had the mildest effect on ascorbic acid, preserving over 90 % of the initial content. The decrease in carotene content may be associated with colour changes (decreasing greenness and increasing hue angle) in the chosen vegetables.

Many studies have not been conducted on leafy vegetable consumption. Hence in over study we have made an attempt to study the consumption pattern of leafy vegetables.

CHAPTER-III
MATERIALS AND METHODS

The materials and methods of the study titled **"Consumption Pattern of Leafy Vegetables in Kochi Population"** are presented under the following headings:

3.1 Location of Study

3.2 Selection of Respondents

3.4 Design of Study

3.4 Assessment Tools

3.5 Data Collection

3.6 Statistical Analysis and Interpretation of Data

3.1 Location of Study

This study adopted a quantitative, cross-sectional survey design to analyze the consumption patterns, preferences, and awareness of leafy vegetables among individuals aged 18-25 years based in Kochi. The objective was to assess their frequency of consumption, knowledge about commercially available products, and perceived barriers to regular intake

3.2 Selection of Respondents

The respondents were selected using convenient sampling, targeting individuals aged 18-25, based in Kochi, who voluntarily consented to participate. The inclusion criteria ensured participants were familiar with local dietary habits and food consumption patterns.

3.3 Design of Study

A descriptive cross-sectional study design was employed to assess the consumption pattern of leafy vegetables and the awareness of GLV-based products among the target population.

3.4 Assessment Tools

A convenience sampling method was employed, where participants were recruited voluntarily through online platforms. A Google form was shared via social media platforms (such as WhatsApp and Instagram), email, and direct messaging to ensure diverse participation. This approach allowed for a larger sample size within a short period, making the study more feasible and cost-effective

a) Demography

The demographic section collected data on age, gender, educational background, and economic status to profile the respondents.

b) Assessment of Nutrition Awareness

Respondent's knowledge on the nutritional benefits of leafy vegetables and their awareness of commercially available GLV-based products were assessed through multiple-choice questions.

c) Green Leafy Vegetable Food Consumption Pattern

The frequency, quantity, and variety of leafy vegetables consumed by respondents were recorded using a food frequency questionnaire (FFQ). The section also explored the inclusion of GLVs in daily diets and preferences regarding specific types of vegetables.

d) Availability of GLV-Based Products

The availability, awareness, and usage of commercially available GLV-based products, such as powders, snacks, and fortified foods, were assessed using structured questions.

3.5 Data Collection

A structured questionnaire was designed using Google Forms to facilitate easy distribution and collection of responses. The questionnaire included close-ended, multiple-choice questions to ensure uniform responses that could be easily analyzed statistically.

The Google form was circulated through digital platforms like Instagram, WhatsApp, etc to ensure wide participation. Participants were encouraged to share the link with peers to increase reach and sample size. A brief introduction explaining the purpose of the study and ensuring anonymity and confidentiality was included before the start of the survey.

Before beginning the survey, participants were presented with an informed consent statement outlining the purpose, expected time for completion, and assurance of data confidentiality. Only those who voluntarily agreed to participate proceeded with the survey.

Ethical guidelines were strictly adhered to during the study.

- Confidentiality: Participant identities were kept anonymous, and the data collected was used solely for academic purposes.
- Informed Consent: Participants were informed about the purpose of the study, their voluntary participation, and the right to withdraw at any time.
- Data Security: The responses were securely stored and accessed only by authorized researchers.

(The questionnaire that we have used for data collection, is given in the Appendix)

3.6 Statistical Analysis And Interpretation Of Data

Data were analyzed using statistical tools to derive meaningful insights. Descriptive statistics such as frequencies and percentages were used to summarize categorical variables. Mean and standard deviation were calculated for continuous variables. Correlation analysis was performed to assess relationships between nutrition awareness, GLV consumption patterns, and family income. The results were interpreted to understand the association between demographic factors and awareness levels of GLV-based products.

