

## CONSUMPTION PATTERN OF DIETARY FAT AND FIBRE AMONG WOMEN WITH RISK FOR CARDIOVASCULAR DISEASE

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### Abstract

Cardiovascular diseases have no geographic and disease boundaries. They are life threatening and are responsible for ill health and death in many countries especially in India. Cardiovascular disease is the most common death in women due to sedentary life style and unhealthy dietary habits. Healthier food choices with more fibre, micronutrients from fruits especially the seasonal fruits will certainly benefit the population from the burden of lifestyle disorders. Simple lifestyle modifications with physical activity will pave way for better promotion in health of the women and thereby heart health. In order to fulfil the objective, a total of 165 adults comprising housewives and working women were chosen. Hence the present study was undertaken to observe the intake of dietary fat and fibre and their impact on the risk for cardiovascular disease. The details regarding baseline data of the study participants, anthropometric, lipid profile, dietary pattern and lifestyle practices were

assessed for risk of cardiovascular disease using Health Risk Assessment Index. Health Education on diet and lifestyle modification were imparted to all high risk women with interactive aids such as chart, power point, pamphlet and demonstration of healthy food choices for healthy heart. A total of 17 women with risk for cardiovascular diseases were included for imparting health education. Health profile of the women was assessed using mean nutrient intake from 24 hour food recall for 3 consecutive days, quantitative food frequency method and lipid profile examination at pre and post education. The lipid levels were statistically analysed for comparison between the difference among women at pre and post education. The study revealed that the lipid fractions decreased although it was not statistically significant. There was a gradual reduction in fat intake from 38 g at pre education to 22 g at post education.

**Keywords :** Health Profile, Risk Assessment Index, Dietary fat and fibre, Lipid profile

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## Introduction

Cardiovascular diseases have no geographic and disease boundaries. They occur throughout the world in all races and in all strata of society, without variation between sexes, ages and socio-economic status. They are life threatening and are responsible for ill health and death in many countries<sup>1</sup>. Asian Indian population is likely to climb up 90 percent cardiovascular mortality in women by 2015. It has been estimated that by 2020, Cardiovascular disease will be the largest cause of disability and death in India with 2.6 million Indians predicted to die due to Cardiovascular disease<sup>2</sup>.

Multiple factors contribute to cardiovascular disease. Approximately 90 percent of the risk of cardiovascular disease observed worldwide are blood lipid abnormalities, raised blood pressure, diabetes, abdominal obesity, psychosocial factor, physical inactivity and inadequate intake of fruits and vegetables. Young adult women should pay special attention for *getting a balanced diet to get enough vitamins and minerals for leading the healthy life. Foods with a lot of fats, salt or sugar, that not have much of good stuff like vitamins and fibre. Eating well and feeling good is about more than just putting "healthy" food into the month*<sup>4</sup>.

Cardiovascular disease remains the leading cause of death among women in the United States. The increasing risk of cardiovascular disease from lifestyle risk

factors like obesity, physical inactivity and sedentary behavior. In 2011, obesity affected 27 percent of all women in the United States. Obesity increase the risk of diabetes, hypertension and cardiovascular disease in women even in the absence of other metabolic abnormalities<sup>5</sup>. Diabetes is more strongly associated with cardiovascular risk in women. Approximately one half of individuals with type 2 diabetes lead to develop cardiovascular disease<sup>6</sup>.

Western Style diets and sedentary lifestyle were key modifiable cardiovascular diseases risk factors. Diet and lifestyle increases cardiovascular diseases risk both directly and indirectly to women. Western diet boosts global heart attack risk by 30 percent. The fried foods, salty snacks and meats that were staples of the western diets, which amount for heart attack risk across the world<sup>7</sup>.

The higher intake of fats, oils, poor food choices (high consumption of sugar, salt, saturated fat) and unhealthy lifestyle (physical inactivity) have been identified as *major risk factors of cardiovascular disease. In the case of women, obesity or over weight was the single most important predictor of diabetes mellitus and cardiovascular disease*<sup>8</sup>.

