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ASSESSMENT OF PAST DIETARY PATTERN AND RISK OF CVD AMONG YOUNG ADULTS, (20 – 40 YEARS)

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Abstract: Cardiovascular diseases (CVD) are the leading cause of mortality globally. Evidences show that around 17.9 million people are deceased due to CVD. Usually, the deaths from CVD were majorly seen among the older population (above 50 years of age) but recent studies and statistics have shown an increase in deaths and people being diagnosed with CVD among the younger population who belong to the age group below 45 years. The most important risk factors which lead to CVD include mainly unhealthy diet, lack of physical activity, consumption of alcohol, smoking, stress, improper sleep patterns and many more. The effects of these risk factors include raised blood pressure, raised blood glucose, raised blood lipids and obesity. Thus, this study was formulated to assess the relationship between lifestyle factors and the risk of CVD among youngsters aged between 20 – 40 years. The objective of this study was to assess the dietary history of the subjects. The study was conducted at Sri Jayadeva Institute of Cardiovascular Sciences & Research, Bengaluru with the sample size of 100 individuals which included both males and females and was carried out using a questionnaire. The results revealed maximum (87) were non-vegetarians and nearly half of them (47 and 32) consumed 4 – 5 meals per day respectively. More than half (57) skipped their meals mainly breakfast and lunch. The results also show that most of the subjects preferred consuming milk, vegetables, fruits (once or twice a week), bakery and confectionery products (mainly bread and sweets), rice on a daily basis, potatoes and deep oil fried foods twice or thrice a week, non-veg foods (egg, chicken, mutton, fish and beef) very frequently, tea/coffee every day, alcohol on a weekly basis (maximum thrice a week) and carbonated drinks twice or thrice a week. Thus, this study can be concluded as the subjects led a sedentary lifestyle with an unhealthy dietary pattern that has led to a higher BMI and WHR along with increasing the risk factors of CVD.

Keywords: Cardiovascular Diseases (CVD), anthropometric and dietary assessment, FFQ.

I. INTRODUCTION

Heart Diseases, also known as Cardiovascular Diseases (CVD), which is a collective term designating to numerous problems or disorders of the heart and blood vessels. It is a collective, used to describe the problems related to the blood circulatory system which includes the heart and the vasculature, i.e., it displaces and conveys the blood. Heart diseases encompass the congenital and acquired maladies associated to the heart. CVD represents the leading non-communicable cause of deaths globally. (Thiriet M., 2019)

CVD can be classified into the following - Ischemic Heart Disease (IHD), Coronary Heart Disease (CHD), Cerebrovascular Disease, Peripheral Artery Disease (PAD), Rheumatic Heart Disease (RHD), Congenital Heart Disease, Congestive Heart Failure, Pulmonary Embolism, Cardiomyopathy, Arrhythmia. All the mentioned classifications share a common pathophysiology which involves atherosclerosis (build of plaque in the arteries) and thrombosis (clotting of blood). The Etiology/Risk factors of heart disease include unhealthy dietary pattern which is one of the most important risk factors, lack of physical activity, tobacco smoking and consumption of alcohol. These result in behavioural risk factors which is seen as increased blood pressure, increase in the blood lipids, raised blood glucose, stress and overweight/obesity. These are modifiable risk factors. The nonmodifiable risk factors include menopausal status, age and 4 gender, family history and birth defects or congenital defects. (Jhumki Kundu et al., 2022) (Amani, Reza et al., 2012)

The signs and symptoms begin with pain and discomfort in the chest area, in some cases this pain radiates to the arms, left shoulder, elbows, jaw, stomach and the back, the patient experiences difficulty in breathing and shortness of breath, nausea, vomiting, sweating, light-headedness, severe headache, dizziness, fainting, fatigue, irregular heartbeats, difficulty while sleeping (shortness of breath), difficulty in walking, leg pain, loss of balance, difficulty in speech, difficulty in seeing (blurriness), edema in the legs, bloating in the stomach (fluid buildup), rheumatic fever includes fever, pain and swelling of the joints, stomach cramps, nausea and vomiting.

Common treatments for CVD include surgical treatments like coronary artery bypass grafting, vascular catheterization, valve replacement, artificial heart transplant and heart transplant from a donor. Behavioural and lifestyle changes mainly include maintaining a healthy dietary pattern as nutrition is the most important behavioural factor in preventing CVD, regularization of physical activity, avoiding further smoking and alcohol consumption, avoiding high fatty foods, foods with high amount of salt and sugars. Medications include beta-blockers, aspirin, angiotensin converting enzyme inhibitors and statins.

Need for the study: The need for taking up this study was to assess the previous lifestyle pattern of the patients who are now diagnosed with cardiovascular diseases. A large number of them consume unhealthy foods on a regular basis which affects their weight management and heart health.

Aim: To assess the relationship between the dietary pattern and the risk of CVD among youngsters (20 – 40 years).

Objectives: To assess the somatic status and the dietary history of the subjects.

II. RESEARCH MATERIALS & METHODS

Detailed information regarding the methods and materials used in the study has been discussed under the following subheadings.

