CONSUMPTION OF FRUITS AND VEGETABLE AMONG ADOLESCENT GIRLS

Project submitted to

ST. TERESA'S COLLEGE, ERNAKULAM

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Affiliated to

MAHATMA GANDHI UNIVERSITY

In partial fulfilment of requirement for the Award of the Degree of

BACHELOR OF SCIENCE

in

HOME SCIENCE

By

LAKSHMI PRIYA S NAIR

Register No. AB20HSC026

DEPARTMENT OF HOME SCIENCE AND CENTRE FOR RESEARCH

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Certified as bonafide research work

Lakshmi Priya 11/4/23

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Examiner

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Chapter 1
INTRODUCTION

Children and adolescents are victims of unhealthy behaviors. poor nutrition, insufficient daily fruits, vegetable consumption, excessive high dense food intake, inactivity, smoking etc. Evidence show that adequate daily fruits and vegetables intake are necessary for adolescents health. It is estimated that optimal daily fruit and vegetables consumption will protect against the main non communicable diseases.

Fruits and vegetables are very important to adolescents.it provide essential vitamins like vitamin C and minerals like folate and potassium.it also contains fiber, and other substances that are important for good health. Fruits and vegetables, as part of a healthy diet, are important for optimal child growth, weight management and chronic diseases prevention. The teenage years are a time of rapid growth and development, so healthy, active young people can have large appetites.in teenage it's important to eat well-balanced meals, rather than too many snacks that are high in salts, sugar and fat etc. According to the consumption of fast foods and junk foods and soft drinks the intake of fruits and vegetables consumption is decreasing. Low intake is happing according to the eating habit of foods. Most of the teenagers are intaking a low amount of fruits and vegetables. Through this a lot of diseases and low nutritional intake is spreading in their body. So among adolescents it is very important to consumed

fruits and vegetables in there diet. So maximum intake is available for adolescents in the intake and consumption of fruits and vegetables.

Fruits and vegetables are mainly occur from plants.it is mainly obtained from our nature. A fruit develops from the flower of a plant, while the other part of the plant are categorized as vegetables. Fruits contain seeds, while vegetables can consists of roots, stems and leaves. Fruits and vegetables are healthy and it is very important for our diet and it also prevents the diseases and gives protection to our body.

According to the diet of adolescents they should eat minimum fruits and vegetables every day. They should eat 2cups of fruits and vegetables every day. The US department of agriculture (USDA)recommends minimum daily intake of 1.5 cups of fruit and 2.5 cups of vegetables for female aged 14-18years and 2cups of fruits and 3cups of vegetables for males aged 14-18year.through this study we can find out how much the daily intake and consumption of fruits and vegetables are consumed according to their particular days in this adolescent period.

Vegetables and fruits are an important part of a healthy diet, and variety is as important as quantity. No single fruit or vegetable provides all of the nutrients you need to be healthy. Eat plenty of fruits and vegetables every day for living a healthy life. A diet rich in vegetables and fruits can lower blood pressure, reduce the risk of heart diseases and stroke, prevent some types of cancer, lower risk of eye and digestive problems and have a positive effect upon blood sugar, spikes that can increase the hunger.

At least nine different families of fruits and vegetables exits, each with potentially hundreds of different plant compounds, that are beneficial to health.

Eat a variety of types and colors of produce in order to give your body the mix of nutrients it needs. This not only ensures a greater diver of beneficial plant chemicals but also creates eye appealing meals.

Fruits and vegetables give you child energy, vitamins, anti-oxidants, fibres and water. These nutrients help protect your child against diseases later in life, including diseases like heart diseases like heart diseases, stroke, and some cancers. Encourages your child choose fruits and vegetables at every meal and for snacks. The Best quality of fruits and vegetables includes Internal quality (flavor, aroma, texture, nutritional value, and absence of biotic and non-biotic contaminants) is linked to aspects not generally perceived externally, but are equally important to many consumers.

Statement of the Problem

World Health Organization (WHO), states that daily consumption of fruits and vegetables (FAV) could decrease the risk for several non-communicable diseases (NCDs). Moreover, eating fruits and vegetables as part of a healthy diet low in sugar, salt, and fat is thought to help prevent weight gain and obesity, which is an independent risk factor for NCDs. Hence the study is focused to find out the adequacy of fruits and vegetables among adolescent girls which influence their health and thereby the health of our nation.

Aim of the Study

- To analyse the consumption of fruits and vegetable among adolescents

Objectives of the Study

The objectives of the study are:-

- To find out types of fruits consumed by adolescents.
- To find out types of vegetables consumed by adolescents.
- To check the adequacy of nutrient intake of the adolescent.

Chapter 2

REVIEW OF LITERATURE

Adolescence is a nutritionally vulnerable life phase. Poor eating habits formed during adolescence can lead to obesity and diet-related diseases in later years. In addition, the high incidence of dieting behaviors can contribute to nutritional inadequacies and to the development of eating disorders. Nutritional needs during adolescence are increased because of the increased growth rate and changes in body composition associated with puberty (Spear, 2002; Das et.al., 2017; Jenkins and Horner , 2015). The dramatic increase in energy and nutrient requirements coincides with other factors that may affect adolescents' food choices, nutrient intake, and thus, nutritional status. These factors, including the quest for independence and acceptance by peers, increased mobility, greater time spent at school and/or work activities, and preoccupation with self-image, contribute to the erratic and unhealthy eating behaviors that are common during adolescence (Siega-Riz , 1998).

A literature review is a piece of academic writing demonstrating knowledge and understanding of the academic literature on a specific topic placed in context. A literature review also includes a critical evaluation of the materials this is why it is called a literature review rather than a literature report.

The review of literature pertaining to the study entitled '***Consumption of Fruits and Vegetable among Adolescent Girls'*** is discussed under the following heading:

2. 1. Health benefits of fruits and vegetables.

2. 2. Fruits and vegetables and lifestyle diseases.

2. 3. Method of consuming fruits and vegetables.

2.1. Health benefits of fruits and vegetables

Health-Promoting Components of Fruits and Vegetables in the Diet

Increasing evidence suggests that a healthy eating strategy with increased consumption of plant-based foods plays important roles in the prevention of chronic diseases, such as heart disease, cancer, stroke, diabetes, Alzheimer's disease, cataracts, and age-related function decline (Boeing et. al., 2012). Regular consumption of fruits, vegetables, whole grains, and other plant foods has been negatively correlated with the risk of the development of chronic diseases (Liu, 2013). The health benefits of fruits and vegetables in a balanced diet and recommend that consumers to eat a wide variety of fruits and vegetables from different sources and including all forms, fresh, frozen, canned, dried, and 100% juices, and the manufacturing of convenient packaging to make fruits and vegetables easy to serve and to store for consumers.

A wide variety of fruits and vegetables provides a range of nutrients and different bioactive compounds including phytochemicals (phenolics, flavonoids, and carotenoids), vitamins (vitamin C, folate, and pro-vitamin A), minerals (potassium, calcium, and magnesium), and fibers. One of the hypotheses about the

health benefits of fruits and vegetables is attributed to the synergy or interactions of bioactive compounds and other nutrients in whole foods, Fruits, vegetables, and other plant-based foods are rich in bioactive phytochemicals that may provide desirable health benefits beyond basic nutrition to reduce the risk of the development of chronic diseases. Phytochemicals are bioactive non-nutrient plant compounds in fruits, vegetables, whole grains, and other plant foods that have been hypothesized to reduce the risk of major chronic diseases. The most important groups of dietary phytochemicals can be divided into general categories as phenolics, alkaloids, nitrogen-containing compounds, organosulfur compounds, phytosterols, and carotenoids.

The most studied groups of dietary phytochemicals related to human health and well-being are phenolics and carotenoids. Phenolics are the products of secondary metabolism in plants; play vital roles in the reproduction, growth, and metabolism of the plants; act as defence mechanisms against pathological virus and fungus infections, parasites, and predators; and contribute to the color of plants. In addition to their functions in plants, phenolic compounds in our diet may reduce the risk of chronic diseases such as cancer, heart disease, and diabetes.