The nutrients and bioactive components including phytonutrients in diets may be beneficial to cardiovascular risk status. Contribution of phytonutrients of the food components in the diet reduces cardiovascular disease risk factors. The

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Cardiovascular disease  
Assessment Index.  
Diet and lifestyle  
related to all high risk  
factors such as chart,  
and demonstration  
for healthy heart.  
Women with risk for  
disease were included for  
study. Health profile  
was assessed using mean  
24-hour food recall for  
quantitative food  
intake and lipid profile  
was assessed post education. The  
data was statistically analysed for  
the difference among  
groups post education. The  
change in the lipid fractions  
was not statistically  
significant. A gradual reduction  
was observed at pre education to

Risk Assessment  
Lipid profile

diets include plant sterols and fibres which are primarily from oats, barley, soy protein and almonds<sup>10</sup> and peanut oil found to be heart healthy oil with low saturated fat, high in polyunsaturated and mono-unsaturated fat which helps to lower cholesterol level and have heart protective properties<sup>9</sup>.

Aerobic exercise is the most effective and powerful behavioral modification to increase high density lipoprotein cholesterol and decrease in triglycerides concentration. The minimum energy expenditure required to improve blood lipoprotein profile is about 1000 kcal at least per week<sup>11</sup>.

Hence the objectives of the present study are to find the role of dietary fat and fiber intake among women and assess the risk for cardiovascular disease, educate the women regarding the role of dietary fat and fibre in prevention of cardiovascular disease and to evaluate the impact of the health education on risk reduction for cardiovascular disease among women

## **Materials and Methods**

### **Selection of area and study participants**

The area selected for the conduct of the study was Coimbatore District. A total of 165 women from households and institutions were selected due to easy accessibility and approachability of the study participants. The baseline data was elicited from the study participants through purposive sampling among the working and non working women in the age group

of 21 to 40 years to find out the association of diet and physical activity in the risk factors of cardiovascular disease.

### **Formulation of tools and collection of data**

A well designed questionnaire was used to collect the data from study participants. The questionnaire consisted of a series of questions that prompt for the purpose of gathering information from respondents. Assessment of health status was done with Health Risk Assessment Index based on the anthropometric measurements, biochemical estimations, dietary pattern and lifestyle practices. The comprehension about dietary pattern of women with specific details on meal pattern, quantity of fats and oil used, fibre intake and consumption of fast foods were collected. Four modules were designed to impart education among the selected study participants which are Healthy Food Choices for Heart, Your Heart and Health, Fat Vs Fibre and Heart Healthy recipes. Twenty four hour dietary recall survey for three consecutive days and food frequency method were used for health risk assessment.

### **Association of health education with health profile**

The impact of the health education and its reflection on the health profile among the women was assessed using mean nutrient intake from 24 hour dietary recall for three consecutive days, food frequency method and lipid profile examination at pre and post education.

## Results and Discussion

### Anthropometric Assessment

Body Mass Index and Waist to Hip Ratio were calculated using anthropometric measurements and details are given in Table I and II respectively.

Table 1: Body Mass Index

N=165

Category	Range	No.	Percent
Low Risk	<23.5	51	30.9
Medium Risk	23.5-29.9	98	59.4
High Risk	>30	16	9.7

#### a. Body Mass Index

The present study reported that 59.4 percent of the women were at medium risk which found to be obese indicating adiposity and higher chance of lifestyle disorders, whereas 9.7 percent women were at high risk with Body Mass Index more than 25, cautioning the need for more awareness and behavioural modifications among the young women which may prevent diseases.

Table 2: Waist to Hip Ratio

N=165

Category	Range	No.	Percent
Low Risk	0.8	8	4.8
Medium Risk	0.8-0.9	127	76.9
High Risk	>0.9	30	18.3

#### b. Waist to Hip Ratio

Seventy six percent women were at medium risk and the 18.3 percent had high risk of cardiovascular disease based on the Waist to Hip Ratio. Women with waist to hip ratio of more than 0.8 and body mass index more than 32 have an increased risk of the cardiovascular diseases<sup>12</sup>.

### Dietary assessment

#### a. Consumption Pattern of Fibre Rich Foods

Among the consumption pattern of cereals and millets, rice was observed to be consumed daily by all the selected women as rice is the staple food of the South Indians. Among the millets, samai, varagu and the cereal, wheat were consumed by 30 percent women once a week. In the case of pulses, 7.2 percent and 10.9 percent of women respectively consumed Bengal gram, whole and black gram daily. Compared to other pulses 78 percent women consumed red gram dhal weekly once and quantity per serving was also noticed high. Consumption pattern of vegetables showed that 81.2 percent of women consumed fibre rich green leafy vegetables weekly once but in low quantity. In the case of roots and tubers, 65.4 percent of the women consumed weekly once and 72 percent women used other vegetables like beans, drumstick, bottle gourd and plantain once in a week. Fruits were used only by 6.6 percent of the women weekly once in the diet.