Key statistical tools included:

- Frequencies and Percentages: To assess the consumption patterns and awareness levels.
- Mean and Standard Deviation: To evaluate trends in participant preferences and perceptions
- Correlation: To assess relationships between nutrition awareness, GLV consumption patterns, and economic status

The analyzed data was interpreted to identify key trends in leafy vegetable consumption. Findings were compared with existing literature to highlight similarities and differences.

CHAPTER-IV
RESULTS AND DISCUSSION

The results pertaining to the present study titled **"Consumption Pattern of Leafy Vegetables in Kochi Population"** are presented under the following headings:

4.1 Demographic Profile

4.2 Nutrition Awareness Assessment

4.3 Leafy Vegetables Food Consumption Patterns

4.4 Availability of Leafy Vegetable Products

The consumption of leafy vegetables is essential for a balanced diet, contributing to overall health by providing essential vitamins, minerals, and dietary fiber (Devi, 2020). However, numerous factors influence people's consumption patterns, ranging from awareness and affordability to taste preferences and market availability. Mishra et al. (2019) highlight that despite the nutritional benefits of leafy greens, their consumption remains inconsistent due to varying levels of awareness and accessibility. This section explores the findings from various studies that shed light on these patterns and the challenges associated with increasing leafy vegetable intake.

4.1 Demographic Profile

The socio-demographic characteristics give basic information on the age, gender, academic status, occupation and monthly income of the selected subjects. The socio-demographic characteristics of the selected subjects are presented in Table 1

Fig 1:Socio-demographic Profile

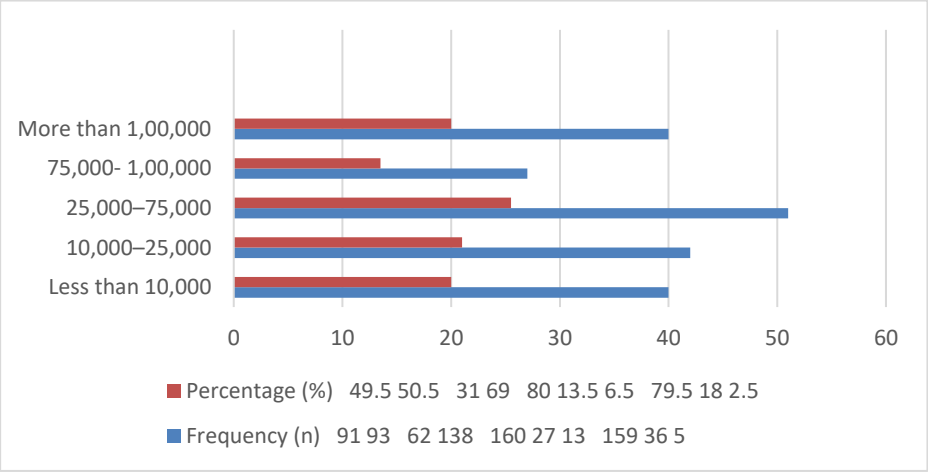


Table-1: Socio-demographic Characteristics

Characteristics	Frequency (n)	Percentage (%)
Age		
18-20	91	49.5
21-25	93	50.5
Gender		
Male	62	31
Female	138	69
Academic status		
Undergraduate	160	80
Postgraduate	27	13.5
Higher Secondary School	13	6.5
Occupation		
Student	159	79.5
Working professional	36	18
Home maker	5	2.5
Monthly family income		
Less than 10,000	40	20
10,000–25,000	42	21
25,000–75,000	51	25.5
75,000- 1,00,000	27	13.5
More than 1,00,000	40	20

Students between the age group of 18–25 years were selected for the study. Out of 200 students, 45.5% of them were in the age group of 18–20, whereas 46.5% of students were in the age group of 21–25. It was found that the majority (69%) of the subjects selected were females and 31% were males. The majority were undergraduates (80%), while 13.5% were postgraduates and 6.5% had completed higher secondary school. In terms of monthly family income, 25.5% belonged to the ₹25,000–75,000 range, with equal proportions (20%) earning either below ₹10,000 or above ₹1,00,000. About 21% reported income between ₹10,000–25,000, and 13.5% fell in the ₹75,000–1,00,000 range.

