Research Article

Role of dietary factors in management of cardiovascular diseases in rural population

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ABSTRACT

Background: Management of cardiovascular diseases in relation to dietary factors presents a particular challenge due to the paucity of healthcare facilities and lack of awareness. Aim of the study the present study was undertaken to study the role of dietary factors in management of cardiovascular diseases.

Methods: A total of 734 respondents of both male and female subjects with age group of 30 years and above age group were taken consent to study the role of dietary factors in management of cardiovascular risk factors in rural population of Tirupati.

Results: The prevalence of low fruit and vegetable consumption has been found to be higher in those aged more than 50 years, female sex, Illiterate and primary level of education, unskilled occupation, unmarried/widowed/divorced, other religion, nuclear family, scheduled caste and tribe and those belonging to lower socioeconomic status. Extra salt consumption was found in 7.8% subjects. The cardiovascular risk was found 76% belong to low risk, and 9.8% to medium risk and 14.2% belong to high risk in our study.

Conclusions: The present study suggests that diet factors like fruit and vegetable intake, amount of salt and oil consumption are most important risk factors in managing the cardiovascular diseases.

Keywords: Cardiovascular, Diet, Factors

INTRODUCTION

Fruits and vegetables may promote cardiovascular health through a variety of micronutrients, antioxidants, phytochemicals, flavonoids, fibre and potassium. Cardio vascular disease risk score was inversely related to fruit and vegetable intake gram/day. The consumption of at least 400 grams of fruits and vegetables per day is recommended as a population intake goal to prevent diet related chronic diseases.[1] Diet habitually high in salt intake play an important role in increasing blood pressure. Metabolic and epidemiological studies have indicated that trans-fatty acids increase the risk of coronary heart disease.[2,3] Control of risk factors may be primary or secondary. Primary prevention implies control of risk factors before the onset of cardiovascular disease.

Secondary prevention denotes control of risk factors after the clinical setting of cardiovascular disease.[4] Primary prevention is very important because 25% of patients may die even before they reach the doctor with the onset of cardiovascular disease. Most cost -effective approach to containing emerging epidemics of these diseases were to reduce the prevalence of these modifiable risk factors.[5]

The current study was undertaken to study the role of dietary factors in management of cardiovascular diseases.

METHODS

We have selected both male and female subjects (N=734) with age group of 30 years and above age group to study the role of dietary factors in management of cardiovascular risk factors in rural area of Tirupati. Subjects were included in the cross-sectional study by using 20 cluster sampling technique. The study subjects were explained the purpose of the study and informed consent was taken from the subjects. One subject from each house aged 30 years and above is interviewed who is selected randomly from those available at home at the time of study. Ethical clearance for this study was accorded by Institutional ethical committee, Sri Venkateswara Medical College, Tirupati.

We have considered low fruit and vegetable intake as subjects who were taking less than three times per week latter was nondaily intake of vegetables. We have also considered percapita oil consumption was calculated by total oil intake by the family in a month divided by total number of family members excluding infants. We have considered socio-economic status, fruit and vegetable consumption, extra salt intake and cooking oil parameters to study the dietary factors prevalence in management of cardiovascular risk diseases.

Cardiovascular risk categorization was made as per American Heart Association, 2008 and recorded.

RESULTS

Most of the subjects are taking vegetables daily (51.4%) or 3-4 times weekly (47.6%). A majority of the subjects are taking fruits 3-4 times weekly (56.0%). Extra salt consumption was found in 7.8% subjects (Table 1).It was found that around 92.5% of subjects are taking non-vegetarian foods. In a week time, chicken was taken by 90.7% subject, meat by 49.5% and fish by 32.8% subjects. Thus relatively chicken was the most common non-vegetarian food item and fish was the least common item consumed (Table 2). The commonest type of cooking oils consumed were palm oil (58.7%), sunflower oil (26.6%), and groundnut oil (4.8%) in that order. As much as 9.9% subjects are taking a mixture of various oils for cooking purposes (Table 3).

The prevalence of low fruit consumption was found to be higher among those aged less than 50 years, female sex, those with illiteracy and primary level of education, unskilled occupation, unmarried/widowed/divorced, hindu religion, joint family, scheduled caste and tribe and those belonging to lower socioeconomic status. However only with regard to unskilled occupation, Scheduled caste and tribe and lower socioeconomic status, the differences were statistically significant (Table 4). It was found that the daily per-capita oil consumption was mostly between 25-50 ml (72.9%) followed by less than 25 ml (15.8%) while there was a proportion of 11.3% subjects who had per capita oil consumption of 50 ml and above (Table 5).

