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Adoption of intervention strategies for high cardiac risk for women

S.Thilagamani, S.Uma Mageshwari

Department of Food Service Management and Dietetics,
Avinashilingam Institute for Home Science and Higher Education for Women - University,
Coimbatore – 641 043, Tamil Nadu

ABSTRACT

Modern day changes in dietary and life style pattern are common causes for lifestyle disorders especially cardiovascular disease. Cardiovascular disease represents an enormous, medial, social and economic burden to the public. Rising affluence has modified the dietary pattern characteristics by increased consumption of fat, junk foods and physical inactivity which are directly related to health disorders. This study was undertaken with the objective to study the impact of intervention namely diet and regular physical activity among the women especially young between 20 and 40 years with high risk for cardiovascular diseases. The intervention was with a diet supplement and regular physical activity for the period of six months and was evaluated with the changes in the Body Mass Index, Waist Hip Ratio and lipid profile at pre and post intervention.

Keywords: *Body Mass Index, Waist Hip Ratio, Lipid Profile, Health Risk Assessment, Cardiac Risk*

1. INTRODUCTION

Health is fundamental to human progress. Heart disease affects people of all ages but is more frequent in middle age and is most often caused by atherosclerosis. Disease of heart may affect the pericardium, myocardium or endocardium. In addition, the blood vessels with in the heart, covering the heart or the heart valves may be diseased. Cardiovascular deaths in men are declining but in women it remains the same or is increasing. Women under the age of 65 years are more than twice as likely as men to die from myocardial infarction. Cardiovascular disease has been projected to cause 4.6 million deaths annually in India by the year 2020. Cardiovascular disease is the leading cause of death among Indian women too, accounting for 17 percent of female mortality [1].

The number of productive life lost due to cardiovascular disease will increase in 2030 for India by 95 percent. Globally, cardiovascular disease is the number one cause of death and is projected to remain so. About 80 percent of the deaths occurred in low and middle income countries [2] . One of the most common problems related to lifestyle today is being overweight. Severe overweight (or) obesity is a key risk factor in development of much chronic disease such as heart disease, Non insulin dependent diabetes mellitus (NIDDM), hypertension and some cancers as well as early deaths [3]. Heart healthy living habits started at an early age with sensible eating, keeping cholesterol levels low, getting regular exercise and maintaining a healthy weight greatly diminish the risk of other cardiovascular problems [4].

The risk for cardiovascular disease becomes four-fold in the case of women. "Stress at work, a very competitive lifestyle, eating out and fast food are increasing in women especially in the 20 to 50 age group, adds Dr Ashok Seth, chairman and chief cardiologist at New Delhi's Escorts Heart Institute and Research Centre. "All these significantly increase their chances of developing heart disease at a younger age. Oestrogen, the female hormone, is known to protect women from heart disease until they reach menopause. But it's becoming increasingly clear that recent lifestyle changes are neutralizing this protective role." Hence this study was undertaken to focus on the impact of diet and regular physical activity in reduction of risk for cardiovascular disease among young women with the following objectives: -

- To standardize a suitable supplement for the selected women with high risk for cardiovascular disease.
- To evaluate the effect of intervention namely diet supplement and regular physical activity for the women with high risk for cardiovascular disease

2. METHODOLOGY

The methodology of the study comprises the following steps:
   A. Selection of area and sample
   B. Categorization of selected women subjects
   C. Development of a diet supplement and intervention with diet and physical activity to the selected high cardiac risk women
   D. Impact of supplementation and physical activity among the selected women

A. Selection of area and sample

The subjects selected were young adult women between the age group of 20 and 40 years. A total of 150 women were identified from the residential areas of Coimbatore by criterion based sampling. The criterion was to select women between the age of 20 and 40 without known history in any form of disease.

B. Categorization of selected women subjects

The risk for cardiovascular disease using the developed Health Risk Assessment (HRA).The

components of the HRA for cardiovascular disease were categorised as non – modifiable factors and modifiable factors. Non – modifiable factors namely age and familial tendency for cardiovascular disease, modifiable factors namely Body Mass Index, Waist Hip Ratio, blood pressure, type and quantity of fat and oil, consumption of foods with fibre such as whole grams, whole grains, vegetables and fruits, fast foods and beverages with details on frequency of consumption such as daily , weekly or rarely were elicited. Lifestyle pattern was elicited with the type of personality, pattern of physical activity such as exercise, yoga and meditation, type of stress.

The women were categorized as low, medium and high risk based on the scores obtained for the Health Risk Assessment. A total of thirty six women with high risk of cardiovascular disease were selected for the study. The women with willingness and support for the study were taken an informed consent and included for the intervention with diet and regular physical activity.