Previous research indicated that younger individuals, particularly those residing in urban areas, exhibited lower consumption rates of leafy vegetables due to a growing preference for processed foods (Barki & Todd, 2007). Economic status also played a vital role, where affordability dictated food choices, often leading lower-income households to select cheaper, processed alternatives over fresh produce (Williems et al., 2015).

The gender distribution in the study was nearly balanced, suggesting that both men and women shared responsibilities in food purchasing and dietary decisions, consistent with findings from Mishra et al. (2019). Education levels were observed to be predominantly undergraduate or postgraduate among participants, which was positively associated with greater nutritional awareness and healthier food choices (Devi, 2020).

4.2 Nutrition Awareness Assessment

The level of awareness regarding the nutritional benefits of leafy vegetables remains a crucial determinant of consumption. While many individuals acknowledge that vegetables are beneficial, detailed knowledge about their specific health contributions is often lacking.

Fig 2 : Awareness of Green Leafy Vegetables

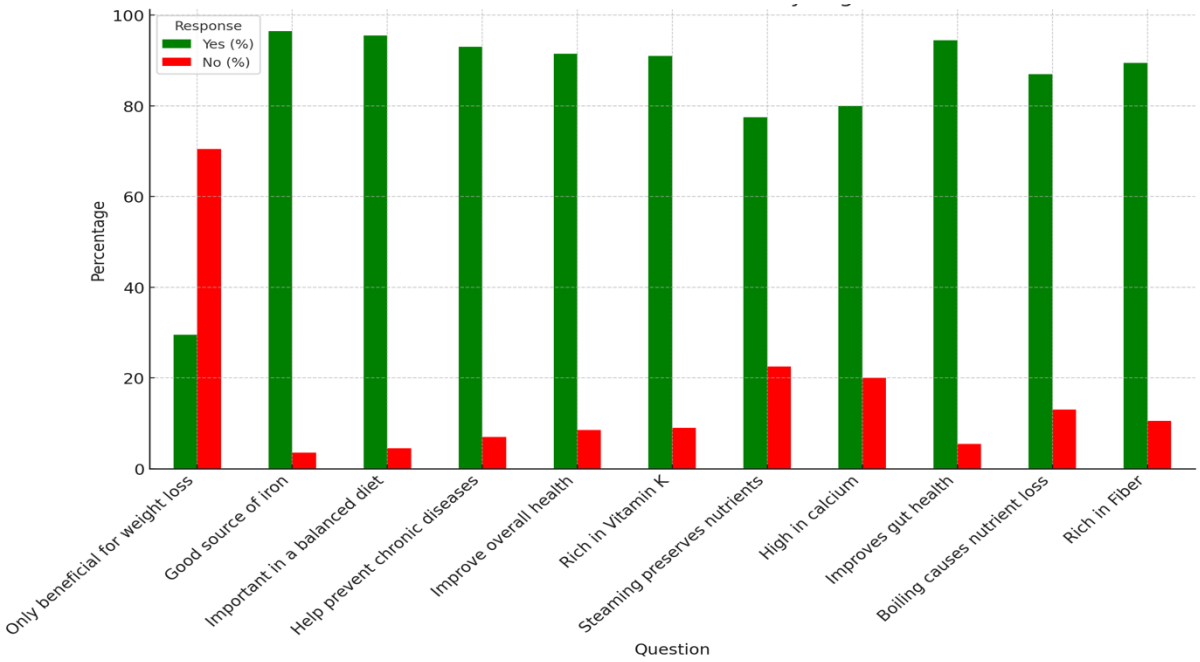


Table-2: Awareness of green leafy vegetables

Questions	Yes(%)	No(%)
Leafy Vegetables are only beneficial for weight loss.	59 (29.5)	141 (70.5)
Leafy vegetables are a good source of iron.	193 (96.5)	7 (3.5)
Leafy Vegetables in a balanced diet is important.	191 (95.5)	9 (4.5)
Leafy Vegetables can help prevent chronic diseases.	186 (93)	14 (7)
Consuming Leafy vegetables can significantly improve your overall health.	183 (91.5)	17 (8.5)
Spinach , Kale and Methi are rich sources of Vitamin K.	182 (91)	18 (9)
Steaming is one of the best ways to preserve nutrients in green leafy vegetables.	155 (77.5)	45 (22.5)
Kale, Spinach and Mustard Greens are high in calcium.	160 (80)	40 (20)
Consuming Leafy Vegetables daily improves gut health.	189 (94.5)	11 (5.5)
Excessive boiling causes nutrient loss.	174 (87)	26 (13)
Leafy vegetables are rich in Fiber.	179 (89.5)	21 (10.5)

