PREVALENCE OF CARDIOVASCULAR RISK FACTORS AMONG RURAL WOMEN – KERALA, INDIA

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Abstract
The prevalence of cardiovascular risk factors were analysed among rural women of Kerala India. A total of 2535 women of age group 30- 60 were included in the study. Information on socio- demographics, physical activity, and dietary habits along with anthropometric data were collected. Analysis of Blood pressure, fasting blood glucose and lipid profile were done. High BMI and waist circumference, diabetes, abnormal cholesterol levels, hypertension were observed. Prevalence of Type II Diabetes mellitus, hypercholesterolemia, and hypertension were 14.3%, 43.58%, 30.5% respectively. Prevalence of obesity and overweight were 10.69 %, 37.94 % respectively.

Introduction
In developing countries like India there is a raise in the NCD burden which is causing morbidity and premature mortality[1, 2]. The prevalence of cardiovascular risk factors is high in rural as well as urban India[3]. There are many risk factors associated with coronary heart diseases and stroke. The prevalence of major risk factors like tobacco use, alcohol consumption, hypertension, hypercholesterolemia, obesity, physical inactivity and unhealthy diet are high across the world. These risk factors contribute to the development of CVD from early life. Obesity is a multifactorial condition influenced by the combined effect of genes, the environment, and the interactions between these two factors. The prevalence of obesity has risen steadily over the past decades in adults and children to become a global epidemic and represents a major public health challenge [4]. It is well established that the obesity is associated with increased prevalence of metabolic syndrome components and subsequent increased risk of type2 diabetes and coronary heart disease [5]. Waist circumference and waist hip ratio are widely used as indicators of abdominal obesity in epidemiological studies. Compared with waist hip ratio, waist circumference has been shown to be the best marker of visceral fat[6]. According to NFHS III data 24.3% of male and 34 % of female are obese. 28.1 % of women in the age group 15 to 49 in Kerala are overweight. In the 25-29.9 BMI group 23.1 % of women in Kerala are overweight. 9.5 % of women are BMI above 30.0. Only 53.9 % of women are in the desirable BMI group (18.5-24.9)[7]. The state of Kerala is a state having high literacy (90.9 %), and most advanced in terms of demographic epidemiological transition, with the largest proportion of elderly and those suffering from NCDs, including diabetes. Also majority of Kerala's inhabitants reside in non urban areas. These factors make rural Kerala an ideal setting to trial and develop new approaches to Type2 diabetes mellitus prevention.[3]. This study is aimed to identify the prevalence of risk factors of cardiovascular diseases among rural women population of Kerala.

Materials and methods
Study was conducted in seven districts of Kerala - Trivandrum, Kottayam, Eranakulam, Palakkad, Malappuram, Wayand and Kasargod. These districts were selected on the basis of geographical variation. One block from each of these districts was selected randomly. Again a random selection method was used to select one panchayath from each block. A total of seven wards - one from each panchayath were selected randomly from these selected

panchayaths for the study. A total of 2535 women of age group 30 to 60 were included in the study. The study was approved by Directorate of Health Services Kerala and informed consent was obtained from all the participants.
The protocol developed by the 'WHO STEPS' program was adopted for data collection[8]. In the first step, data were collected by standard interview method. Personal details, socio demographical variables, behavioural risk factors (diet, tobacco use, physical activity, consumption of junk food etc.) were included in the questionnaire. In the second step, anthropometric measurements such as weight, height [9] waist circumferences and hip circumference [10] of the participants were measured with light clothing and without shoes. Waist circumference was measured at the level of umbilicus while the participants were supine. Percentage of body fat was estimated with a fat monitor (impedance meter). For blood pressure measurement, electronic equipment (OMRON -4, Omron Corporation, Kyoto, Japan) was used that has been recommended by the WHO for community based studies. Blood pressure measurements were taken twice in a seated position, and if there was a difference of more than 10 mm of Hg either in systolic or diastolic blood pressure between the initial readings, a third measurement was obtained. An average of the two or more readings was taken for analysis.