2.1 Location and Sampling

2.2 Data Collection using a questionnaire

2.3 Statistical Analysis

2.1 LOCATION & SAMPLING

2.1.1 LOCATION

The study was carried out at Sri Jayadeva Institute of Cardiovascular Sciences & Research. The data collection was done with a help of a questionnaire.

2.1.2 SAMPLING

The study was conducted on a group of individuals who were diagnosed with CVD and were inpatients.

- The samples were collected by purposive random sampling.
- The samples were young adults who belonged to the age group of 20 – 40 years.
- They included both males and females.
- The total sample size (N) was 100.

2.2 DATA COLLECTION

The study involved purposive random sampling technique. The data was collected with the help of a questionnaire. The study was carried out in Bangalore amongst 100 inpatients. The subjects were summarized about the study and then the data was collected with one-on-one interactions.

The questionnaire was classified into the following parts:

PART A: Socio Demographic data (name, age, gender, occupation, lifestyle, sociodemographic scale using Kuppu Swamy scale)

PART B: Nutritional Assessment

PART 1B: Anthropometric Assessment (height (cm), weight (kg), waist and hip circumference (cm), BMI and waist to hip ratio)

Part 2B: Biochemical Assessment (lipid profile, blood pressure, random blood glucose, and haemoglobin)

PART 3B: Clinical Assessment (general information like physical activity, smoking, stress, sleep pattern, weight loos or weight h=gain in past 6 months, family history regarding CVD; examination based on the heart disease the subject had and symptoms prior to being admitted)

PART 4B: Dietary Assessment (type of diet consumed, number of meals consumed per day, skipping of meals and a validated food frequency questionnaire)

2.3 STATISTICAL ANALYSIS

The collected data was compiled, classified, tabulated and subjected to statistical analysis.
The following statistical analysis was being done: Mean, Standard Deviation, T-test and Chi-Square test

III. RESULTS & DISCUSSIONS

This present study was carried out to assess the previous lifestyle pattern of the patients who are now diagnosed with cardiovascular diseases.

Table 1. Response based on the Type of Diet the respondents followed

Characteristics	Category	Respondents	
		Number	Percent
Diet type	Lacto-vegetarian	10	10.0
	Eggetarian	3	3.0
	Non-vegetarian	87	87.0
Number of meals eaten per day	2	4	4.0
	3	17	17.0
	4	47	47.0
	5	32	32.0
Total		**100**	**100.0**

Table 1 discusses about the diet type of the subjects, i.e., whether they are vegetarians or non-vegetarians, etc. and also about the number of meals they eat every day.

The results show that 87% of the subjects are non-vegetarians followed by 10% as lacto-vegetarians or vegetarians. Most of the subjects had the habit of eating non-veg almost every alternate day and some, every day. Chicken, mutton (goat/sheep) and beef eaters were the maximum subjects then followed by fish and eggetarians. The lacto-vegetarian subjects had a diet which included fats like ghee or butter in their meal every day. According to a study by Shridhar K. *et al*. (2014), showed lower CVD risk among people taking vegetarian diet. According to another study by Tong, T. Y. N *et al.* (2019) fish eaters and vegetarians had a lower rate of IHD than meat eaters, although vegetarians had a higher rate of stroke.

The results also talk about the number of meals the subjects eat on a daily basis. It shows that 47% of them eat 4 meals per day which includes breakfast, lunch, evening smacks and then dinner. This is then followed by 32% of the subjects who consume 5 meals per day which in addition includes mid-morning snacks. Then 17% of the subjects consume 3 meals per day which includes the three main meals, breakfast, lunch and dinner. And 4% consume only 2 meals per day which is either breakfast and dinner by skipping lunch or lunch and dinner by skipping breakfast and not including any mid-time snacks. Eating pattern differs from person to person, their age, lifestyle, severity of their medical condition, etc. According to a study by Chen H. J. et al. (2016) which did a study to compare the eating frequency and CVD, a 24-hour dietary recall was done with 1-2, 3, 4, 5, 6 and more meals per day was assessed. The study was concluded as eating frequency was inversely associated with CVD mortality, many frequent meals per day was associated with high total energy intake and then promote weight gain.

Table 2. Classification of the respondents based on BMI

Characteristics	Category	Classification		Respondents	
		WHO	ASIAN	Number	Percent
BMI	Normal	18.5 – 24.9	18.0 – 22.9	38	38
	Obese	≥ 30	≥ 25	32	32
	overweight	25 – 29.9	23.0 – 24.9	19	19
	underweight	< 18.5	< 18	11	11
Total				**100**	**100**

Table 2 discusses about the BMI classification under which the subjects come under. The subjects are classified under the Asian classification by WHO.

The results reveal that 38% of them fall under the normal Asian category, the subjects under this category include moderate and heavy physical activity workers, i.e., farmers, housewives, subjects with congenital heart disease and other unskilled workers. This is followed by 32% of subjects who are obese, the subjects under this category include mainly the sedentary workers which includes housewives, derivers, low activity level employees, etc. The data shows that 19% of them are overweight, again it includes housewives, derivers, low activity level employees, etc. The subjects under the obese and overweight category are also seen to follow an unhealthy lifestyle which includes unhealthy diets, lack of physical activity or exercise. The results also show that 11% of the subjects fall under the underweight category, this includes subjects who are mainly anemic and again follow an unhealthy diet pattern where the intake of food is decreased or have a higher level of energy expenditure with low intake.