A high level of awareness regarding the nutritional benefits of green leafy vegetables was reported among the participants. Approximately 96.5% recognized leafy vegetables as rich sources of iron, while 95.5% associated them with a balanced diet. The role of leafy greens in preventing chronic diseases was acknowledged by 93%. Furthermore, 91% were aware that spinach, kale, and methi are rich sources of Vitamin K.

Nevertheless, awareness about cooking methods for nutrient retention was lower; only 77.5% knew that steaming best preserves nutrients. This finding echoed earlier observations that although many recognize the health benefits of vegetables, detailed knowledge about preparation methods remains limited (Paul et al., 2012).

Awareness of the link between daily consumption and gut health was noted among 94.5% of participants, and 87% knew that excessive boiling leads to nutrient loss. However, 70.5% incorrectly believed that leafy vegetables are only beneficial for weight loss.

Mishra et al. (2019) also found that knowledge gaps persisted regarding specific micronutrient benefits. Public health education campaigns have effectively bridged these gaps, particularly among school-aged children (John & Dhanasekaran, 2016). Moreover, nutrition education programs, as implemented in rural Kerala, have been successful in boosting leafy vegetable intake among women (Krishnendu & Prasannakumari, 2015).

4.3 Leafy Vegetables Food Consumption Patterns

Despite their health benefits, leafy vegetable consumption is often inconsistent due to multiple barriers, including taste preferences, safety concerns, and market trends. Research has shown that bitter-tasting greens such as fenugreek and mustard leaves are often avoided, leading to reduced intake in modern diets (Barki & Todd, 2007).

Table-3: Food consumption pattern of green leafy vegetables

Leafy Vegetable	**Frequency**	**Number (%)**
Spinach	Daily	14 (7)
	1–2 times a week	48 (24)
	2–3 times a week	29 (14.5)
	Once a week	52 (26)
	Once a month	57 (28.5)
Amaranth	Daily	6 (3)
	1–2 times a week	36 (10.5)
	2–3 times a week	21 (10.5)

	Once a week	58 (29)
	Once a month	79 (39.5)
Drumstick Leaves	Daily	6 (3)
	1–2 times a week	38 (19)
	2–3 times a week	26 (13)
	Once a week	56 (28)
	Once a month	74 (37)
Curry Leaves	Daily	93 (46.5)
	1–2 times a week	26 (13)
	2–3 times a week	41 (20.5)
	Once a week	28 (14)
	Once a month	12 (6)
Cabbage	Daily	11 (5.5)
	1–2 times a week	52 (26)
	2–3 times a week	47 (23.5)
	Once a week	58 (29)
	Once a month	32 (16)

Consumption frequencies showed that daily intake was limited for most leafy vegetables:

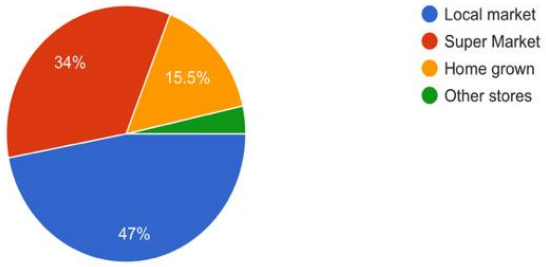
Spinach was consumed daily by only 7%, weekly by 26%, and monthly by 28.5%.Amaranth saw a 39.5% monthly intake, while 29% consumed it weekly.Drumstick leaves were consumed monthly by 37% of participants.Curry leaves exhibited a notably high daily consumption rate (46.5%), reflecting cultural cooking practices.Cabbage was consumed weekly by 29%, and two to three times a week by 23.5 %.