**Table 3. Consumption Pattern of Fibre Rich Foods**

N=165

Food groups	Quantity / serving (Mean value in g)	Frequency of Consumption					
		Daily		Weekly		Monthly	
		No.	%	No.	%	No.	%
Cereals and Millets	46	18	11.2	31	19	34	20.5
Pulses	39.8	4	2.5	81	49.1	32	19.6
Green leafy vegetables	40	26	16.2	52	31.5	37	22.3
Roots and Tubers	54.2	0	0	70	42.7	36	21.9
Other vegetables	54	0	0	65	39.4	50	30.2
Fruits	55	0	0	52	31.7	49	29.7
Nuts and Seeds	43.7	10	6.1	48	29.4	39	23.7

\* Multiple Response

**b. Consumption pattern of fats/oils**

With regard to fat consumption, 50 percent of the women included more than three teaspoons of oil (refined oil) indicating risk for cardiovascular disease. Gingelly oil, palm oil and coconut oil were also used by the women. All the study participants used refined oil every day as a source of visible

fat. As the cost of palm oil was economically low, its use for cooking was found among 30.3 percent women. So, preference of eating foods from street vendors on a daily basis will result in obesity which may increase the risk for lifestyle disorders like cardiovascular disease, as palm oil found to contain only saturated fatty acid.

**Table 4. Consumption Pattern of Fats and Oils**

N=165

Risk criteria	Low risk		Medium risk		High risk		HighRisk		Medium risk		Low risk	
	<3 tsp		3 tsp		>3 tsp		Daily		Weekly		Monthly	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Refined oil	14	8.4	40	24	83	50.3	123	74.5	11	6.6	3	1.8
Gingelly oil	4	2.4	15	9.0	13	7.8	12	7.2	16	9.6	4	2.4
Palm oil	5	3.0	26	15.7	25	15.1	50	30.3	4	2.4	2	1.2
Olive oil	3	1.8	5	3.0	8	4.8	10	6.0	2	1.2	4	2.4
Mustard oil	4	2.4	3	1.8	3	1.8	5	3.0	4	2.4	1	0.6
Coconut oil	20	12.1	29	17.5	33	20	46	27.8	29	17.5	8	4.8
Vanaspathi	2	1.2	8	4.8	2	1.2	0	0	8	4.8	4	2.4
Butter	20	12.1	10	6.0	5	3.0	0	0	24	14.5	11	6.6

\* Multiple Response

**Table 5. Mean Nutrient Intake of Selected Women**

Nutrient	Recommended dietary allowance (A)	Pre education (B)	Excess/Deficit	't' value	Post education (C)	Excess/Deficit	't' value
Energy (k cal)	1900	1953	+53	37.49**	1902.3	+02	41.56**
Protein (gm)	55	63	+8	7.90**	70	+15	11.63**
Carbohydrate (k cal)	475	532.1	+57	12.63**	539	+64	16.37**
Fat(gm)	20	38	+18	8.65**	22.2	+2	3.52*
Fibre (gm)	30	1.6	-28	76.95**	12.1	-17	63.49**
Vitamin A (mcg)	4,800	3794	-1006	236.20**	3998	-802	285.14**
Iron (mg)	21	18.6	-2.4	4.27**	20	-1	1.46NS
Calcium (mg)	600	576	-24	6.84**	615	+15	8.36**
VitaminC (mg)	40	30.2	-10	7.39**	41.3	+1.3	1.052NS

\* Recommended Dietary Allowance, 2010 \* - significant at 5% level \*\* - Significant at 1% level (p<0.01)  
NS - Not Significant

### III Analysis of the health status of the selected study participants

The mean nutrient intake of the selected women showed that the energy derived from the menu met the ICMR Recommended Dietary Allowance with high intake of protein and carbohydrates. There was a gradual reduction in fat intake from 38 g at pre education to 22 g at post education. This evidently proved the awareness to the women folks in the use of fats and oils for themselves and for family. There was an improvement in fibre intake from 1.6 g to 12.1 g and still calls for increased awareness and modification in the consumption of fibre through whole grams, grains, vegetables and fruits. The mean intake for micronutrients such as

vitamin, iron, calcium, vitamin C had increased and met the ICMR Recommended Dietary Allowances.