According to a study by Czernichow S. *et al.* (2011) the risk of CVD also increases linearly across quantiles of both these abdominal obesity marker with 66 percent increased risk in the highest quantile of WHR. This study says BMI is a better marker for CVD mortality.

This table concludes that the prevalence of CVD increases with an increase in the BMI. This can be corrected with good nutrition counselling and monitoring the subjects on a regular basis along with nutrition and medical interventions along with incorporating regular physical activity.

Table 3. Classification of the respondents based on Waist Hip Ratio

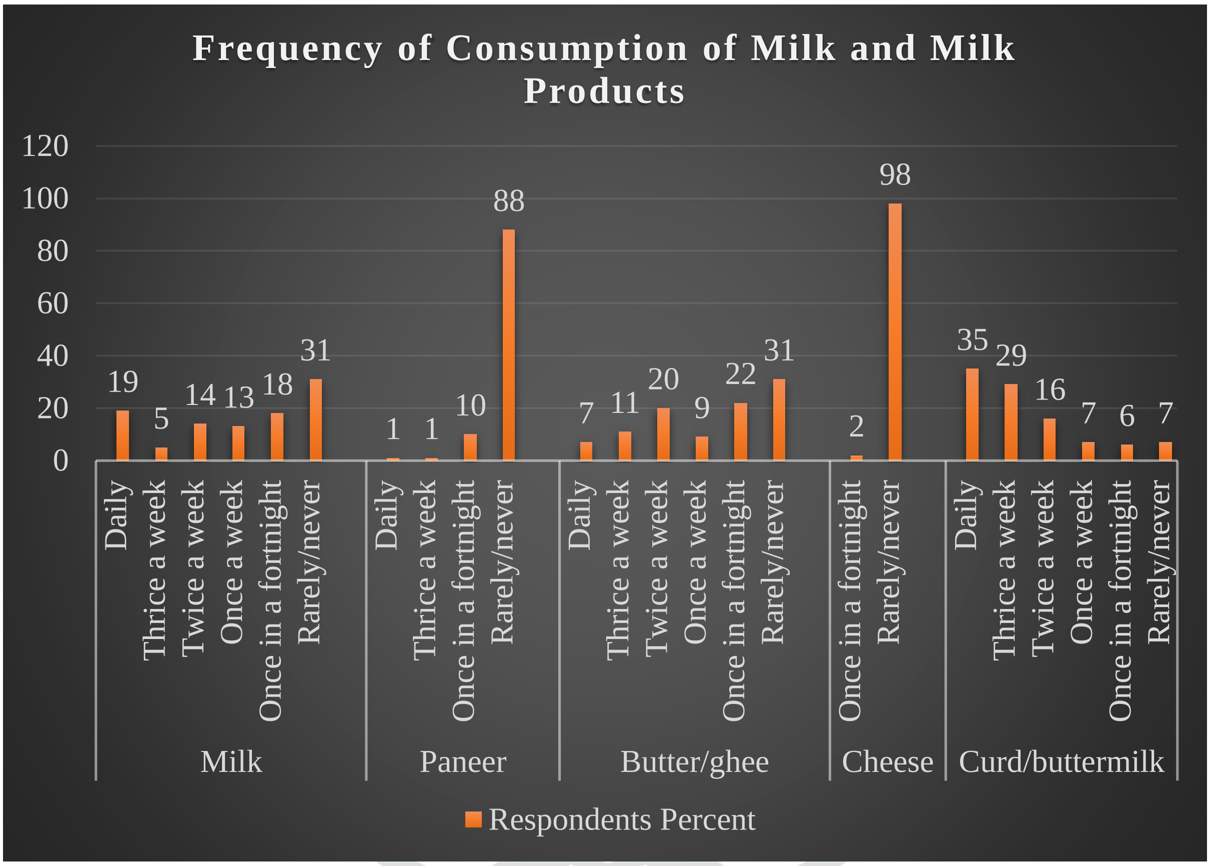
Characteristics	Category	Classification		Respondents	
		Male	Female	Number	Percent
Waist hip ratio	High	≥ 1.0	≥ 0.86	66	66.0
	Low	≤ 0.95	≤ 0.80	13	13.0
	Moderate	0.96 – 1.0	0.81 – 0.85	21	21.0
Total				**100**	**100.0**

Table 3 discuses about the waist hip ration classification under which the subjects come under. The subjects are classified under the WHR classification given by WHO.

The results reveal that 66% of the subjects, including both males and females fall under the high category, which is an alarming fact. The higher the WHR, higher is the chance of being diagnosed with CVD. This is followed by 21% of subjects having a moderate level of WHR, which is also not a good sign and 21% of the have a low or normal level of WHR. Similar to BMI, the subjects with higher WHR follow an unhealthy diet and lack physical activity due to which they have a higher percentage of visceral fat or the stomach fat which is a sign to being unhealthy and drawing non-communicable diseases.