C. Development of a diet supplement and intervention with diet and physical activity to the selected high cardiac risk women

Diet Supplement

In order to standardize the supplement three variations were developed with different proportion of ingredients namely wheat flour, Italian millet flour and soya flour, carrots, curry leaves, spices such as turmeric, pepper, garlic, groundnut oil and salt. The ingredients were tried in various proportions and were baked as biscuits. Organoleptic evaluation of the diet supplement was done by panelists for attributes like colour, texture, taste and flavour. Score card was developed using numerical scoring method ranging from a maximum score of 5 to a minimum score of 1 with semi trained panel members consisting of 25 numbers. Three variations were made and analyzed for the best acceptance level and nutrients were analysed thrice using standard procedure to know the nutrient contribution from the biscuits on accurate levels.

Physical Activity

Women worked out with the equipment such as tread mill for lower body and cardiac strength for six minutes. Elliptical fitness exerciser was worked out for six minutes and pedelar for eight minutes to strengthen calf and thigh muscles. Rowing to strengthen arms, cycle to relax lower body, twister to hip muscles, strength routine for muscle group namely biceps, triceps, spinal region and abdomen stretching machines for stretching and relaxing muscles for 40 minutes with eight minutes each. The work out of one hour every day would burn 100 kilocalories everyday and a reduction of 2 to 3 kilogram every month.

D. Impact of intervention in risk reduction among the selected women

Women were with high risk for cardiovascular disease were Grade I obese (BMI greater than 25) and a high Waist Hip Ratio (more than 0.8). The impact of the intervention strategies among women was studied with comparison of risk scores, lipid profile using photometric method at pre intervention and post intervention. Serum biochemical inflammation markers of cardiovascular diseases such as homocysteine (chemiluminescence immunoassay method (CLIA method)), C reactive protein (turbidimetric immunoassay method)and lipase A (enzymatic method) was done at pre intervention and post intervention period of six months for a subsample of 12 women.

RESULTS AND DISCUSSION

The results of the study are discussed under the following headings.

A. Categorization of the selected women

The age wise distribution of the selected women is given in Table I

TABLE 1

AGE WISE DISTRIBUTION OF THE SELECTED WOMEN

N=150

Risk category	20-30 years		31-40 years		Total	
	No	%	No	%	No	%
Low risk	35	23.3	10	6.7	45	30.0
Medium risk	23	15.3	40	26.7	63	32.0
High risk	12	8.0	30	20	42	28.0

The age wise distribution of the women showed that twenty eight per cent of the women were with high risk for cardiovascular disease. The percentage of women in the low risk category was higher in the 20 to 30 year age group with 23.3 per cent and women in the age group of 31 to 40 years were with medium and high risk for cardiovascular diseases. It is in tune with the etimate that women will continue to experience disproportionately high mortality from cardiovascular disease. India is one of the countries in which women will represent a higher proportion of cardiovascular disease deaths than men, by 2040 [5].

B. Standardisation of the diet supplement

The various proportions tried for standardisation of the supplement are discussed with their mean score card in table 2.

TABLE 2: MEAN SCORE CARD

Variations	Appearance (5)	Texture (5)	Flavor (5)	Taste (5)	Total (20)
V_1	4.4	4.3	4	4	16. 7
V_2	4.4	4.3	4	3.8	16.5
V_3	4.6	4.6	4.6	4.4	18.2

Five point scale: - Excellent - 5, Good - 4, Acceptable - 3, Fair - 2, Poor - 1.
Ingredients – Soya flour, wheat flour, Italian millet flour, turmeric, almonds, groundnut oil, pepper, salt.

V_1 is in the proportion of 1:1:1, V_2 is in the proportion of 0.5:1:0.5, V_3 is in the proportion of 0.5:1:1. The variation V_3 which obtained the maximum score was used for the supplementation.

Mean Nutritive Value of the supplement

The mean nutritive value of the supplement per 100 grams that was distributed for a day is given in Table 3

Table 3: Nutritive value of the Biscuits per 100 grams (2 servings)

Nutrients		Mean Nutritive value	RDA	PERCENTAGE CONTRIBUTION
Energy	K.cals	401	1899	21
Protein	g	11.3	55	20.5
Fat	g	6.4	30	21.3
Carbohydrates	g	71.0	352	17
Total Fibre	g	4.0	40	10
Iron	mg	3.0	21	17.1
Calcium	mg	168	600	74.7
Beta carotene	mcg	2158.6	4800	44.9

The supplement had a good nutritional adequacy and provided nutritional contribution of the biscuit was 21 per cent of the day's total calorie requirement with 401 Kilo calories. The protein content was 11.31 grams meeting 20.5 per cent of the total requirement for a day. The percentage of fat was 21.3 meeting the major percentage from Mono unsaturated fats from groundnut oil. The fiber content was 4.o grams meeting ten per cent of the requirements. The biscuit provides 3.0 milligrams of iron meeting 17.1 per cent of the Recommended Dietary Allowances [6]. The amount of calcium present in the supplement was 168 milligrams providing 74.7 per cent of the Recommended Dietary Allowances. A high Beta carotene with 2158.6 micro grams was present. Nutritive value of the biscuits proved to be effective to be given as a nutritional supplement.