### IV Health education and Health profile at pre and post education of the study Participants

#### a. Food frequency of the selected women

The food frequency consumption of foods for all food groups showed that education to women has increased the knowledge on consumption of grains such as wheat, samai and varagu in addition to rice. Also pulse consumption has increased with more for whole grams. The use of seasonal vegetables also gradually increased among the women. The women had more awareness on healthy food choices for millets, vegetables and fruits.

N=165

Monthly	
No.	%
34	20.5
32	19.6
37	22.3
36	21.9
50	30.2
49	29.7
39	23.7

N=165

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N=165

Weekly	Low risk	
	No.	%
6.6	3	1.8
9.6	4	2.4
2.4	2	1.2
1.2	4	2.4
2.4	1	0.6
17.5	8	4.8
4.8	4	2.4
14.5	11	6.6

**Table 6. Frequency of Food Consumption by the Selected Women**

N=165

Food items	Pre Education				Post Education			
	Daily	Weekly once	Monthly once	Not at all	Daily	Weekly once	Monthly once	Not at all
Cereals & Millets	165	-	-	-	165	-	-	-
Pulses	120	40	-	5	140	25	-	-
Green leafy vegetables	26	80	59	-	40	95	30	-
Other Vegetables	20	75	50	20	59	63	33	10
Roots & Tubers	40	76	43	6	25	50	84	6
Fruits	11	55	79	20	25	90	42	8
Non-vegetarian	60	80	15	10	30	55	60	20
Nuts & oil seeds	16	58	49	42	18	62	43	42

**b. Mean Serum lipid profile**

The mean value of the serum lipid profile examination among women showed that the lipid fraction such as total cholesterol, low density lipoprotein, very low density lipoprotein, triglyceride decreased although there was not a significant decrease in the statistical analysis with 't' tests. This may be

attributed to the reason of the shorter intervention period and this may prove beneficial to the women where behavioral modification in healthy choices and dietary pattern on a long practice and adopting healthier food choices. The serum lipid fractions respond well to the simple dietary modifications with reduction in fat and increase in fiber.

**Table 7. Mean Serum Lipid Profile of the Selected Women**

N=17

Serum fractions	Standard values mg/dl	Mean values Pre	't' value	Mean values Post	't' value
Total cholesterol	<200	189.9 ± 40.43	0.707NS	179.12 ± 43.84	0.102 NS
High density lipo proteins	60	49.6 ± 6.13	0.699 NS	50.33 ± 8.63	2.33*
Low density lipo proteins	60-130	111.4 ± 40.40	0.854 NS	108.18 ± 40.19	1.504 NS
Very low density lipo proteins	40-50	30.7 ± 11.72	0.983 NS	28.47 ± 12.79	1.88 NS
Triglycerides	<150	151.5 ± 59.42	0.811 NS	146.77 ± 43.66	1.247 NS

National Cholesterol Education Programme - 2012, \* - Significant at 5% level, NS - Not Significant

N=165

Post Education		
	Monthly once	Not at all
	-	-
	-	-
	30	-
	33	10
	84	6
	42	8
	60	20
	43	42

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N=17

Pre values	't' value
Pre = 43.84	0.102 NS
Post = 8.63	2.33*
Pre = 40.19	1.504 NS
Pre = 12.79	1.88 NS
Pre = 43.66	1.247 NS

\* Not Significant

### Conclusion

The dietary pattern and lifestyle practices are the major modifiable risk factors in prevention of cardiovascular disease and other lifestyle disorders such as diabetes mellitus, obesity and hypertension. Imparting education among the women to adopt healthy food choices, fibre rich foods, low fat and physical activity will have

greater influence on the health of the women. Healthier food choices with more fibre, combination of oils and micronutrients from fruits especially the seasonal fruits will certainly benefit the population from the burden of lifestyle disorders. Simple lifestyle modifications with physical activity will pave way for better promotion in health of the women and thereby heart health.

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