According to a study by Czernichow S. *et al.* (2011) WHR was related to a higher risk of CVD mortality. The risk of CVD also increases linearly across quantiles of both these abdominal obesity marker with 66 % increased risk in the highest quantile of WHR.

Figure 1. Classification of respondents based on the Frequency of Consumption of Milk and Milk Products

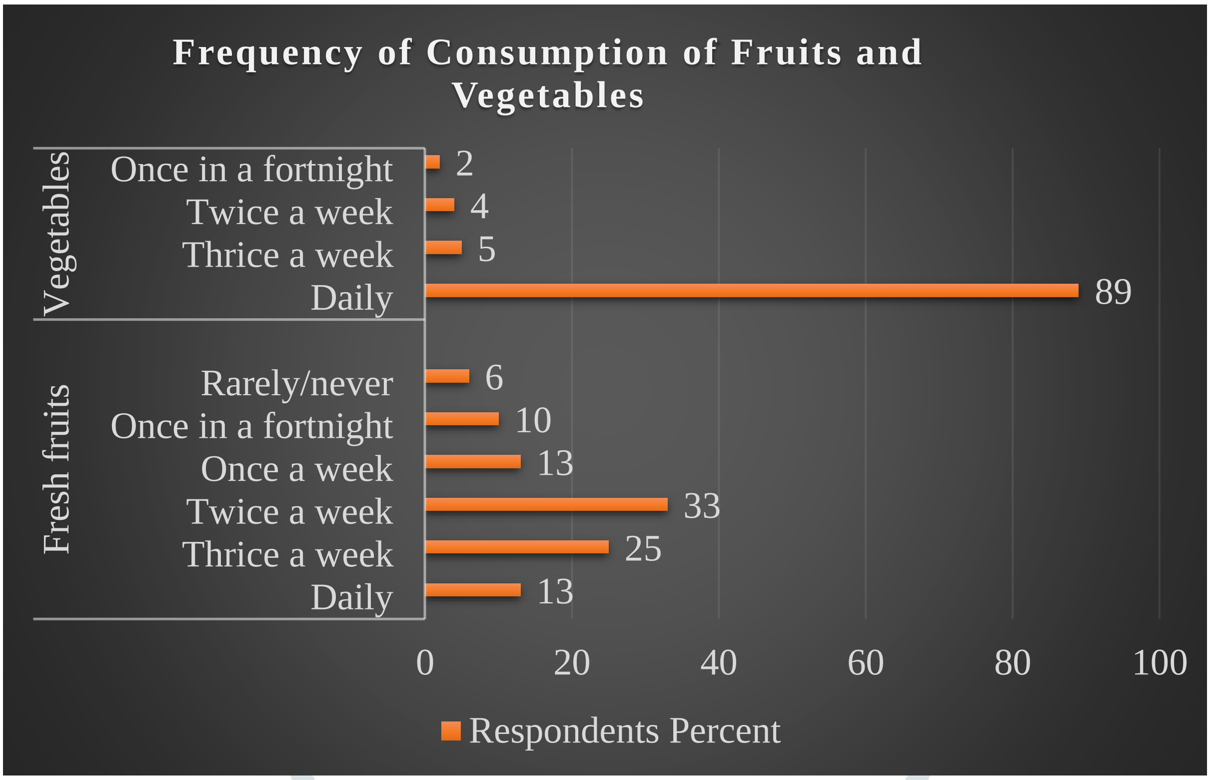


*Multiple responses

Figure 1 talks about the consumption pattern of milk and milk products.

The results show that around 19% of the subjects consume milk on a daily basis where as 31% of them never consumed any plain milk or any malt-based drinks. While coming to the consumption pattern of paneer and cheese, more than half (88 and 98% respectively) of them did not consume paneer and cheese, the reason for this is that the subjects were mainly included low-income groups and farmers and people from villages, this group of people have no habit of eating paneer. Coming to the consumption of butter/ghee, the results show a mixed pattern of 7 – 20% of them consuming it (mainly ghee) on a weekly basis whereas 20 – 31% having it once in a fortnight or never. In order to reduce the risk of CVD, inclusion of low-fat or fat-free milk (slim milk) is advised. According to a study by Fontecha, J *et al.* (2019), milk and dairy products contain the milk fats which are a major source of saturated fatty acids has been linked to increasing the risk of CVD, stroke.

Figure 2. Classification of respondents based on the Frequency of Consumption of Fruits and Vegetables