Despite high awareness, actual intake was inconsistent, often influenced by taste preferences, food safety concerns, and modern dietary trends. Bitter-tasting greens were often avoided (Barki & Todd, 2007), and concerns regarding pesticide contamination discouraged fresh vegetable consumption (Freshfel, 2014).Consumption of indigenous leafy greens, despite their nutritional advantages, was limited (Modi et al., 2018; Pradeepkumar et al., 2013).

Table 4: Common places where vegetables are usually purchased

Places	Frequency (%)
Local market	94 (47)
Super market	68 (34)
Home grown	31 (15.5)
Other stores	7 (3.5)

Fig-3 : Common places from where green leafy vegetables are bought



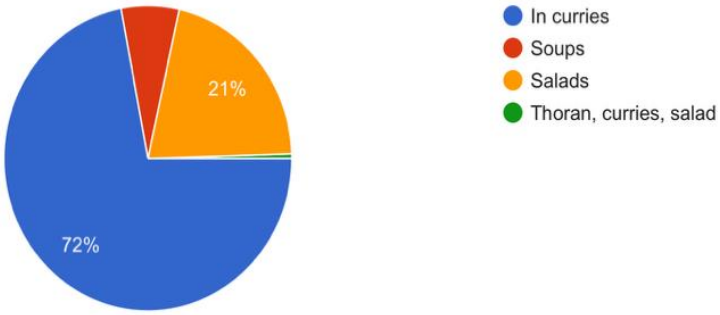
Vegetables were primarily purchased from local markets (47%), followed by supermarkets (34%), with 15.5% relying on home-grown sources and 3.5% from other stores.

This preference for local markets indicated a reliance on fresh produce and supported findings that availability and accessibility strongly influenced vegetable intake (Regmi & Gehlhar, 2005).

Table 5: Forms in Which Leafy Vegetables Are Commonly Consumed

Consumption method	Frequency (%)
In curries	144 (72)
Soups	13 (6.5)
Salads	42 (21)
Thoran, curries, salads	1 (0.5)

Fig-4 :Forms in which Green leafy vegetables are commonly consumed



Curries emerged as the most popular method of leafy vegetable consumption, as 72% of respondents incorporated leafy vegetables into curries. Salad consumption was reported by 21%, while 6.5% consumed leafy vegetables in soups. Only 0.5% used multiple preparation forms regularly.

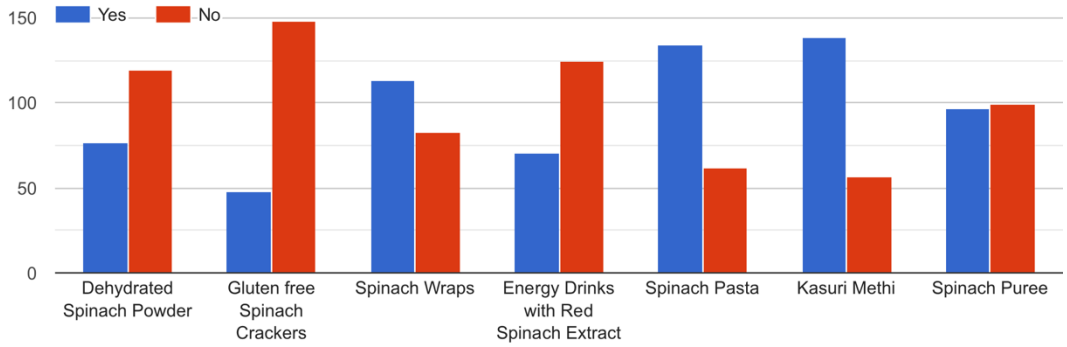
These findings corresponded to traditional South Indian dietary habits, where vegetables are commonly consumed after cooking (Saha & Deka, 2018).