Fruits and vegetables are good sources of dietary phenolics. Flavonoids are a major group of phenolic compounds that commonly have a generic structure consisting of 2 aromatic rings (A and B rings) connected by 3 carbons that are usually in an oxygenated heterocycle ring, or C ring. Fruits, vegetables, and other plant foods are rich sources of flavonoids, which have been linked to reducing the risk of major chronic diseases, such as heart disease, cancer, stroke, diabetes, Alzheimer's disease, cataracts, and age-related function decline. Carotenoids have

received considerable attention because of their unique physiological functions as provitamins and antioxidant effects, especially in scavenging singlet oxygen. Carotenoids play essential functions in photosynthesis and photoprotection in plants. The photoprotection role of carotenoids in plants is due to their ability to quench reactive oxygen species, especially singlet oxygen, which is formed from exposure of light and radiation. Carotenoids can react with free radicals and become radicals themselves. Their reactivity is mainly influenced by the length of the chain of conjugated double bonds and the characteristics of the end functional groups.

Vitamin C is an essential nutrient and plays an important function in collagen synthesis to prevent scurvy, a vitamin C deficiency disease. Vitamin C is also an excellent antioxidant to scavenge free radicals and to prevent oxidative stress. Potatoes are also good sources of vitamin B-6, which is essential for regulating nervous system function and metabolism. Glycoalkaloids are natural toxins produced in potatoes during germination. Glycoalkaloids are synthesized as natural defense mechanisms against pathogens, insects, parasites, and predators and are mainly localized in the skin with the highest levels around the eyes of outer layer of potatoes. These compounds are toxic to humans and can cause death at concentrations >330-mg/kg sample.(jinkai zheng, 2019).

Dietary Fibers from Fruits and Vegetables and Their Health Benefits

Dietary fibers (DFs) regulate host health through various mechanisms related to their dietary sources, specific physicochemical structures, fermentability, and physiological properties in the gut. Considering the numerous types and sources of DFs and their different physicochemical and physiological

properties, it is challenging yet important to establish the key mechanisms for the beneficial health effects of DFs. In this review, the types and structures of DFs from different fruits and vegetables were summarized and the effects of different processing methods on DF properties were discussed. Moreover, the impacts of DFs on gut microbial ecology, host physiology, and health were described. Understanding the complex interaction between different DFs and gut microbiota is vital for personalized nutrition. It is also important to comprehend factors influencing gut microbiota and strategies to regulate the microbiota, thereby augmenting beneficial health responses. The exploration of molecular mechanism linking DFs, gut microbiota, and host physiology may allow for the identification of effective targets to fight against major chronic diseases.(Liu, 2013).

2. 2. FRUITS AND VEGETABLES AND LIFESTYLE DISEASES.

Increased consumption of fruit and vegetables for the primary prevention of cardiovascular diseases

There is increasing evidence that high consumption of fruit and vegetables is beneficial for cardiovascular disease (CVD) prevention. The primary objective is to determine the effectiveness of i) advice to increase fruit and vegetable consumption ii) the provision of fruit and vegetables to increase consumption, for the primary prevention of CVD. Cardiovascular disease (CVD) is a global burden and varies between regions. This regional variation has been linked in part to dietary factors and low fruit and vegetable intake has been associated with higher rates of CVD. This review assessed the effectiveness of increasing fruit and vegetable consumption as a single intervention without the influence of other dietary patterns or other lifestyle modifications in healthy adults and those at high

risk of CVD for the prevention of CVD. It is found 10 trials involving 1730 participants in which six examined the provision of fruit and vegetables to increase intake and four trials examined dietary advice to increase fruit and vegetable intake (Biondi, et. al., 2021). There were variations in the type of fruit and vegetable provided but all interventions investigating provision involved only one fruit or vegetable component. There were also variations in the number of fruit and vegetables that participants were advised to eat. Some studies advised participants to eat at least five servings of fruit and vegetables a day while others advised at least eight or nine servings per day. The duration of the interventions ranged from three months to one year. Adverse effects were reported in three of the included trials and included increased bowel movements, bad breath and body odour. None of the included trials were long enough to examine the effect of increased fruit and vegetable consumption on cardiovascular disease events such as heart attacks. There was no strong evidence that provision of one type of fruit or vegetable had beneficial effects on blood pressure and lipid levels but most trials were short term. There was some evidence to suggest beneficial effects of dietary advice to increase fruit and vegetable consumption but this is based on findings from two trials. More trials are needed to confirm these findings. (Louise Hartley-published in 4June 2013).

The Role of Dietary Factors in Cancer Prevention: Beyond Fruits and Vegetables

Cancer, a disease resulting from dysregulated cell growth control, is caused by an interaction of dietary, genetic, and environmental risk factors. Dietary factors, including physical activity, may contribute to approximately one-third of all cancers. This meta-review summarizes dietary factor and cancer risk

associations and makes specific dietary recommendations to reduce risk of specific cancers. The evidence supporting specific dietary recommendations to reduce the risk of cancer is heterogeneous in its strength and consistency (Farvid et.al., 2016). Prospective epidemiologic studies have provided strong evidence supporting regular physical activity and minimal adult weight gain to lower risk of colorectal and breast cancer. The strongest evidence linking specific foods to decrease risk of certain cancers includes the consumption of fruits and vegetables and whole grains. Secondary prevention trials and observational prospective epidemiologic studies have demonstrated the efficacy of a Mediterranean-type dietary pattern to decrease risk of both cancer and cardiovascular diseases. We recommend the adoption of dietary patterns emphasizing regular physical activity, fruits and vegetables, whole grains, legumes, nuts, seeds, and low-fat dairy products to all people at risk for cancer and cardiovascular disease. These recommendations may be incorporated into enjoyable cultural food patterns as exemplified by Mediterranean-type diets. The preparation and enjoyment of meals in a convivial atmosphere is a vital component of lifestyles to prevent chronic diseases such as cancer and certain cardiovascular diseases. (Oliveria, 2023)

2.2. METHOD OF CONSUMING FRUITS AND VEGETABLES.

Fruit and vegetable intake: issues with definition and measurement

Accurate determination of fruit and vegetable consumption is essential for research that seeks to determine current fruit and vegetable intake patterns, what type and amount of fruit and vegetable consumption is optimal for human health and for evaluating interventions developed to increase such consumption. However, there are many issues that make accurate determination of fruit and

vegetable consumption quite difficult. There are many methods used to measure fruit and vegetable intake, but all have limitations. Also, what foods individuals consider to be or to not be fruits or vegetables appear to be quite variable, with such variability often associated with the individual's racial/ethnic background. Researchers and governmental agencies vary with respect to what foods they include and do not include when calculating fruit and vegetable intake. Chronic diseases are increasing in prevalence worldwide. Nearly a third of deaths worldwide are from CVD and it is estimated that by 2025, nearly 30 % of the adult population in the world will have hypertension).

The worldwide prevalence of overweight and obesity and of diabetes, are increasing at epidemic rates, with diabetes prevalence expected to more than double to 366 million persons worldwide by 2030. In the USA, approximately 90 million persons suffer from at least one chronic disease with seven of every ten deaths attributable to chronic diseases (Das, et. al., 2017). It is estimated that the annual medical costs associated with chronic diseases exceed $US 1 trillion, While many dietary components contribute to good nutrition and health, much focus has been placed on inadequate consumption of fruits and vegetables. Studies are increasingly showing that low levels of fruit and vegetable intake are associated with the development of major chronic diseases including CVD), stroke and diabetes, and hypertension, Thus, development and implementation of effective interventions to increase intake of fruits and vegetables are of utmost importance. However, it is first necessary to identify exactly what should be targeted in such interventions and this in turn requires accurate and consistent methods for determining individuals' fruit and vegetable intake.. In light of the association between fruit and vegetable intake and health and disease, researchers have sought

to evaluate current intakes of fruit and vegetables among various populations including often determining what proportion of a study population meets a set goal intake of fruit and vegetables. Theoretically the goal is or should be a level of intake that promotes health and prevents disease. For many years, the oft-cited goal was that individuals should consume at least 5 or more servings of fruits and vegetables combined on a daily basis, a goal set out in 1990 in both Healthy People 2000) and the US Department of Agriculture's and US Department of Health and Human Services' Dietary Guidelines for Americans. The latter also specified that at least 2 servings come from fruit and at least 3 servings come from vegetables, a seemingly small qualification. However, when the same data were analysed using guidelines similar to those recommended in the Dietary Guidelines for Americans only 12 % of adults met intake objectives compared with 32 % when the goal was the more general '5 or more'(