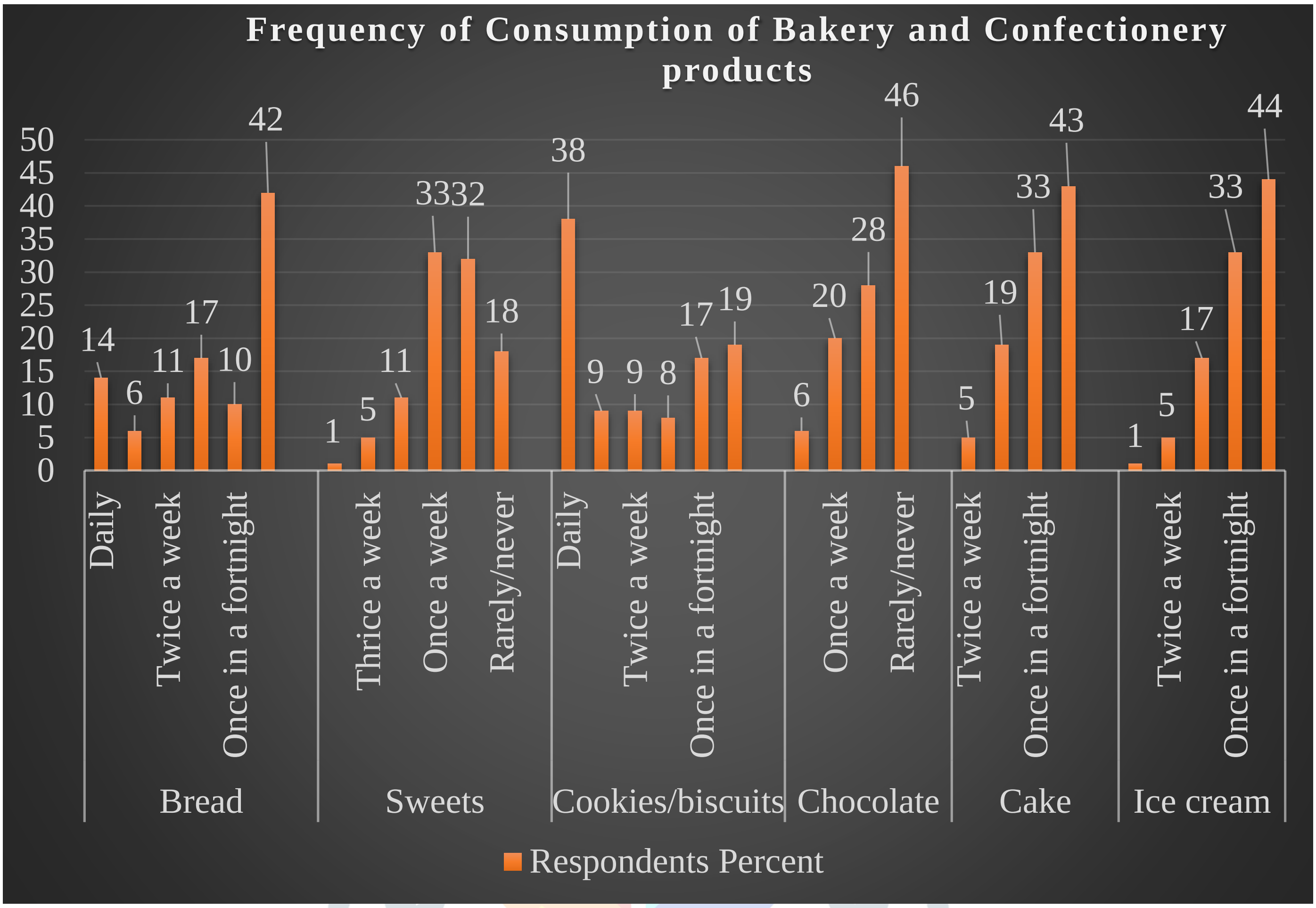


*Multiple responses

Figure 2 represents the consumption pattern of fruits and vegetables.

The results show that nearly all (89%) of them consume vegetables on a daily basis, this is a dietary habit followed by all the Indians, i.e., consuming at least one vegetable every day in the form of a side dish or the main dish. While coming to the consumption pattern of fruits, it gives a mixed response which shows 13 – 33% of them consume fruits on a weekly basis, but among this only 13% consume it every day which is not much of a satisfying answer. Around 10% of them either consume fruits once in a fortnight or rarely than that. Fruits and vegetables are a rich source of micronutrients. In order to maintain a healthy micronutrient balance, consumption of fruits and vegetables is important on a daily basis and is a need to overcome any micronutrient deficiency and CVD rising from it. According to a review by Aune, D. *et al.* (2017), conducted a meta-analysis of 95 studies, there was a reduction in the risk of CVD when the subjects consumed up to 800g/day of fruits and vegetables combined.

Figure 3. Classification of respondents based on the Frequency of Consumption of Bakery and Confectionery Products