4.4 Awareness on the availability of leafy vegetable products

Table 6: Awareness on the availability of various green leafy vegetable products in market

Products	**Yes (%)**	**No (%)**
Dehydrated Spinach Powder	77 (38.5)	119 (59.5)
Gluten free Spinach Crackers	48 (24)	148 (74)
Spinach Wraps	113 (56.5)	83 (41.5)
Energy Drinks with Red Spinach Extract	71 (35.5)	125 (62.5)
Spinach Pasta	134 (67)	62 (31)
Kasuri methi	139 (69.5)	57 (28.5)
Spinach Puree	97 (48.5)	99 (49.5)

Fig-5: Awareness of the availability of green leafy vegetable products



Awareness regarding processed and value-added leafy vegetable products varied:

Spinach pasta awareness was highest (67%),Followed by spinach khakra (69.5%) and spinach wraps (56.5%).Awareness of dehydrated spinach powder (38.5%), gluten-free spinach crackers (24%), and spinach-based energy drinks (35.5%) was relatively low.

While urban households increasingly preferred ready-to-eat vegetable products for convenience (Brazil Ministry of Health, 2017), affordability and accessibility challenges persisted, particularly for lower-income groups. Subsidizing fresh produce and promoting indigenous vegetables were suggested as strategies to improve access and nutrition (Devi, 2020).

It has been reported by Freshfel (2014) that, despite rising health awareness, the average consumption of vegetables across Europe continues to fall below the WHO-recommended daily intake. Likewise, it has been emphasized in the Dietary Guidelines for the Brazilian Population (2017) that an increase in daily fresh vegetable intake is crucial for the prevention of non-communicable diseases such as diabetes and cardiovascular conditions.

Based on these findings, several strategies are recommended to enhance leafy vegetable consumption. **Nutrition education** should be prioritized through public health campaigns to increase awareness of the specific benefits of leafy greens, particularly their role in preventing anemia and other nutrient deficiencies. Improving **market accessibility** is essential, and governments can support this by implementing policies such as subsidies and incentives for local

farmers to make fresh vegetables more affordable. Additionally, **food safety measures** must be strengthened to address concerns about pesticide residues and bacterial contamination, ensuring better post-harvest handling and strict safety regulations. Promoting **indigenous greens** can also play a significant role, as traditional leafy vegetables are often well-adapted to local climates and provide important nutrients. Lastly, **innovative product development** can help increase consumption by expanding the availability of ready-to-eat and fortified leafy vegetable products that align with modern dietary habits.

Table 7: Correlation analysis of nutrition awareness

	Education	**Occupation**	**Income**
Nutrition awareness	1	**1**	0.999

Table 8: Correlation analysis of consumption pattern

	Education	**Occupation**	**Income**
Consumption pattern	1	1	0.999

Table 9: Correlation analysis of knowledge on the availability of various GLV products

	Education	**Occupation**	**Income**
Consumption pattern	1	1	0.999

Tables 7, 8, 9 indicate that nutrition awareness, consumption patterns, and knowledge of the availability of green leafy vegetable products had a positive correlation with education, occupation, and income.

CHAPTER V
SUMMARY

The study titled “Consumption Pattern of Green Leafy Vegetables in Kochi” investigated how young adults in urban Kochi consume, understand, and access green leafy vegetables (GLVs), as well as the factors influencing their choices. It involved 200 participants aged 18 to 25, mostly undergraduates. Of these, 69% were female, with almost equal numbers in the 18–20 (45.5%) and 21–25 (46.5%) age groups. Family incomes varied, with 25.5% earning between ₹25,000 and ₹75,000, while 20% earned less than ₹10,000 or more than ₹1,00,000.

Most participants showed high nutrition awareness. Nearly all (96.5%) knew GLVs are rich in iron, and 95.5% understood their role in a balanced diet. Awareness of their benefits for disease prevention (93%) and gut health (94.5%) was also strong. About 91% recognized that spinach, kale, and methi are high in Vitamin K. However, some misconceptions existed; 70.5% wrongly thought GLVs are only good for weight loss. Also, only 77.5% were aware of cooking methods like steaming that help preserve nutrients.