In the third step of the study, fasting venous blood samples were drawn from all the individuals involved in the study. Fasting blood sugar was estimated by the enzymatic method [11]. Fasting total cholesterol [12], HDL Cholesterol [13], serum triglyceride [14] and direct LDL were also estimated enzymatically. The data obtained were analysed by SPSS software version 16.

Results
Most of the women candidates involved in the study were house wives with only 38% working in government or private sector. The educational qualification of 54% of the participants was either matriculation passed or higher. Majority of participants were nonvegetarians. Only 3.4 % of the study population uses green leafy vegetables daily. Most of the participants consume it rarely or monthly. More than 60% consumes it rarely. Only 9.6 % consumes fruits daily. 69% percentage of the studied population consumes fruits rarely. Others consume it weekly. Daily consumption of bakery foods were reported in 23 % and 77.03% of the population uses these food stuffs very rarely. 16 %. of the studied population have fast food in a daily or weekly twice basis. In the studied population of rural women 82 % were in the sedentary category (inactive at work), 4 % in the heavy category (vigorous activity at work), and 16% were in the moderate (moderate activity at work) category. About 30.7 % do physical exercises.
Prevalence of obesity (BMI ≥ 30), overweight (BMI 24.99 - 30) and underweight (< 18.5) were 10.69 %, 37.94 % and 5.8 % respectively. High body fat percentage was seen in 67.83% of the population. 78.4% of the participants are with high (> 0.85) waist hip ratio. Hypertension (Systolic BP ≥ 140 mmHg or Diastolic BP ≥ 90 mmHg) was observed in 30.5% of the study population. The prevalence of pre-hypertension (Systolic BP 120-139 mmHg or Diastolic BP 80-89 mmHg.) was 37.1%. Among the high blood pressure category 33.4% were newly detected in the survey.

Prevalence of Type II diabetes mellitus both under medication and newly detected cases with fasting blood glucose ≥ 126 mg/dl was 14.3% and prediabetes (Fasting blood glucose 100-110) prevalence was 16.9%. Among the known diabetic category (under medication) 73.7 % had glucose under control. About 37.67 % of the diabetic category was newly detected.

A students't' test was conducted with SPSS software version 16. The mean and standard deviation values of the cardiovascular risk factor variables are illustrated in Table (1).

A Pearson correlation test was done. BMI and Waist hip ratio are positively correlated to FBS, total cholesterol, Systolic and diastolic pressure and LDL (The r and P values were shown in Table 2). BMI and waist hip ratio showed negative correlation with HDL. Body fat is positively correlated to BP, total cholesterol and LDL.

Tables

Table 1. The mean values of NCD risk factors

Parameter	Mean
Age	41.5±7.1
BMI(Body mass index)	24.9±4.2
Body fat	34.8±15.2
Waist circumference	83.6±11.4
Fasting blood sugar	99.8±30.2
Systolic blood pressure	123.4±15.8
Diastolic pressure	78.9±9.1
Total cholesterol	199.3±37.8
LDL	122.5±36.1