Increasing knowledge regarding health and nutrition has led to frequent refinements in what is considered goal intake. Healthy People 2010 objectives were more specific than Healthy People 2000 objectives with the goal being at least 2 daily servings of fruits and at least 3 daily servings of vegetables and the additional requirement for vegetables that at least one-third or more of servings be dark green or orange vegetables. The US Department of Health and Human Services and the US Department of Agriculture also set out more specific goals in their Dietary Guidelines for Americans 2005. Those guidelines recommended that fruit and vegetable intake increase with increasing energy needs and stated that many persons would need to eat nine or more servings daily to meet recommendations. In a study where the criteria for meeting fruit and vegetable intake were similarly specific, and with the adequate level of intake being tied to

gender, age and level of activity, it was estimated that fewer than 5 % of American adults met the recommended levels of fruit and vegetable intake). Healthy People 2020, launched in December 2010, reflecting the increasing agreement of the importance of both consuming a variety of fruits and vegetables and consuming amounts of fruits and vegetables correlated with overall energy needs, has set goals where consumption of fruits and vegetables is stated in cup equivalents per 1000 kcal (4184 kJ) rather than in servings and where an additional specific goal is stated for consumption of a specific category consisting of dark green and orange vegetables and legumes in addition to the general categories of fruits and of vegetables. The Dietary Guidelines for Americans 2010 not only recommends increased consumption of vegetables, especially dark green and orange and red vegetables and legumes, but also provides specific recommended daily intakes for five categories of vegetables in relation to daily energy intake. These recommendations are based on the association between increased intake and reduced risk for many chronic diseases as previously discussed and on the fact that fruits and vegetables are nutrient-dense foods and eating them may also help in maintaining healthy body weight . (Randall A Roark-published in 4th April 2012)

Progress in smart labels for rapid quality detection of fruit and vegetables

Smart labels are an effective way to provide timely feedback to consumers on the quality of fruit and vegetables and have great potential for development and market application. This paper reviews the types and research progress of smart labels. It also summarizes the classification of various smart labels according to the factors affecting the quality of fruit and vegetables. Based on the characteristics of fruit and vegetables, smart labels suitable for fruit and vegetable quality

inspection are collated, including ethylene-sensitive, color-sensitive and temperature-sensitive types. Finally, the future development and new applications of smart labels are foreseen. Fruit and vegetables play an important role in our daily diet and are rich in some essential vitamins, inorganic salts, biological enzymes and dietary fiber that are beneficial to human health. fruit and vegetables are susceptible to mechanical, physical, chemical, and microbial damage during postharvest storage and transportation. It can impair their quality and make them potentially uncomfortable for people to consume, and more seriously, microbial contamination of fruit and vegetables may cause diseases worldwide (Hsia, et. al., 2021).

Synthetic fungicides and biological control methods are commonly used to improve the quality of fruit and vegetables, but they can only be carried out at a certain stage of fruit and vegetable production and marketing. In this case, real-time detection of fruit and vegetable quality is very necessary. Smart labels can not only provide quality information for producers, but also provide food data for consumers. Food data refers to data information that can characterize food quality and food safety, including the temperature and pH condition of the environment in which the food is located and the condition of its own respiratory loss and contamination by microorganisms. smart labels applied to fruit and vegetable quality inspection can be more intuitive for quality inspection and monitoring, and provide safer and healthier products to consumers. This paper will review the smart labels that can be used for rapid fruit and vegetable quality inspection and categorize their principles and application status to provide theoretical references for the further development of fruit and vegetable quality industry. (Chen, 2023).

Chapter 3

METHODOLOGY

Research Methodology is the systematic, theoretical analysis of the methods applied to a field of study. According to the contemporary scenario, adolescent food habit is very much unhealthy, eating inadequate unhealthy food with less vegetables and fruits having low nutritive value. The study on ***'Consumption of Fruits and Vegetable among Adolescent Girls'*** aims to analyse the consumption of fruits and vegetable among adolescents

The methodology adopted to collect data for the study is a baseline survey in online mode. Online surveys are one of the most popular option for people and organizations who would like to collect their research data with less time in a cost effective way. A set of questions is sent to the target sample and the sample can respond via world wide web. The sample receive online surveys via various mediums such as email, embedded over website, social media etc. Through online survey, one can collect the data fast and make the results without much delay.

The survey comprised of following steps:

3.1. Study Locale

3.2. Selection of Sample

3.3. Selection of Tool

3.4. Collection, Consolidation and Analysis of the Data

3.1. Study Locale

The selected area for the study is Ernakulam district of Kerala state. This area was selected due to the convenience and easy access for the researcher.

3.2. Selection of Sample

Sample size of the study consisted of 100 adolescent girls from 16 to 19 years (late adolescence period). The technique used for selection of sample is convenience sampling technique.

3.3. Selection of Tool

Selection of tool is an important part of the study. A structured questionnaire was used to collect the necessary information for the study. The questionnaire as a tool, usually comprised of a set of standardized questions that explore a specific topic and collect the necessary information about demographics, opinions, attitudes or behaviours (Walliman, 2011).

The structured questionnaire developed as the tool for the study which include a set of questions to collect the general information, information pertaining to fruits and vegetable consumption pattern among adolescence is given in Appendix 1.

3.1.4. Collection, Consolidation and Analysis of the Data

The questionnaire was converted to Google form and the google form link was distributed through WhatsApp. It is a cost saving method and the respondents can be flexible over where and when to complete their questionnaire. The filled in questionnaire were collected, consolidated, analyzed and presented in tables and figures for ease in understanding. A table is one of the simplest and most revealing

devices for summarizing data and presenting them in a meaning full manner. Graphs make the data easily understandable from a lay person's point of view. Thus tables and graphs were used to make the results more convincing and appealing.