Despite this awareness, GLV consumption was inconsistent. For example, only 7% ate spinach daily, 26% weekly, and 28.5% monthly. Amaranth was mostly eaten monthly (39.5%), followed by drumstick leaves at 37%. Curry leaves had the highest daily use (46.5%), showing their strong cultural presence. Cabbage and other greens were eaten moderately, mainly weekly. Bitter taste and worries about pesticides were barriers to eating GLVs more often.

Most people bought leafy vegetables from local markets (47%) or supermarkets (34%), while 15.5% used homegrown greens. Curries were the most popular way to eat GLVs (72%), reflecting traditional habits. Salads (21%) and soups (6.5%) were less common, and only 0.5% regularly used GLVs in multiple forms.

Awareness of processed and value-added GLV products varied. Spinach khakra (69.5%) and spinach pasta (67%) were well known, followed by spinach wraps (56.5%). Fewer people knew about dehydrated spinach powder (38.5%), gluten-free spinach crackers (24%), or spinach- based energy drinks (35.5%). This shows there’s room to improve knowledge about new, convenient GLV products that might boost consumption.

Correlation analysis indicated a perfect positive relationship (r = 1.00 or 0.999) between nutrition awareness, consumption patterns, and product knowledge with education, occupation, and income. These strong correlations reflect the crucial role of socioeconomic status in influencing dietary behavior. The results are consistent with prior research showing that higher education levels often lead to healthier eating patterns due to increased nutritional literacy.

The study shows that social, economic, and cultural factors play a big role in what people choose to eat. Education and jobs help people become more aware and make better food choices, while cultural habits—like liking curry dishes—make it easier to include green leafy vegetables (GLVs) in regular meals. Taste preferences, food safety concerns, and modern diet trends also affect whether people want to eat certain leafy greens.

On a practical level, there's a need for focused nutrition education to clear up wrong ideas (like thinking GLVs are only good for weight loss) and teach cooking methods that keep nutrients intact. Making fresh produce more accessible and affordable through subsidies and support for local farmers is important. It's also key to promote traditional and local greens that are rich in nutrients and fit well with the local environment. Lastly, creating easy-to-use products like fortified snacks or drinks can appeal to the eating habits of young people in cities.

This study, which looked closely at green leafy vegetable consumption in Kochi, has some limitations to keep in mind when interpreting the results.

The study didn't evaluate how well any programs or public health efforts to increase vegetable consumption worked. Looking at the impact of these interventions or changes after nutrition education could have made the findings more useful

CHAPTER VI
CONCLUSION

Based on the discussion and results of the study on leafy vegetable consumption habits of the people of Kochi, it is evident that there is a large difference between practice and knowledge. A vast majority of the subjects know the nutritional benefits of leafy vegetables, including their role as good sources of iron, givers of an equilibrated diet, and chronic disease preventers. But this sensitivity is not always translated into food eaten daily. Several arguments can be raised in the defense of this lag, such as food habits, fear of food safety (i.e. residues of pesticides), and the effect of prevailing diet trends towards processed foods.

The evidence also underscores the significance of socio-demographic factors. Nutrition awareness is positively, strongly correlated with education, occupation, and income, and therefore people with higher education, better occupation, and higher income are more nutrition aware of the advantages of leafy vegetables. Likewise, food habits and market availability of leafy vegetable products are positively, strongly correlated with these variables. This would imply that targeted interventions, such as nutrition education programs, may be especially beneficial in encouraging leafy vegetable consumption among targeted groups of people.

To increase leafy vegetable consumption among the Kochi population, there are a few strategies that need to take priority. Public health campaigns will need to address raising awareness about the advantage of leafy greens, which is their capacity to prevent anemia and other micronutrient deficiencies. Improvement in the quality of market availability is most essential, and it can be facilitated by the government via policy of incentives and subsidies to the farmers on local basis for decreasing the cost of vegetables. Improvement in safety standards is as vital as reducing pesticide residue and bacterial contamination problem. In addition, serving local greens and the manufacturing of new products can assist in boosting consumption by way of greater availability of ready-to-eat and fortified leafy greens that are in line with modern consumption patterns.

Recommendations for Future Research.