Microbial Quality of the Supplement

The microbial quality of the supplement with mean Total Viable Count is given in Table 4

Table 4: Total viable count of the biscuits

Biscuit	Total viable count at 37°C (CFU / g)			
Days	0 day	5 days	10 days	15 days
Sample1	Nil	0.2×10^2	0.3×10^2	0.4×10^2
Sample2	Nil	0.3×10^2	0.4×10^2	0.5×10^2
Sample 3	Nil	0.2×10^2	0.2×10^2	0.5×10^2

The total viable count at room temperature was studied for 3 samples taken at random from different batches to study the accuracy in the microbial quality and also to determine the frequency of distribution within the standard limits on initial, 5 days, 10 days and 15 days.

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Though there was an increase in the count as the period increased, the viable count was within the limit. Hence the supplement was prepared once in every 5 days for distribution.

C. IMPACT OF INTERVENTION AMONG THE WOMEN

The impact of intervention at pre and post period of six months is given in the following tables by comparison of scores at pre and post intervention

Table 5: Comparison of parameters at pre and post intervention

N=36

Parameters	Pre intervention		Post intervention		t value	Significance
	Mean	S.D	Mean	S.D		
BMI	26.67	3.25	24.02	2.29	2.075	**
WHR	0.88	0.05	0.85	0.05	2.072	*
TGL	95.33	32.57	93.36	32.54	3.750	**
Total cholesterol	168.42	26.14	165.63	25.19	3.794	**
HDL	45.82	7.79	47.83	7.19	-5.750	**
LDL	103.34	26.02	100.99	26.14	3.24	**
VLDL	18.37	6.97	17.89	7.13	1.926	Ns
Risk Scores	118.67	26.08	99.42	21.57	3.05	**

** - significant at one percent level,* - significant at five per cent,　　Ns - not significant

The intervention of diet and physical activity among the women with high risk for cardiovascular disease showed a significant reduction at pre and post intervention at one per cent level for Body Mass Index, triglycerides, total cholesterol, high density lipoproteins, low density lipoproteins and risk scores at 5 per cent significance for Waist Hip Ratio. Very low density lipoproteins did not have any significant reduction at its statistical interpretation but had reduced mean low density lipoproteins from 18.37 at pre intervention to 17.89 at post intervention.

The mean weight reduction showed a difference of 6 kilograms between pre intervention and post intervention with 1.5 kilograms each for the first two months, one kilogram for the next three months and remained with little changes in the last month.

Comparison of specific biochemical markers for cardiovascular diseases

The specific biochemical markers for cardiovascular diseases namely c reactive protein, homocysteine and lipase for the sub sample of twelve women are given in the table 6.

Table 6: Specific Serum Biochemical markers for cardiovascular disease

Serum Biochemical markers	Pre intervention N=12		Post intervention N=12	
	Mean	S.D	Mean	S.D
C reactive protein 0 mg / litre	0.11	0.09	0.09	0.06
Homo cysteine 8- 12 u mol/L	8.55	3.04	8.16	2.86
Lipase U/L 0 to 110 U/L	32.57	8.11	28.13	8.24

The specific biochemical marker c reactive protein was little higher showing the risk with 0.11 at pre intervention and 0.09 at post intervention. The other markers homocysteine and lipase were well within the normal limits when compared at pre at post intervention.

CONCLUSION

Women manage with daily chores, reach professional goals, socialize, but ignore the most vital aspect health. Women with her multiple role at home, career need to maintain health through balanced food pattern with healthy food choices and regular physical activity through proper aerobic exercises is the need of the hour to tackle the burden of the present life into a healthy quality living.

REFERENCES

[1] WHO, the World Health Report (2002). *Reducing Risks, Promoting Healthy Life.* Geneva: World Health Organization.

[2] American Dietetic Association (2008), Egg consumption and cardiovascular disease risk, Vol. 108(7), P. 1251.

[3] Goyal, A. and Yusuf, S. (2006) ''The burden of cardiovascular disease in the Indian subcontinent'', Indian Journal of Medical Research, 124, Pp.235-244.

[4] Parkand, L., Mobasseri, S., Libron, P.R., and Kliein L.W (2008), cardiovascular disease in women, awareness, prevention and psychosocial characteristics hear drug, Vol.3, Pp.191-202.

[5] Yusuf, S., Reddy, S., Ounpur, S. and Anand, S. (2001), Global burden of Cardiovascular Disease, Ciruclaion, American Heart Association,Vol.104, P.2855.

[6] Gopalan, C., Sastri, R. and Balasubramanian, S.C. (2010) ''Nutritive value of Indian foods'', National Institute of Nutrition, ICMR, Hyderabad.