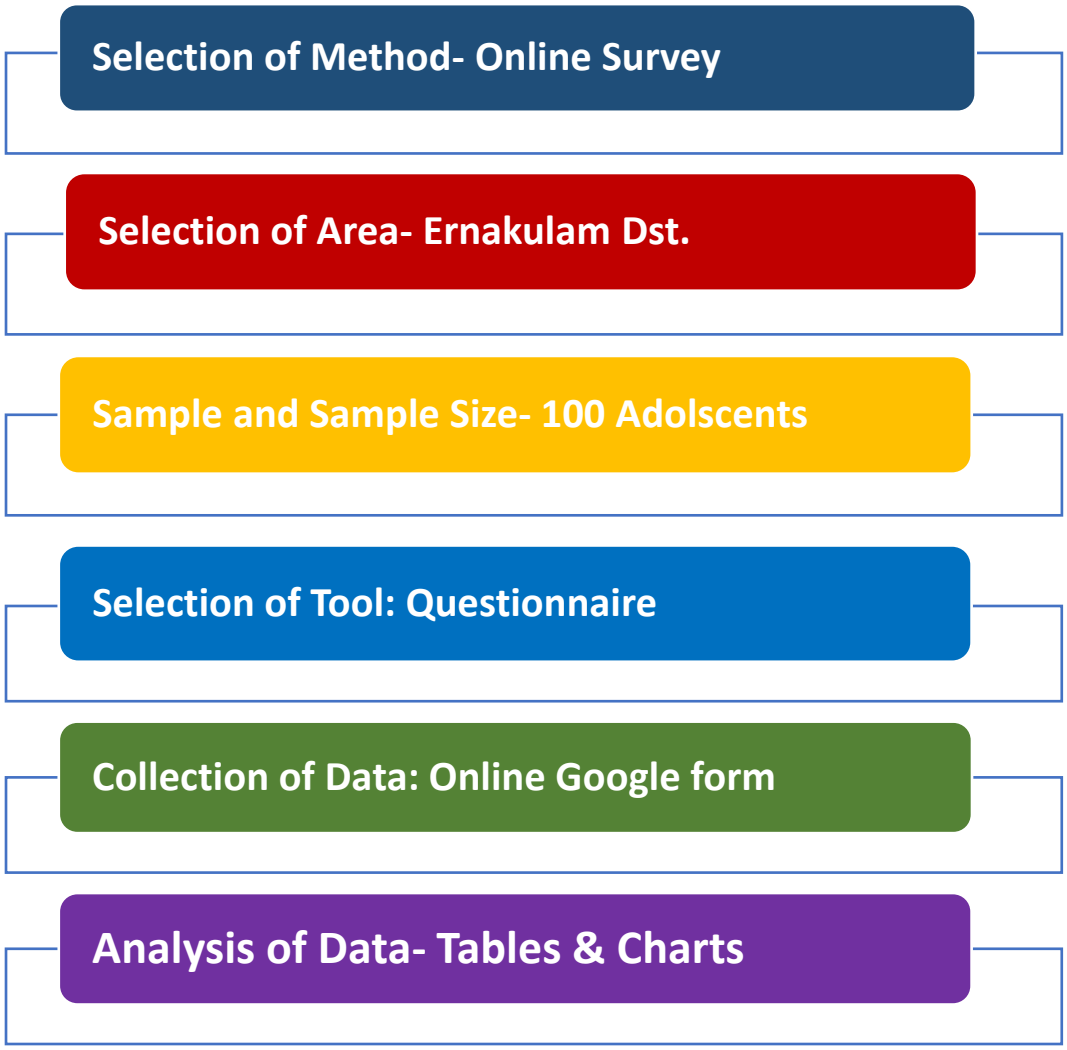

Figure 3.1

Research Design

Chapter 4
RESULTS AND DISCUSSION

Fruits and vegetable consumption is linked to many positive health outcomes, but studies reveals that many of the teenagers do not consume fruits and vegetables on a daily basis (Vareecken, et. al., 2015). The study was conducted with the aim of analyzing the fruits and vegetable consumption habit of among adolescents. The results of the study entitled ***'Consumption of Fruits and Vegetable among Adolescent Girls'*** is presented and discussed in following sub headings.

4.1. Background details of the selected samples

4.2. Information pertaining to fruits and vegetable consumption

4.1. BACKGROUND DETAILS OF THE SELECTED SAMPLE

The background information pertaining to the selected sample comprised of name, contact number, age and income level of the family.

4.1.1. Age of the Sample

The respondents of the study were classified according to their age and given in the figure 4.1.

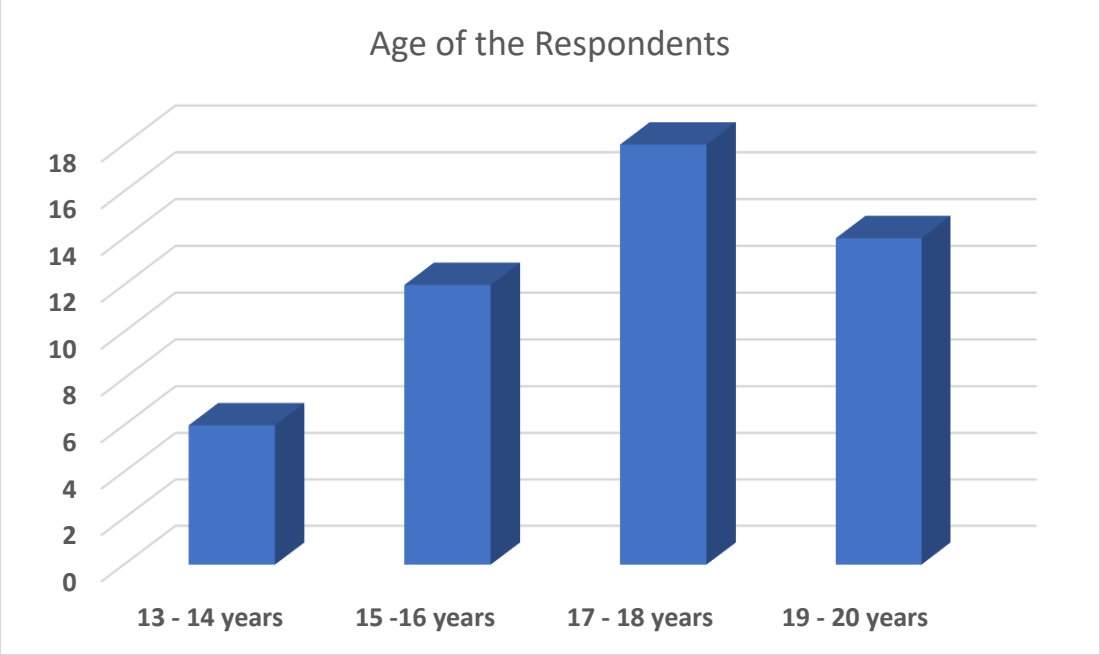

Figure 4.1

Distribution of the samples according to their Age

The sample consists of 50 adolescent girls from different both early adolescent stage and late adolescent stage. They include 12% of 13-14 age category, 24% of 15-16 age category, 36% of 17-18 category and 28% 19-20 category.

4.1.2 Income level of the respondents

The respondents of the study were classified according to their income level as shown in figure 4.2.

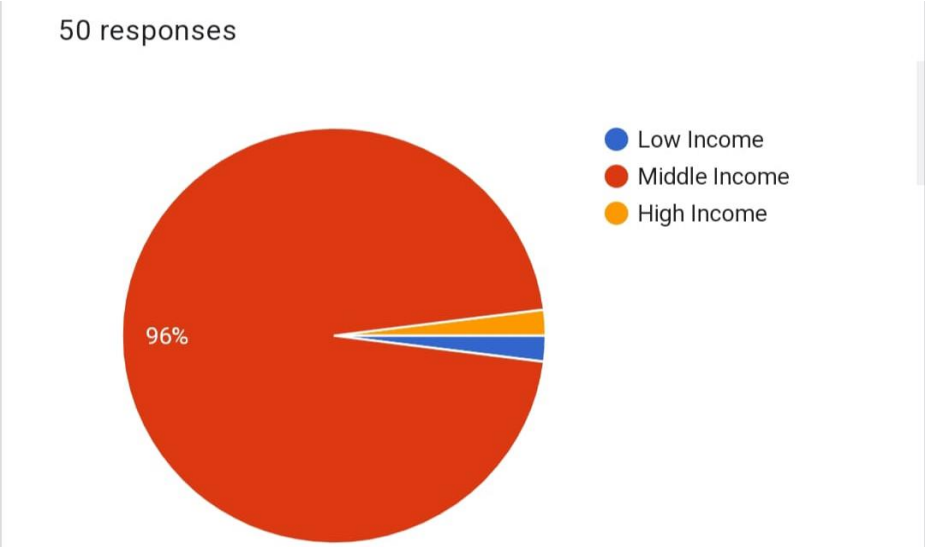

Figure 4.2

Distribution of the samples according to their Income level

The study reveals that majority of the respondents (96%) is from middle income families.

4.2. INFORMATION PERTAINING TO FRUITS AND VEGETABLE CONSUMPTION

4. 2.1. Inclusion level of fruits among respondents.

The respondents of the study were classified according to the inclusion level of fruits in diet as shown in the figure 4.3.