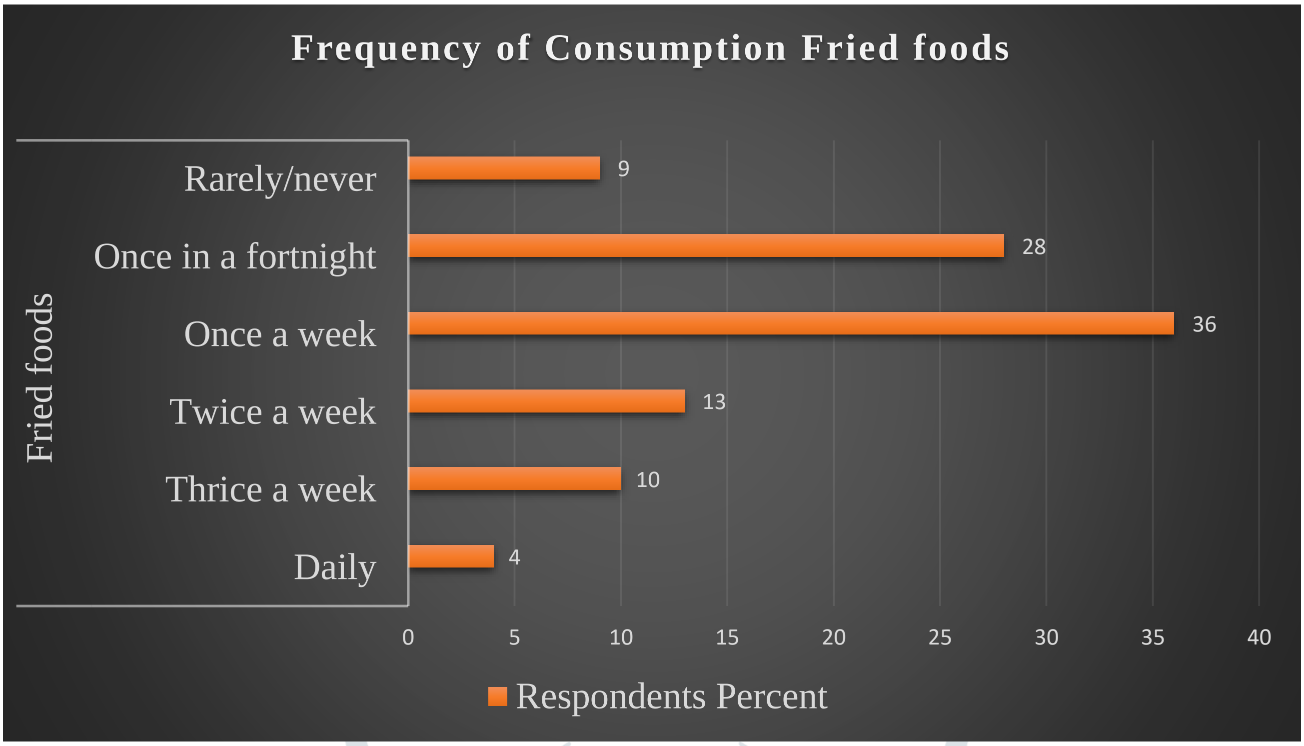
*Multiple responses

Figure 3 represents the consumption pattern of bakery and confectionery products.

The results show a mixed response where nearly half of them rarely or never consume any bakery products which includes bread, sweets, cookies/biscuits, chocolates, cakes and ice cream. Among all the subjects, 14 and 38% of them consume bread and cookies/biscuits on a daily basis whereas nearly 30% of them consume sweets on a weekly basis. Similarly, around 20 – 30% consume biscuits, chocolates, cakes, ice cream once in a fortnight. The reason for them to consume these food items on a regular basis is mainly their background, i.e., the subjects belong to a low- income group and majority are farmers, homemakers and others who are not much exposed to eating these food products.

According to a study by Gazarová *et al.*, says consumption of bread and bakery products has been declined in the western countries as a reason for concerns with weight gain and its effect on the visceral fat which is directly associated with the risk of CVD.

Figure 4. Classification of respondents based on the Frequency of Consumption of Fried Foods