Table 1: Details of dietary factors consumption (n=734).

Parameter		No. of subjects	Percentage
Vegetable intake			
(a)	Daily	377	51.4
(b)	3 - 4 times weekly	350	47.6
(c)	1-2 times weekly	7	1.0
Fruit intake			
(a)	Daily	73	9.9
(b)	3 - 4 times weekly	411	56.1
(c)	Weekly once	106	14.4
(d)	Occasionally	144	19.6
Extra salt			
(a)	Yes	57	7.8
(b)	No	677	92.2

Table 2: Non-vegetarian consumption and types of foods consumed (N=734).

Parameter		No. of subjects	Percentage
Non-vegetarian consumption			
(a)	Yes	679	92.5
(b)	No	55	7.5
Meat consumption (in a week)			
(a)	Yes	363	49.5
(b)	No	371	50.5
Chicken consumption (in a week)			
(a)	Yes	666	90.7
(b)	No	68	9.3
Fish consumption (in a week)			
(a)	Yes	241	32.8
(b)	No	493	67.2

Table 3: Type of cooking oil used by subjects (N=734).

Type of Cooking oil	No. of subjects	Percentage
Sunflower oil	195	26.6
Groundnut oil	35	4.8
Palm oil	431	58.7
Gingelley oil	3	0.4
Sunflower and Palm oil	32	4.3
Sunflower and groundnut oil	11	1.5
Sunflower and gingelly oil	3	0.4
Groundnut and Palm oil	14	1.9
Sunflower , Palm oil and groundnut oil	10	1.4

Table 4: Relationship between low fruit consumption (less than 3 times weekly) with certain socio-demographic factors (n=734).

Factor	Prevalence of Low fruit intake (%)	Odds ratio and 95% CI	Statistical significance
Age less than 50 years	172 / 497 (34.6)	1.18 (0.85 - 1.64)	$\chi 2$=1.02; P=0.31 ;NS
Female sex	128/ 361 (35.5)	1.13 (0.83 - 1.53)	$\chi 2$=0.62; P=0.43 ;NS
Illiterate & Primary	135 / 376 (35.9)	1.18 (0.87 - 1.61)	$\chi 2$=0.17; P=0.27 ;NS
Unskilled occupation	187 / 462 (40.5)	2.26 (1.61 - 3.16)	$\chi 2$=22.8; P<0.001 ;S
Unmarried/widowed/divorced	40 / 95 (42.1)	1.49 (0.96 - 2.31)	$\chi 2$=3.14; P=0.07 ;NS
Hindu religion	237 / 690 (34.3)	1.25 (0.64 - 2.43)	$\chi 2$=0.42; P=0.51 ;NS
Joint family	97 / 264 (36.4)	1.20 (0.88 - 1.65)	$\chi 2$=1.32; P=0.25 ;NS
Scheduled caste & tribe	69 / 162 (42.6)	1.60 (1.12 - 2.29)	$\chi 2$=6.74; P=0.009 ;NS
Low Socioeconomic status	168 / 343 (49.0)	3.62 (2.62 - 5.00)	$\chi 2$=63.8; P<0.001 ;S

Table 5: Per capita oil consumption among the families.

Percapita oil consumption in ml	No. of subjects	Percentage
Less than 25	116	15.8
25 - 50	535	72.9
50 and above	83	11.3
Total	734	100.0

Table 6: Mean Per-capita oil consumption by socioeconomic status.

Variable		Mean±SD	Statistical significance
Socio-economic status			
(a)	Upper & Middle	36.6±12.1	t=4.06; P<0.001; S
(b)	Lower	34.8±11.5	
Current Smoking			
(a)	Yes	35.8±12.9	t=0.78; P=0.43; NS
(b)	No	34.9±11.1	
Current Alcohol intake			
(a)	Yes	36.9±12.4	t=2.25; P=0.0026; S
(b)	No	34.6±11.2	

Those with upper and middle socio-economic status had higher level of mean daily per capita oil consumption (36.6 ml) than lower socio-economic class (34.8 ml) and the difference is also found to be statistically significant (P<0.001; S). Similarly those who were taking alcohol currently had higher consumption (36.9 ml) compared to those not taking alcohol (34.6) and the difference is also statistically significant (P=0.0026; S). Although a slightly higher level of consumption was found in smokers (35.8 ml) compared to non-smokers (34.9 ml), the difference is

however not statistically significant (P=0.43; NS). It was found that higher proportion of those belonging to unskilled occupations had been consuming > 35 ml per capita oil daily (43.1% compared to 29.4% and the difference is also found to be statistically significant (P<0.001; S) (Table 6).