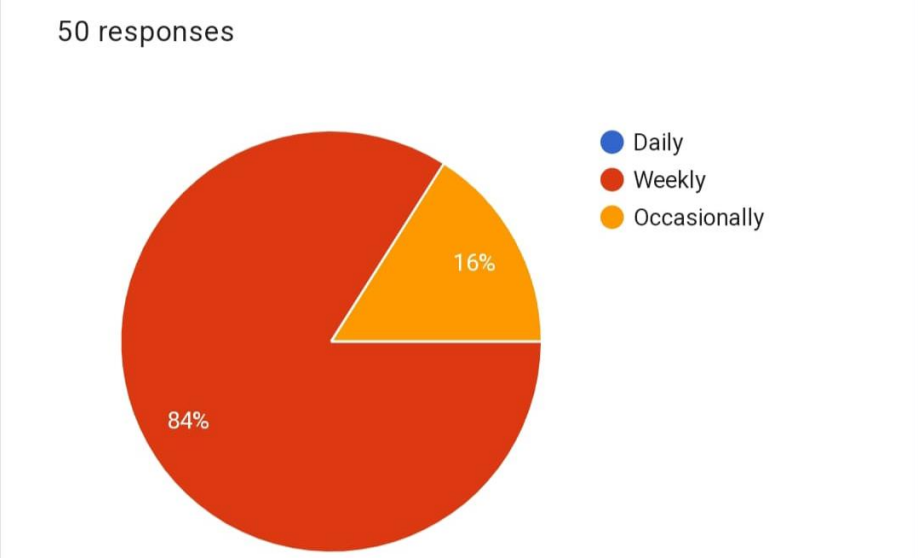

Figure 4.3

Classification of the respondents according to Inclusion of fruits in Diet

The study reveals that daily consumption of fruits among the respondents was nil. The majority (84%) of the respondents consumes fruits weekly and 16% of the respondents consumes occasionally.

4. 2. 2. Inclusion of vegetables among respondents in their Diet

The respondents of the study were classified according to the inclusion level of vegetables in the diet as shown in the figure 4.4.

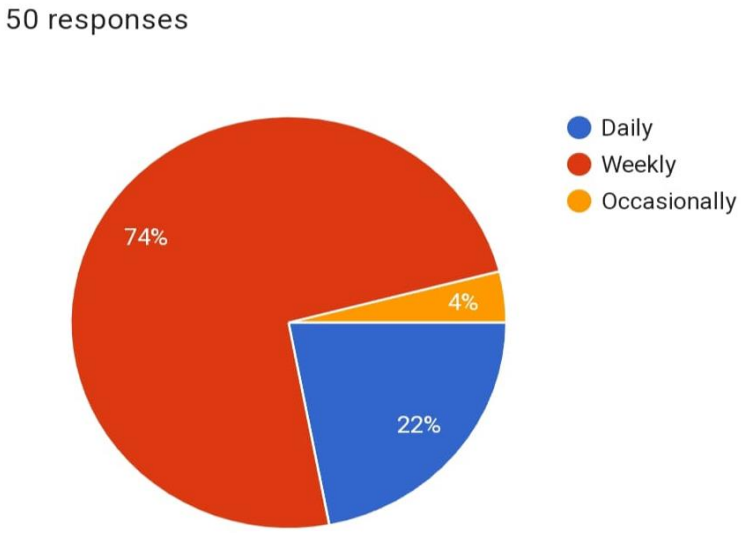

Figure 4.4

Classification of the respondents according to Inclusion of vegetables in Diet

The study reveals that majority (74%) of the respondents consumes vegetables only weekly and 22% of the respondents consumes daily and 4% of the respondents are belonging to occasionally.

4. 2. 3 Types of fruits consumed

The details of the types of fruits consumed by the respondents are shown in the Figure 4.5.

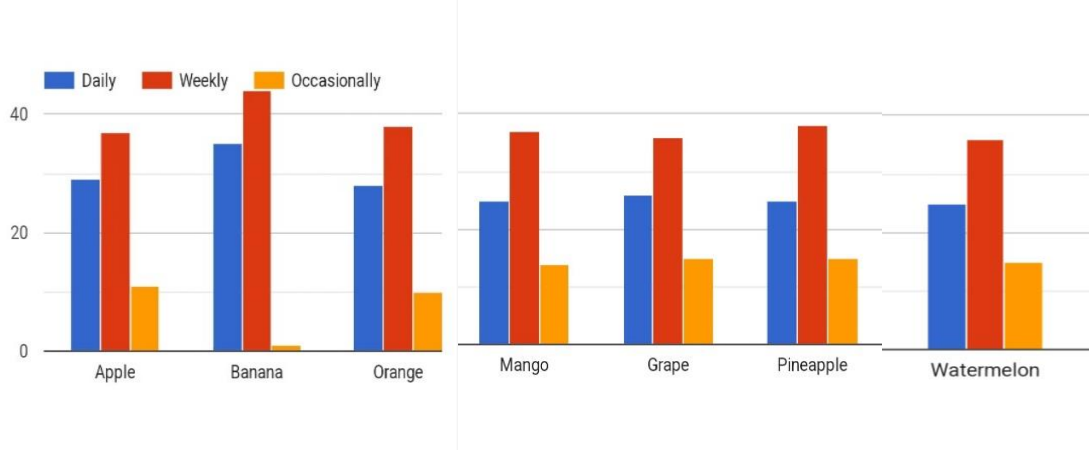

Figure 4.5

Types of fruits consumed.

The above figure shows various types of fruits consumed by the respondents. Fruits consumed by the respondents include apple, banana, orange, mango grapes, pineapple and watermelon.

4.2.4. Types of vegetables consumed

The details of the types of Vegetables consumed by the respondents in the study are shown in the Figure 4.6.

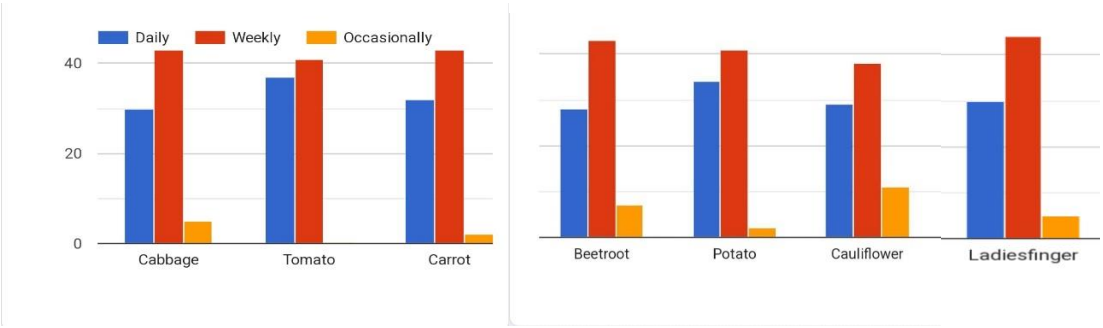

Figure 4.6

Types of vegetables consumed.

The graph shows various types of vegetables consumed by the respondent. The vegetable consumed includes cabbage, tomato, carrot, beet root potato, cauliflower and lady's finger.

4.2.5. Quantity of fruits Consumed by the Respondents.

The quantity of fruits consumed by the respondents is shown in the figure 4.7.

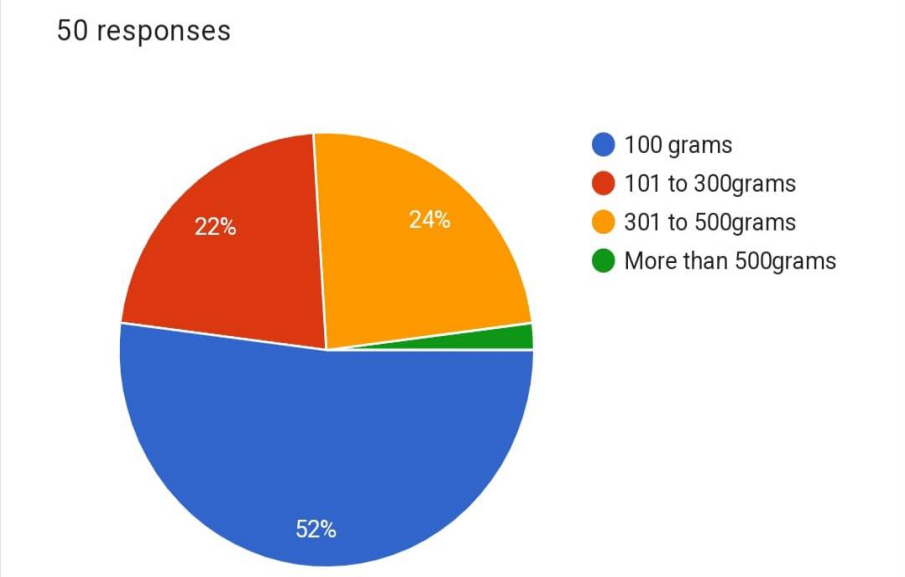

Figure 4.7.