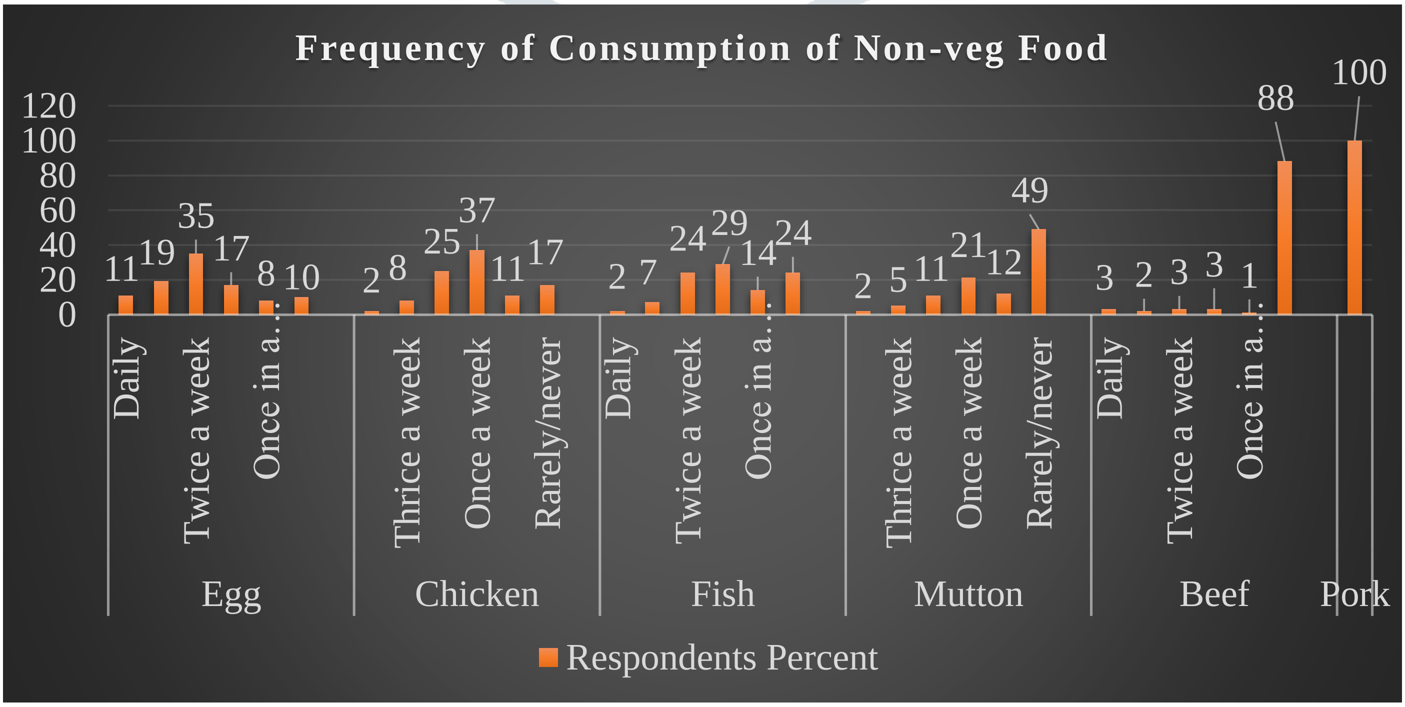


*Multiple responses

Figure 4 indicates the consumption pattern of fried foods.

The results show that around 10 – 36% of them eat deep oil fried foods on a weekly basis, where as 4% of them consume it on a daily basis. This consumption pattern shows an unhealthy eating pattern of appetizers. The subjects need to reduce the consumption of these foods to reduce the intake of saturated fatty acids and the reuse of previously used oils. Deep frying will lead to the loss of nutrients from the foods that are fried. According to a study by Djoussé, L. *et al.* (2015), says there is a positive association between frequency of fried foods and risk of coronary heart disease, diabetes and hypertension. The results of this study show in increase in the incidence of heart failure among males.

Figure 5. Classification of respondents based on the Frequency of Consumption of Non-vegetarian Food



Multiple responses

Figure 5 talks about the consumption pattern of non-vegetarian of the subjects.

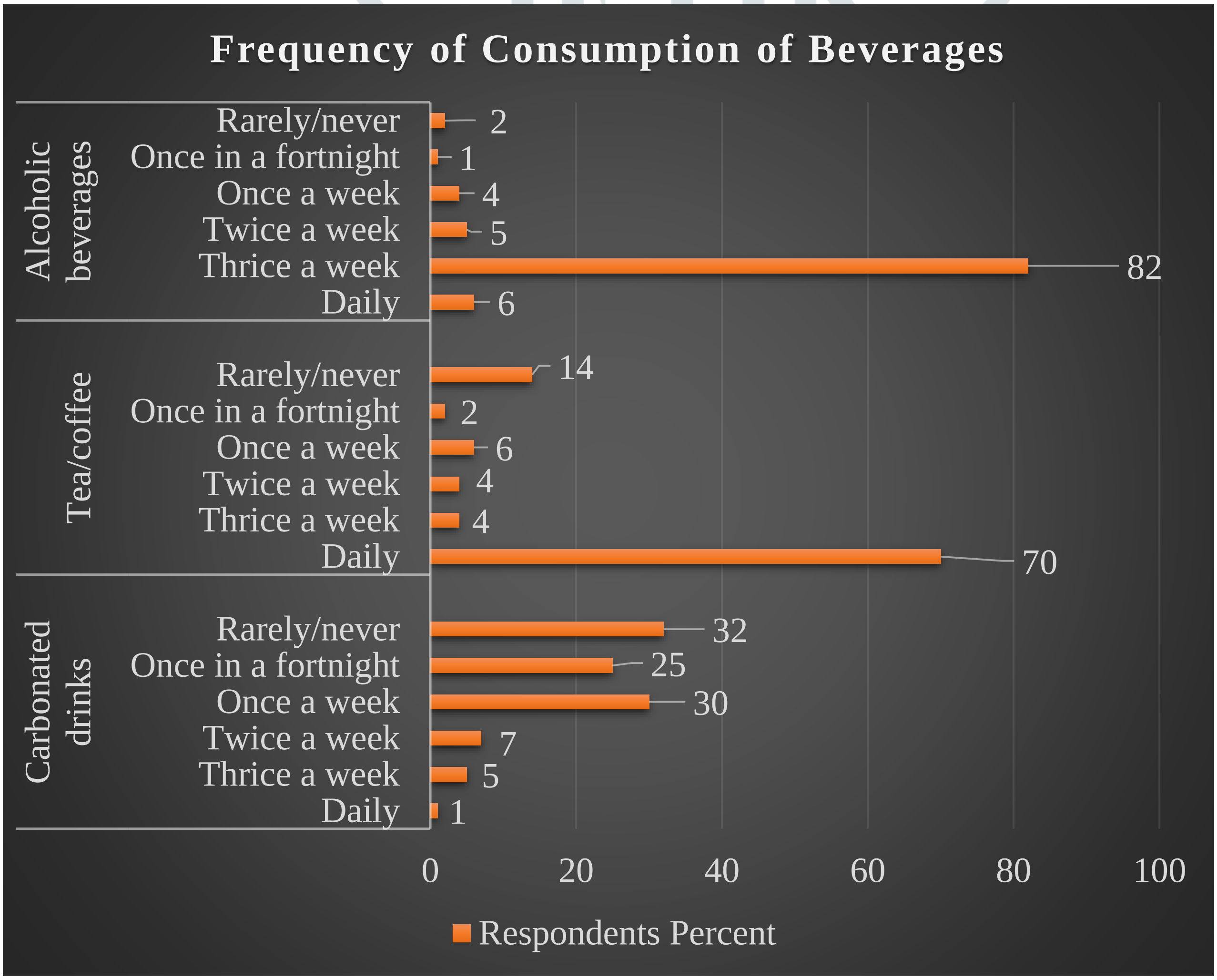
The results show a mixed response when it comes to the eating pattern of egg, chicken, fish and mutton. Around 2 – 12% of them eat these four non-veg foods on a daily basis whereas 5 – 37% eat on a weekly basis; maximum is either twice a week or thrice a week. Around 8 – 50% of them eat once in a fortnight or rarely or never it.