Table 7: Relationship between low vegetable consumption (not daily) with certain socio-demographic factors (N=734).

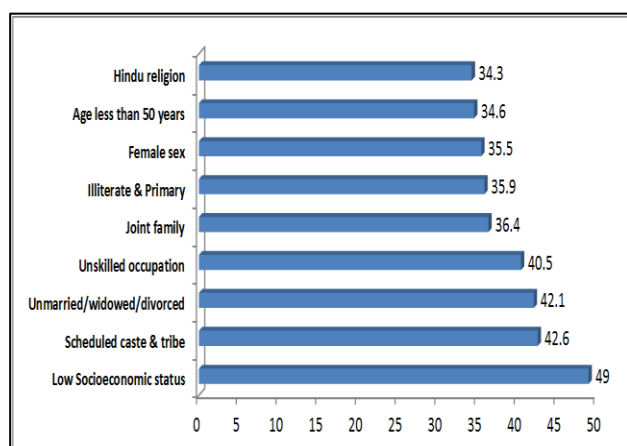| Factor	Low vegetable consumption (%)	Odds ratio and 95% CI	Statistical significance
Age 50 years and above	127 / 237 (53.6)	1.34 (0.98 - 1.83)	χ2=3.43; P=0.06 ;NS
Female sex	178/ 361 (49.3)	1.05 (0.79 - 1.41)	χ2=0.13; P=0.73 ;NS
Illiterate and Primary	199 / 376 (52.9)	1.42 (1.06 - 1.90)	χ2=5.67; P=0.02 ;NS
Unskilled occupation	261 / 462 (56.5)	2.38 (1.75 - 3.24)	χ2=30.8; P<0.001 ;S
Unmarried/widowed/divorced	47 / 95 (49.5)	1.05 (0.68 - 1.60)	χ2=0.03; P=0.86 ;NS
Other religions	23 / 44 (52.3)	1.17 (0.63 - 2.15)	χ2=0.25; P=0.62 ;NS
Nuclear family	235 / 470 (50.0)	1.16 (0.86 - 1.57)	χ2=0.97; P=0.32 ;NS
Scheduled caste and tribe	98 / 162 (60.5)	1.85 (1.30 - 2.64)	χ2=11.7; P<0.001 ;S
Low socio-economic status	225 / 343 (65.6)	3.74 (2.76 - 5.08)	χ2=74.2; P<0.001 ;S-

Figure 1: Relationship between low fruit consumption (less than 3 times weekly) with certain socio-demographic factors (n=734).
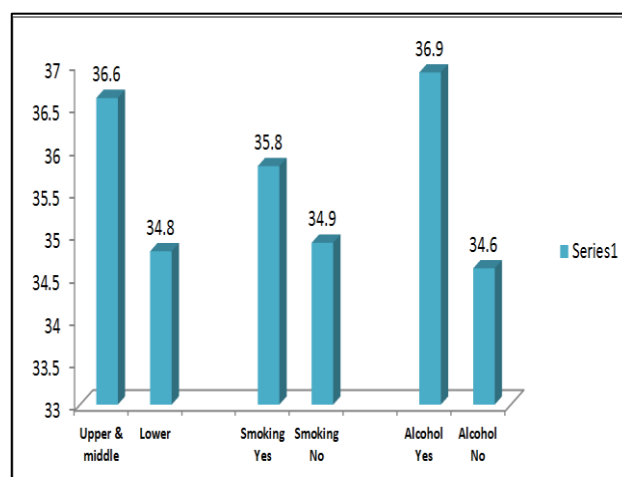

Figure 2: Mean Per-capita oil consumption by socioeconomic status.

Table 8: Cardiovascular risk categorization in the present study.

Cardiovascular risk category	Males (%)	Females (%)	Total (%)
Low (less than 10 %)	217 (58.5)	341 (94.4)	558 (76.0)
Medium (10 – 20%)	58 (15.5)	14 (3.9)	72 (9.8)
High (Above 20%)	98 (26.3)	6 (1.7)	104 (14.2)
Total	373 (100.0)	361 (100.0)	734 (100.0)

χ2=135.7; P<0.001; S.