Quantity of fruits Consumed by the Respondents.

The study reveals that the more than half (52%) of the respondents consumes less than 100 grams of fruits. 24%of the respondents consumes 301 to 500 grams of fruits, 22% of the respondents consumes 101 to 300grams and only very few respondents consume more than 500 grams of fruits.

4. 2. 6 Quantity level of vegetables consumed by the respondents.

The details of the quantity of vegetables consumed by the respondents is shown in the figure 4.8.

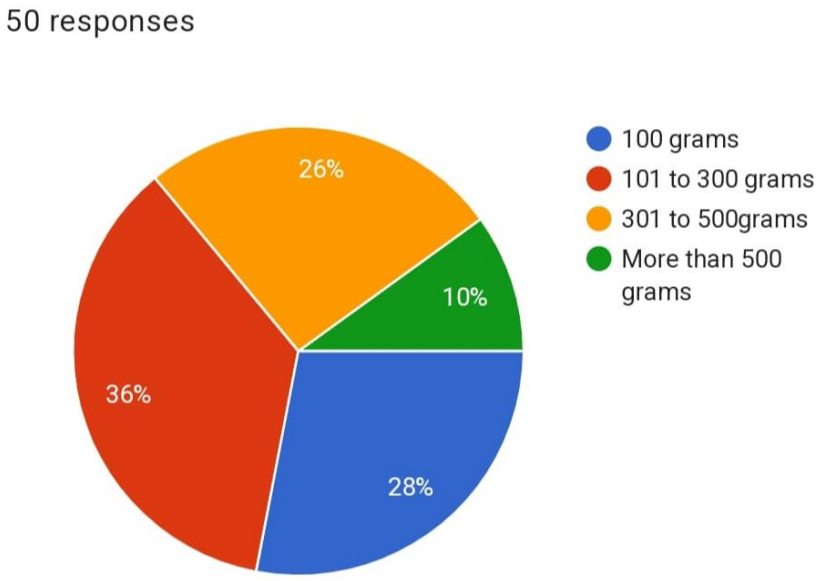

Figure 4.8

Quantity of vegetables Consumed

The study reveals that 36%of the respondent consumes 101 to 300 grams.28% of the respondents consumes 100grams.26%of the respondents consumes 301 to 500grams.and 10% of the respondents consumes more than 500grams.

4. 2.7. Method of Consuming Fruits

The details of the method of consuming fruits among respondents is given in the figure 4.9.

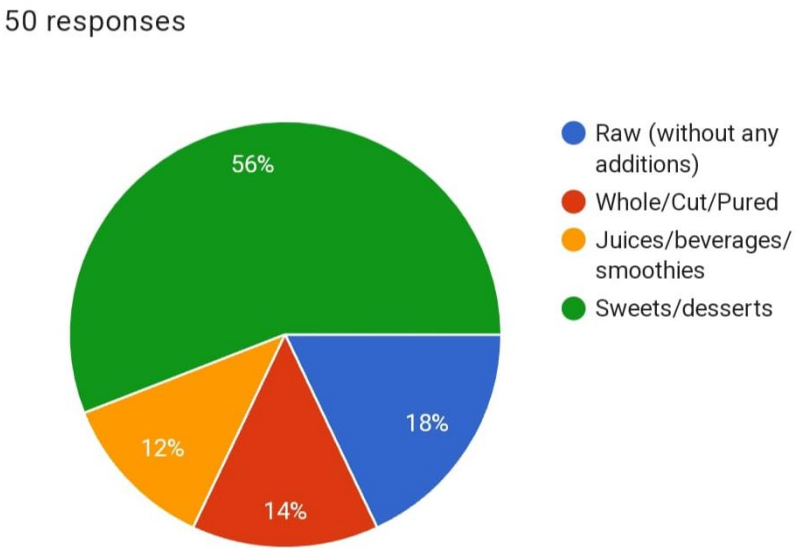

Figure 4.9.

Method of Consuming fruits

The study shows that more than half of the respondents (56%) consumes fruits as sweets/desserts. 18% of the respondent consumes raw fruits (without any additions). 14%of the respondents consumes whole/cut/pureed fruits. 12% of the respondents consumes fruits as juices/beverages/smoothies.

4.2.8. Method of Consuming vegetables among respondents

Method of the consuming vegetables among the respondents is shown in the figure 4.10.

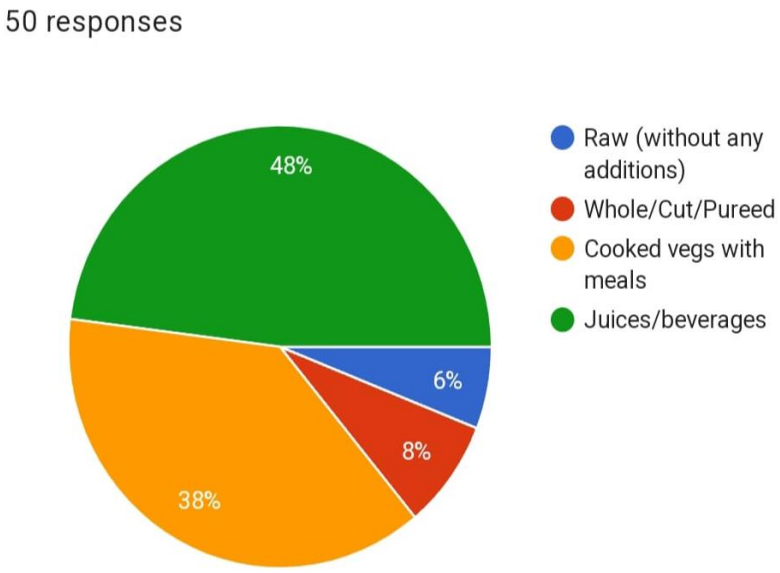

Figure 4.10.

Method of consuming vegetables

The study shows that 48% of the respondents consumes as juices/ beverages. 38% of the respondents consumes cooked vegs with meals, 8% of the respondents consumes whole/cut/pureed, 6%of the respondents consumes raw (without any additions).

4. 2. 9. Frequency of Consuming fresh fruits among respondents

Frequency of Consuming fresh fruits among respondents in the study is given in the figure 4.11.

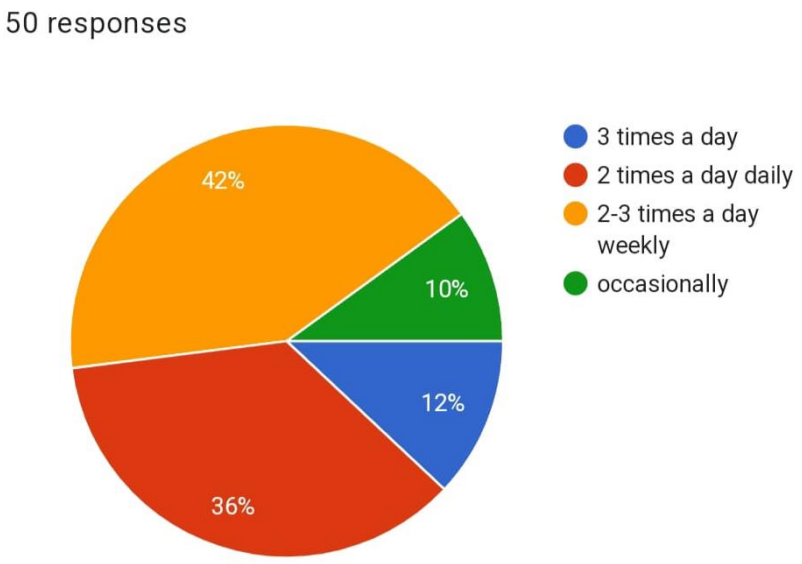

Figure 4.11.

Frequency of Consuming fresh fruits among the respondents

The study shows that nearly half of the respondents (42%) consumes 2-3 times a day weekly, 36%of the respondents consumes 2 times a day, 12% of the respondents consumes 3 times a day and 10% of the respondents consumes occasionally.