When coming to the eating pattern of beef only handful (3%) of them eat every day, whereas again a handful (2 – 3%) of them eat on a weekly basis and only 1 once in a fortnight and rest all never eat it.

In case of pork, none of the subjects ate pork. So, consolidating the results we can see that the number of subjects who eat both white and red meat on a regular basis, i.e., either daily or twice or thrice or once a week are significantly high which directly has a relation with increased risk of CVD. It justifies when compared with their BMI and WHR. More than the number of times, the quantity they eat during each meal matters. Thus, a change in their diet pattern needs to be bought in by keeping an eye on the quantity they eat and even the number of times they eat.

According to a study by Tong *et al.* (2019), vegetarians showed a lower risk of mortality from IHD when compared to non-vegetarians. the results of this study show a lower risk of IHD among fish eaters and vegetarians than meat eaters.

Figure 6. Classification of respondents based on the Frequency of Consumption of Beverages



*Multiple responses

Figure 6 shows the consumption pattern of beverages which includes tea/coffee, carbonated drinks and alcoholic beverages.

The results show that around 5 – 30% of them consume carbonated drinks on a weekly basis whereas only 1, every day. Around 25 – 32% consume it once in a fortnight or rarely or never. These high sugar content beverages are known to have a direct link with the increased risk of CVD. more the consumption of it, more is the risk. As a solution, the subjects need to gradually reduce its consumption from weekly to rarely which will help in reducing the risk of CVD and associated disorders in the body.

Coming to the consumption of tea/coffee, more than 50% (70) of them consume it on a daily basis, 5 – 30% on a weekly basis and 25 – 32%, either once in a fortnight or rarely or never. Thus, it shows that consumption of tea/coffee has a direct link with CVD. The number of times they drink these beverages per day also matters, more amount of caffeine going into the body can be more harmful and affect the body functioning.

Seeing the consumption of alcoholic beverages, more than half (82%) consume alcohol at least thrice a week, which is a greater number, whereas only 2 – 6% on a weekly basis and only a handful of 6% on a daily basis. As we know consumption of alcohol is injurious to health, the subjects need to slowly reduce the consumption. Ex-drinkers also have an injurious effect on their health even though they have put an end to alcohol consumption.

According to a study by Pacheco, L. S. *et al*. (2020), says that there is a significant positive association between sugar sweetened beverages and risk of CVD. It was found that these beverages increase the risk of revascularization and stroke with daily consumption of these beverages. It mainly increases the risk of CHD among females.

According to another study by Zheng H. *et al.* (2022), says the relationship between tea/coffee and CVD is controversial as these beverages can increase the indicators which are harmful to physical health such as blood pressure, total cholesterol and triglycerides whereas certain studies have shown that chronic tea/coffee/caffeine consumption could reduce the risk of CVD due to their anti-inflammatory properties. But the results of this study show that increased consumption of tea/coffee was associated with an increased risk of all-cause and specific death for patients with CVD.

IV. CONCLUSION

Taking everything into account, this study, Assessment of Past Dietary Pattern and Risk of CVD Among Young Adults, (20 – 40 years) can be concluded by saying that the subjects diagnosed with CVD led a sedentary lifestyle with an unhealthy dietary pattern that has led to overweight and obesity. The risks of this, affects the health status of the individuals and it cannot be left unattended or neglected. Therefore, following a daily physical activity schedule is important along with including a well-balanced diet and leading a healthy lifestyle that improves the health status of the subjects. Since most of the subjects belonged to lower middle class, lower poverty line class, they need to be enlightened and given knowledge about the non-communicable diseases, its risk factors and how to combat it. They need to be taught how to make better food choices, the importance of consuming all the major meals without skipping, how important their sleep pattern is, how their psychological pattern mainly stress effects the body, the type of food they eat, its portion size, healthy or unhealthy, etc. since this study mainly focuses on young adults, it is important for them to lead a healthy lifestyle. Once they are diagnosed with CVD, it is a warning sign which alarms them to leave their past lifestyle and to adapt to a newer healthy and wholesome lifestyle.

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