The prevalence of low vegetable consumption has been found to be higher in those aged more than 50 years, female sex, Illiterate and primary level of education, unskilled occupation, unmarried/widowed/divorced, other religion, nuclear family, scheduled caste and tribe and those belonging to lower socioeconomic status. However the differences were significant only with regard to

unskilled occupation and lower socioeconomic status (Table 7). The cardiovascular risk was found 76% belong to low risk, and 9.8% to medium risk and 14.2% belong to high risk in our study (Table 8).
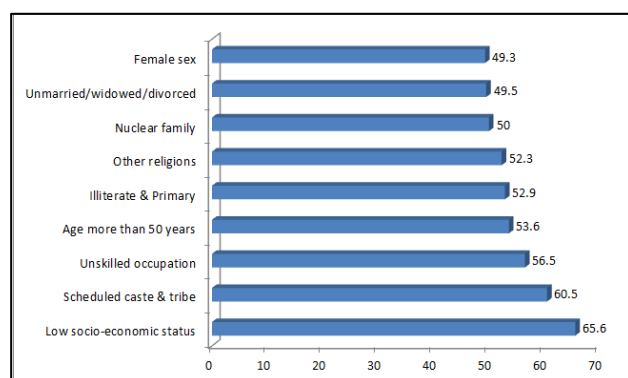

Table 7: Relationship between low vegetable consumption (not daily) with certain socio-demographic factors (n=734).

DISCUSSION

The daily intake of vegetables was found in 51.4% subjects. It was found in the current study that a majority of them were taking fruits 3-4 times weekly (56.0%). The extra salt consumption was found to be 7.8%. A very high prevalence was reported in Assam study.[6]A randomized controlled study has substantiated that sodium reduction may also reduce long-term risk of cardiovascular events.[7] It was found in the present study that a large majority of them were non-vegetarians (92.5%). It was found that the commonest cooking oil consumed were palm oil (58.7%). It was sound that the daily per capita oil consumption was mostly between 25-50 ml (72.9%).The prevalence of low fruit consumption in the present study was found to be 34.0%. A slightly higher level was found in a study in rural Karnataka study 42.8%.[8] In the present study, low fruit consumption was found to be higher among those aged less than 50 years, female sex, those with illiteracy and primary level of education, unskilled occupation, unmarried/widowed/divorced, hindu religion, joint family, scheduled caste and tribe and those belonging to

lower socioeconomic status. However only with regard to unskilled occupation, scheduled caste and tribe and lower socioeconomic status, the differences were statistically significant. The low fruit consumption may be due to lack of awareness in the families regarding the nutritive value of seasonal and inexpensive fruits. A very high level was reported in rural Lucknow study 88.1%.[9] The prevalence of low vegetable consumption in the current study has been found to be 48.6%. A low prevalence of 30.7% was reported in rural Karnataka study.[8] In the present study, low vegetable intake was found to be higher in those aged more than 50 years, female sex, Illiterate and primary level of education, unskilled occupation, unmarried/widowed/divorced, other religion,

nuclear family, scheduled caste and tribe and those belonging to lower socioeconomic status. However the differences were significant only with regard to unskilled occupation and lower socioeconomic status. Very high prevalence of 99.1% was reported in rural Lucknow.[9] People with fruit and vegetable intake in the highest quintile had a relative risk for coronary heart disease of 0.80 (95% CI 0.69 to 0.93) compared with those with intake in the lowest quintile.[10] A Boston study evaluated the association between consumption of fruits and vegetables and risk of coronary heart disease in the Nurses' Health Study and the Health Professionals' Follow-Up Study. In these two studies, 84,251 women aged 34-59 years were followed for 14 years, and 42,148 men aged 40-75 years were followed for 8 years. All were free of diagnosed cardiovascular disease.[11] A study in Cambridge, reviewed ecological, case–control and cohort studies examining the association of dietary fruits and vegetables with cardiovascular disease. For coronary heart disease, nine of ten ecological studies, two of three case–control studies and six of sixteen cohort studies found a significant protective association with consumption of fruits and vegetables or surrogate nutrients.[12] For stroke, three of the five ecological studies and six of eight cohort studies found a significant protective association.[11] For circulatory disease, one of two cohort studies reported a significant positive association. The cardiovascular risk estimated based on scoring recommended by American heart association has found that overall, 76% belong to low risk, and 9.8% to medium risk and 14.2% belong to high risk. The results of our study supports protective effect of fruits and vegetables on stroke and coronary heart disease.[13]

CONCLUSION

The present study suggests that diet factors like fruit and vegetable intake, amount of salt and oil consumption are most important risk factors in managing the cardiovascular diseases. Our study recommends that health awareness programmes should be conducted to promote the regular dietary intake of vegetables and seasonal and inexpensive fruits.

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