4. 2. 10 Frequency of Consuming fresh vegetables among respondents

Frequency of Consuming fresh vegetables among respondents is given in figure 4.12

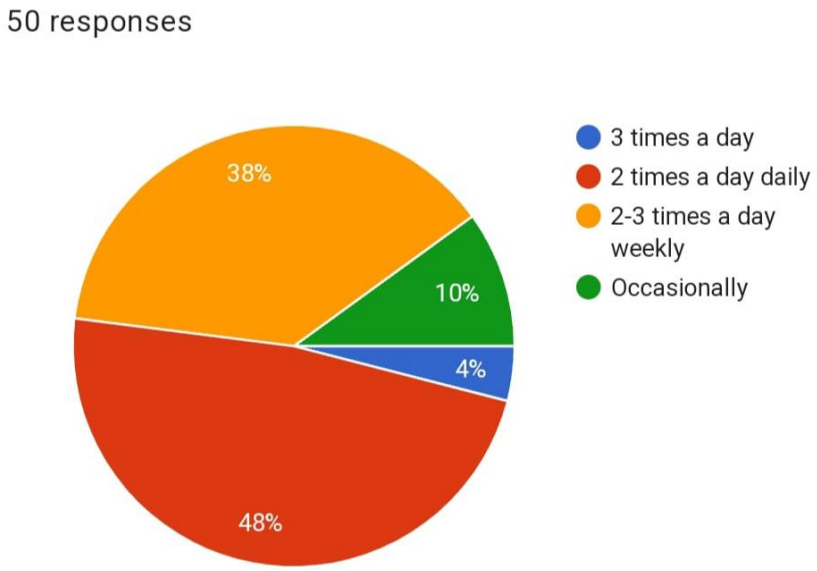

Figure 4.12.

Frequency of Consuming fresh vegetables among respondents

The study shows that nearly half of the respondents (48%) consumes 2 times a day, 38% of the respondents consumes 2-3 times a day weekly, 10% of the respondents consumes occasionally and 4% of the respondents consumes 3 times a day.

4. 2.11 Intake of fruits and vegetables among respondents

The details regarding intake of fruits and vegetables among respondents in the study as shown in the figure 4.13.

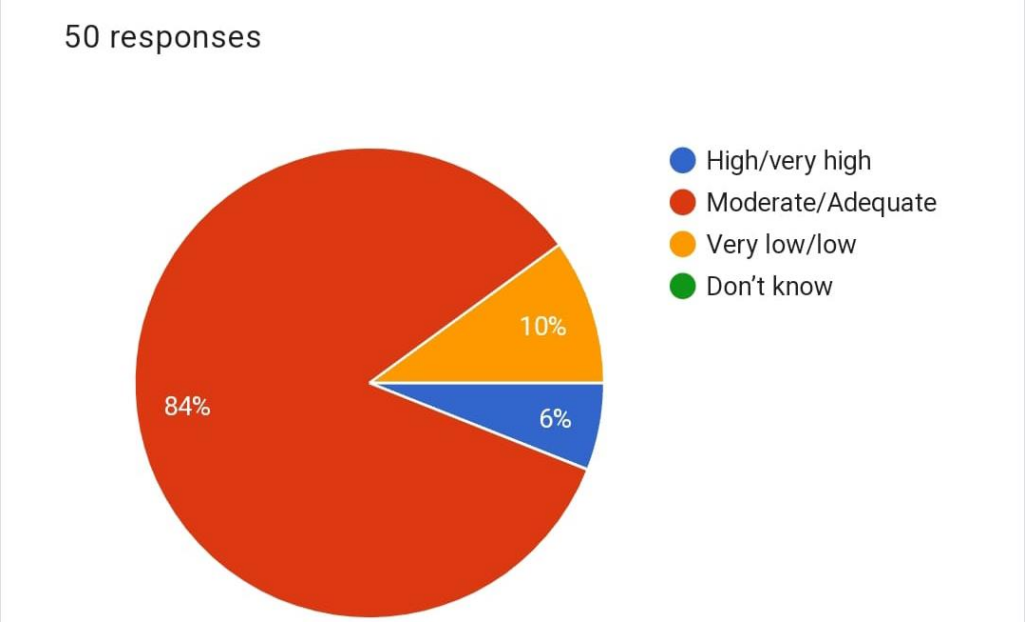

Figure 4.13.

Intake of Fruits and Vegetables.

The study shows that majority of the respondents (84%) consumes moderate/adequate amount of fruits and vegetables, only 10% of the respondents comes under very low/ low category and only 6% respondents comes under high/very high category.

4. 2. 12. Assessment of fruits and vegetables consumption among respondents for the past 6 months

Assessment of fruits and vegetables consumption among respondents for the past 6 months is given in figure 4.14.

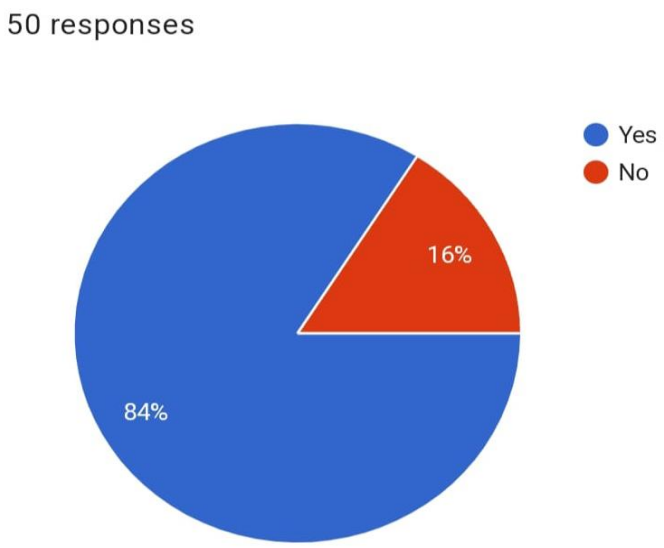

Figure 4.14

Assessment of fruits and vegetables consumption for the past 6 months

While assessing fruits and vegetables consumption among respondents in their opinion, majority of the respondents (84%) says they increased their fruit and vegetable consumption during the past 6 months, while 16% of the respondents does not.

4.2.13. Future Consumption of fruits and vegetables

The details regarding future consumption of fruits and vegetables intake over the next 6 months among respondents is shown in the figure 4.15.

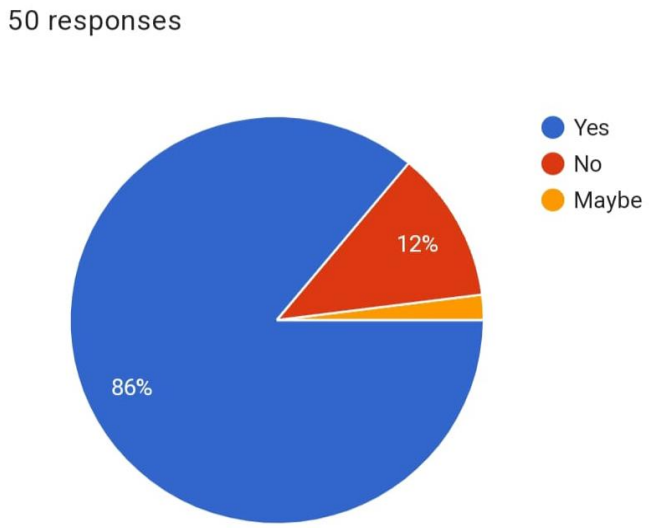

Figure 4.16

Future Consumption of fruits and vegetables.

The study reveals that majority (86%) of the respondents would like to increase their fruits and vegetable consumption, while 12% says no and 2% may or may not increase their consumption.

4. 2.14. Interest in setting up organic garden

Interest of the respondents regarding setting up of organic garden for increasing fruits and vegetable consumption were collected and given in the figure 4.17.