Table 2. Pearson correlation test result

Variable	BMI		Waist hip ratio	
	r	P	r	P
Systolic BP	0 .249	0.000	0.174	0.000
Diastolic BP	0.260	0.000	0.168	0.000
cholesterol	0.072	0.000	.099	0.000
LDL	0.057	0.004	.066	0.001
HDL	-0.062	0.049	-0.039	0.002
FBS	0.074	0.000	0.122	0.000
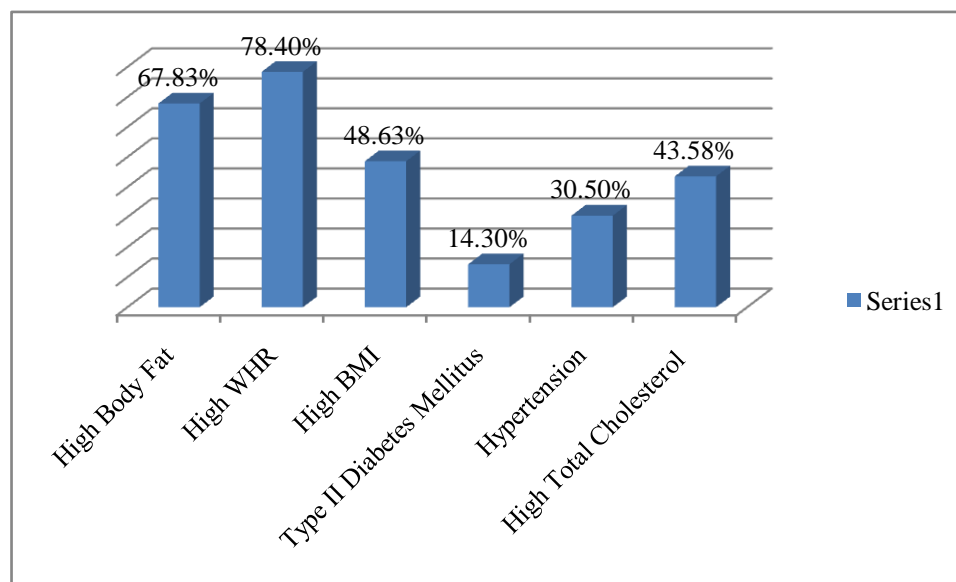
Figure (1) Prevalence of cardiovascular risk factors

Discussion

In the present study a total of 2535 women of age group 30-60 from rural Kerala were included. In terms of behavioural risk factors, the use of tobacco products and alcohol were very rare or none in the study population. The consumption of green leafy vegetables and fruits is low. High prevalence of abnormal BMI WHR and waist circumference were observed in the study population. Diet and physical activity are considered key measures to prevent weight gain and development of obesity [15]. Fruit and vegetable consumption has been associated with a lower risk of cardiovascular diseases (CVD) [16, 17]. Fruits and vegetables are rich in dietary fibre and water content; also contain a myriad of vitamins, minerals, which are inversely associated with cardiovascular disease risk factors [18]. In a cohort study, Bogers et al revealed the adverse effect of overweight on blood pressure and cholesterol levels [19]. In our study also as the BMI and WHR increases there is a remarkable increase in the percentage of cardiovascular risk factors such as total cholesterol, LDL Cholesterol and high blood pressure. Obesity and physical inactivity independently contribute to the development of coronary heart disease in women [20]. The epidemiology of cardiovascular risk factors is changing rapidly with obesity pandemic. It contributes or directly causes most other modifiable risk factors namely hypertension, dysmetabolic syndrome and type 2 diabetes mellitus. Obesity can also exacerbate cardio vascular disease through a variety of mechanism including systemic inflammation. The weight reduction is a key strategy for simultaneous improvement in global cardio vascular risk, with anticipated improvements in survival and quality of life [21]. The morbidity and mortality associated with cardio vascular diseases can be reduced by controlling the obesity epidemic [22]. High prevalence of hypertension and prehypertension were observed in the population. The prevalence of diabetes hypercholesterolemia, and hypertension were 14.3 %, 43.58 %, 30.5% respectively. These figures are comparable with Krishnan et al 2016 [23]. Statistically significant correlations of BMI, body fat and waist hip ratio values with hypertension, diabetes and cholesterol values emphasises the importance of maintaining a healthy body weight. The obesity epidemic depends on various factors such as life style, genetics and other socio environmental and biological factors. Excess body weight and high WHR significantly increase the risk of numerous diseases and clinical disorders including all cause morbidity and CHD and hypertension But by maintaining a healthy diet and an overall healthy life style the risk of non communicable diseases can be reduced.

Conclusion

High prevalence of cardiovascular risk factors was observed in the rural women of Kerala of age group 30 to 60. In our study there is a positive relation between BMI, WHR and cardio vascular risk factors. Modifications in the dietary habits and life style can reduce the risk factors. Interventions are necessary in the society to develop a healthy life style among the rural population.

Acknowledgements

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