Future research must be aimed in various directions to understand leafy vegetable consumption behavior in Kochi better. One must study factors other than nutrition awareness, i.e., usage of knowledge in actual practice about best cooking practices and misconception elimination about leafy vegetables. Moreover, due to the demographic limitations of the

study, further research should include a broader age group, income groups, and geographic locations (urban and rural) to achieve a better representative image of consumption patterns. Qualitative research would be required to determine the influence of cultural factors, taste, and convenience in the consumption of leafy vegetables.

To increase the validity and reliability of results, future research must utilize more precise methods of measuring diet than self-report questionnaire data, ideally food diaries or biomarkers. Market and supply chain analysis to determine cost and access barriers, especially to indigenous green leafy vegetables and value-added products, is also required. Intervention trials comparing the impact of specific education interventions, subsidies, and new product creation are warranted. Lastly, the researchers should be careful against the apparently ideal correlations identified in this study and use more powerful statistical techniques to analyze the interrelations between the variables while controlling for potential confounding variables

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APPENDIX-I

QUESTIONNAIRE TO ELICIT INFORMATION ON " CONSUMPTION PATTERN OF LEAFY VEGETABLES IN KOCHI"

I) Sociodemographic Details

1. Name

2. Age

3. Gender

4. Academic status

   a) Undergraduate
   b) Post Graduate
   c) Higher Secondary School
   d) Secondary School

5. Occupation

   a) Student
   b) Working Professional
   c) Home maker
   d) Other

6. Approximate monthly family income

   a) Less than 10000
   b) 10000-25000
   c) 25000-75000
   d) 75000-100000
   e) More than 100000

II) Awareness of Green Leafy Vegetables among College Students

1. Are Leafy Vegetables only beneficial for weight loss?

a) Yes

b) No

2. Are Leafy vegetables good source of iron?

a) Yes

b) No

3. Are Leafy Vegetables in a balanced diet important?

a) Yes

b) No

4. Can Leafy Vegetables help prevent chronic diseases?

a) Yes

b) No

5. Does consuming Leafy vegetables significantly improve your overall health?

a) Yes

b) No

6. Are Spinach, Kale and Methi rich sources of Vitamin K?

a) Yes

b) No

7. Is steaming one of the best ways to preserve nutrients in green leafy vegetables?

a) Yes

b) No

8. Are Kale, Spinach and Mustard Greens high in calcium?

a) Yes

b) No

9. Does consuming Leafy Vegetables daily improve gut health?

a) Yes

b) No

10. Does excessive boiling cause nutrient loss?

a) Yes

b) No

11. Are leafy vegetables rich in Fiber?

a) Yes

b) No

III) Green Leafy Vegetables Food Consumption Pattern

1. How often do you consume leafy vegetables?

a) Daily

b) 1-2 times a week

c) 2-3 times a week

d) Once a week

e) Once a month

2. Where do you usually buy leafy vegetables from?

a) Local market

b) Super Market

c) Home grown

d) Other stores

3. How do you usually consume leafy vegetables?

a) In curries

b) Soups

c) Salads

d) Other

4. Why do you consume leafy vegetables?

a) They are nutritious and healthy

b) They aid with digestion

c) They prevent diseases

d) Other

V.Awareness of the products available in the market

5. Are you aware of these products available in the market?

A. Dehydrated Spinach Powder

a) Yes
b) No

B. Gluten free Spinach Crackers

a) Yes
b) No

C. Spinach Wraps

a) Yes
b) No

D. Energy Drinks with Red Spinach Extract

a) Yes
b) No

E. Spinach Pasta

a) Yes
b) No

F. Kasuri Methi

a) Yes
b) No

G. Spinach Puree

a) Yes
b) No

6. Are you aware of these products available in the market?

H. Dehydrated Spinach Powder

a) Yes
b) No

I. Gluten free Spinach Crackers

c) Yes
d) No

J. Spinach Wraps

c) Yes
d) No

K. Energy Drinks with Red Spinach Extract

c) Yes
d) No

L. Spinach Pasta

c) Yes
d) No

M. Kasuri Methi

c) Yes
d) No

N. Spinach Puree

c) Yes
d) No