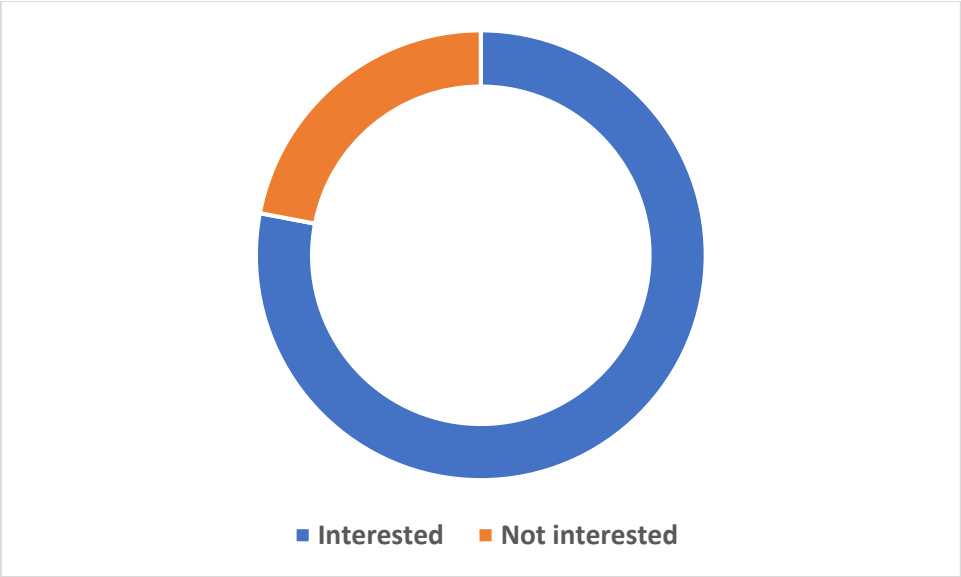

Figure 4.17.

Interest in setting up Organic Garden

The study reveals that the majority (78%)of the respondent are interested in setting up an organic garden in their home premises for increasing consumption of fresh fruits and vegetables while 22% were not interested.

Chapter 5
SUMMARY AND CONCLUSION

The results obtained from the study on ***'Consumption of Fruits and Vegetable among Adolescent Girls'*** *is* summarized and presented in following points:-

1. The study locale was Ernakulam district.
2. An online survey was conducted through social media platforms and data was collected and recorded.
3. The sampling technique used was convenience sampling technique.
4. The sample consists of 50 adolescent girls from different both early adolescent stage and late adolescent stage. They include 12% of 13-14 age category, 24% of 15-16 age category, 36% of 17-18 category and 28% 19-20 category.
5. Majority of the respondents (96%) is from middle income families.
6. The study reveals that daily consumption of fruits among the respondents was nil. The majority (84%) of the respondents consumes fruits weekly and 16% of the respondents consumes occasionally.
7. The study reveals that majority (74%) of the respondents consumes vegetables only weekly and 22% of the respondents consumes daily and 4% of the respondents consumes occasionally.
8. The common fruits consumed by the respondents include apple, banana, orange, mango grapes, pineapple and watermelon.

9. The common vegetables consumed by the respondents includes cabbage, tomato, carrot, beet root potato, cauliflower and lady's finger.
10. The study reveals that the more than half (52%) of the respondents consumes less than 100 grams of fruits. 24%of the respondents consumes 301 to 500 grams of fruits, 22% of the respondents consumes 101 to 300grams and only very few respondents consume more than 500 grams of fruits.
11. The study reveals that 36%of the respondent consumes 101 to 300 grams.28% of the respondents consumes 100grams.26%of the respondents consumes 301 to 500grams.and 10% of the respondents consumes more than 500grams.
12. The study shows that more than half of the respondents (56%) consumes fruits as sweets/desserts. 18% of the respondent consumes raw fruits (without any additions). 14%of the respondents consumes whole/cut/pureed fruits. 12% of the respondents consumes fruits as juices/beverages/smoothies.
13. The study shows that 48% of the respondents consumes as juices/ beverages. 38% of the respondents consumes cooked vegs with meals, 8% of the respondents consumes whole/cut/pureed, 6%of the respondents consumes raw (without any additions).
14. The study shows that nearly half of the respondents (42%) consumes 2-3 times a day weekly, 36%of the respondents consumes 2 times a day, 12% of the respondents consumes 3 times a day and 10% of the respondents consumes occasionally.

15. Nearly half of the respondents (48%) consumes 2 times a day, 38% of the respondents consumes 2-3 times a day weekly, 10% of the respondents consumes occasionally and 4% of the respondents consumes 3 times a day.
16. The study shows that majority of the respondents (84%) consumes moderate/adequate amount of fruits and vegetables, only 10% of the respondents comes under very low/ low category and only 6% respondents comes under high/very high category.
17. While assessing fruits and vegetables consumption among respondents in their opinion, majority of the respondents (84%) says that they increased their fruit and vegetable consumption during the past 6 months, while 16% of the respondents does not.
18. The study reveals that majority (86%) of the respondents would like to increase their fruits and vegetable consumption, while 12% says no and 2% may or may not increase their consumption.
19. The study reveals that the majority (78%) of the respondents are interested in setting up an organic garden in their home premises for increasing consumption of fresh fruits and vegetables while 22% were not interested.

CONCLUSION

This study on fruits and vegetable consumption pattern of the adolescents highlights that adolescents are not much aware of the health benefits of fruits and vegetables and consumption of fruits and vegetables were not adequate. The consumption should be increased in order to build a healthy community in future.

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APPENDIX 1

QUESTIONNAIRE TO ELICIT INFORMATION REGARDING CONSUMPTION OF FRUITS AND VEGETABLES IN DAILY DIET AMONG ADOLESCENT GIRLS

I. Background Data of the respondent

1. Name of the respondent:

2. WhatsApp no.

3. Age of the respondent:

4. Income Level of the Family:

   - o Low Income
   - o Middle Income
   - o High Income

II. Details regarding Consumption Pattern

5. Inclusion of fruits in diet

   - o Daily
   - o Weakly
   - o Occasionally

6. Inclusion of vegetables in diet

- o Daily
- o Weakly
- o Occasionally

7. Types of fruits consumed

FRUITES	DAILY	WEEKLY	OCCASIONALY
1. Apple			
2. Banana			
3. Orange			
4. Mango			
5. Grapes			
6. pineapple			
7. Watermelon			
8. Any other (Specify)			

8.Types of vegetables consumed

VEGETABLES	DAILY	WEEKLY	OCCASIONALY
1. Cabbage			
2. Tomato			
3. Carrot			
4. Beetroot			
5. Potato			
6. Cauliflower			
7. Lad's finger			
8. Any other (Specify)			

9. How much quantity of fruits do you eat a day (approximately)?
    - o 100 grams
    - o 101 to 300grams
    - o 301 to 500grams
    - o More than 500grams
10. How much quatity of vegetables do you eat a day(approximately)?
    - o 100grams
    - o 101 to 300grams
    - o 301 to 500grams
    - o More than 500grams
11. How do you usually eat your fruits?
    - o Raw (without any additions)
    - o Whole/Cut/Pureed
    - o Juices/beverages/smoothies
    - o Sweets/desserts
    - o Others (Specify)
12. How do you usually eat your vegetables ?
    - o Raw (without any additions)
    - o Whole/Cut/Pureed
    - o Cooked vegs with meals
    - o Juices/beverages
    - o Others (Specify)

13. How often do you usually eat fresh fruits?
    - o 3 times a day
    - o 2 times a day daily
    - o 2-3 times a day weekly
    - o occasionally

14. How often do you usually eat fresh vegetables?
    - o 3 times a day
    - o 2 times a day daily
    - o 2-3 times a day weekly
    - o Occasionally

15. Assess your overall diet in fruits and vegetables intake? It is
    - o High/very high
    - o Moderate/Adequate
    - o Very low/low
    - o Don't know

16. In the past 6 months have you tried to increase fruits and vegetables intake?
    - o Yes
    - o No
    - o Others

17. Reason for increasing

    ……

18. Are you seriously thinking about increasing fruits and vegetables intake over the next 6 months?
    - o Yes
    - o No
    - o Others

19. Are you interested in setting up an organic garden for increasing the consumption of fruits and vegetables?

- o interested
- o not interested

21. Reasons if any, if not including adequate amount of fruits and vegetables

…….