

## Original Research Article

# A cross sectional study to evaluate the prevalence of cardiovascular risk factors among college students aged 18-25 years in and around Calicut

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## ABSTRACT

**Background:** Cardiovascular disease (CVD) has a major impact on both developed and developing nations as it has become a leading cause of death all over the World. In recent years an increasingly robust body of epidemiological evidence has highlighted the proliferation of CVD risk factors worldwide. The westernization of dietary habits, decreased levels of physical activity, increased childhood obesity and increased tobacco consumption accelerated by industrialization, globalization now threaten once low risk regions. The project aims to establish the need for screening, risk assessment, education and management in young adults. Objective of the study was to assess the risk behaviours in relation to smoking habits, alcohol use, sexual promiscuity among college going youth populace in southern part of Calicut.

**Methods:** A cross-sectional study was conducted among college students aged 18-25 years around Calicut city. Study was conducted during the months of June 1<sup>st</sup> and July 30<sup>th</sup> 2016. The colleges were selected using simple random sampling method and the partakers were interviewed after getting assent from the concerned institutions. The sample size was calculated as 200 from WHO Global health observatory data prevalence of tobacco usage as 51%.

**Results:** Mean (SD) age of study population is 20.90 ( $\pm 2.11$ ). Majority of the study population were females (78.5%) and males were 21.5%. Prevalence of smoking found to be 4% and alcohol consumption was found to be 2.5% among study population. BMI of the study population is 21.04 ( $\pm 3.73$ ).

**Conclusions:** The results of this survey are alarming that the college going youth population fail to understand the devastating consequences of risky behaviours. Hence, interventions must be designed to prevent high-risk behaviours among the vulnerable population.

**Keywords:** NCDs, CVD Risk factors, Risk behaviours, Youth

## INTRODUCTION

Cardiovascular disease (CVD) is the leading cause of death and disability worldwide. It is expected that by 2020, CVD would prevail as the leading cause of death and disability over infectious diseases globally.<sup>1</sup>

Non communicable diseases (NCDs) are at their peak in India and Indians develop cardiovascular diseases like coronary artery diseases, cerebro-vascular Accidents (CVA) and peripheral vascular diseases (PVD) early with more severity when compared to Western counter parts.<sup>2</sup> In Kerala, conventional risk factors are strongly associated with CVDs.<sup>3</sup> Unhealthy dietary choices and drastic change in life style contributes to weight gain and

dyslipidemia. Obesity has become a major public health challenge among young adults and is a strong risk factor for cardiovascular diseases (CVDs). Other important conventional risk factors are systemic hypertension and dyslipidemia. Presently, the greatest public health challenge to developing countries is to control epidemics of chronic noncommunicable diseases, specifically CVD, diabetes and stroke which have caused almost doubled mortality rates than other communicable diseases in India.<sup>4</sup> In 2006, Gaziano et al predicted that individuals of Asian Indian ethnicity would account for 40-60% of global CVD burden within the next 10-15 years.<sup>5</sup>

Body mass index (BMI) is a good clinical parameter to assess health and health risk in an individual. The healthy range of BMI for South East Asians including Indians is in the range between 18.5–23 kg/m<sup>2</sup>. For Asians, overweight is a BMI between 23 and 24.9kg/m<sup>2</sup> and obesity a BMI greater than 25 kg/m<sup>2</sup>, markedly lower than in western population. BMI correlates well with mortality due to cardiovascular diseases. BMI is the best available tool for screening and evaluation of overweight and obesity in adults. This is the main reason for screening BMI in college students.

Blood pressure (BP), yet another clinical parameter shows health and health risk in the population. Blood pressure deviations outside normal range, if detected early in the early life will predict the adult or future hypertension. Moreover, high blood pressure is a major modifiable risk factor for CVDs. These are the reasons for including blood pressure measurement of college students in the proposed study. Main advantage of the proposed study are the following. In this study there is an opportunity for early detection of cardiovascular risk factors among young adults. Early detection is critical to identify individuals at risk and to promote lifestyle changes before the progression of the disease. Young adults are ideal targets for prevention efforts because they are in the process of establishing life style which track forward into adulthood.

### **Aims and objectives**

To assess the risk behaviours in relation to aims to establish the need for screening, risk assessment, education and management in young adults among college going youth population in Calicut city.

## **METHODS**

### **Study design**

The names of college students who were from the selected colleges were listed. Exclusion criteria were applied to eliminate the students whose age was below 18 years and above 25 years. The rest of the students who exactly fit into the study age group 18-25 years were included in the sample frame who got equal chances for being selected. Hence serial numbers were assigned to

the list of students. Simple random sampling method was adopted to select the participants for the study, till we get 200 students, taking into account 15% absentism or non – response.

### **Study place and period**

Study was conducted during the months of June 1st to July 30th 2016 in and around Calicut city.

### **Sample size**

Formula:  $4pq/d^2$

Different sample sizes can be calculated based upon different prevalence level of different risk factors. Here the sample size was arrived with the prevalence of cardiovascular risk factor profile of medical students in a tertiary care hospital of central Kerala.

p= 75% i.e. 0.75

q=1-0.75

=0.25

d=allowable error; d=0.030; d<sup>2</sup>=0.00093

$$n = \frac{Z^2 \alpha^2 PQ}{d^2} = \frac{0.75 \times 0.25}{0.00093} = 200$$

Sample size= 200 students.

### **Selection criteria**

Individual college students who have given the completed data through questionnaire and also appeared for physical measurements are considered to be study sample unit.

### **Data collection**

All individuals who participated in this study received verbal and written explanation (in English language) of the procedures involved and the benefits expected from the study. After obtaining informed consent, interview schedule was administered to the subjects also explained that all the results would be reported only as group data. Self administered questionnaire was used to collect information on identification data and risk behaviours in relation to cardiovascular diseases.

### **Study instruments**

The study used four instruments to obtain the data.

1. Pre designed, pre tested, semi structured interview schedule.
2. Assessment of physical measurements including height and weight for the calculation of body mass index, waist and hip circumference for waist-hip ratio.

3. Mercury Sphygmanometer for measuring blood pressure.
4. Pilot study.

The pilot study was conducted on 30 students, representative of both sexes from each class in our institution before undertaking the main study to test the applicability of the questionnaire. After appropriate modifications the questionnaire was finalized. Each questionnaire took around 10-15 minutes to complete. Following the questionnaire, physical measurements were completed within 5-10 minutes.

### **Descriptive variables**

The demographic variables were those of age, gender, total monthly income and total members in the family. The variables for identifying risk factors were tobacco smoking, alcohol consumption, and family history of obesity, lack of physical activity, diet patterns, stress, overweight, obesity, abdominal obesity and Hypertension.

### **Ethical clearance**

Clearance from the Institutional Ethical Committee was obtained. Permission to conduct the study was obtained from the Head of Institute of all four colleges where the study was planned.

Informed written consent was obtained from each student before the interview (Appendix I).

### **Statistical analysis**

The data analysis was done using SPSS Version 20 software. The test of significance was done using chi-square test with statistical significance level set at  $p < 0.05$ .

## **RESULTS**

### **Socio-demographic profile**

Mean (SD) age of study population is 20.90 ( $\pm 2.11$ ) with minimum age of 18 and maximum age of 25. Majority of the study population were females (78.5%) and males were 21.5%. 48% of the study population belongs to MBBS, 16% belongs to BDS, 12% belongs to degree, 9.5% belongs to BSc nursing, 4% belongs to BA English, 4% belongs to BSc physics, 3.5% belongs to BCom and 3% belongs to DOA.

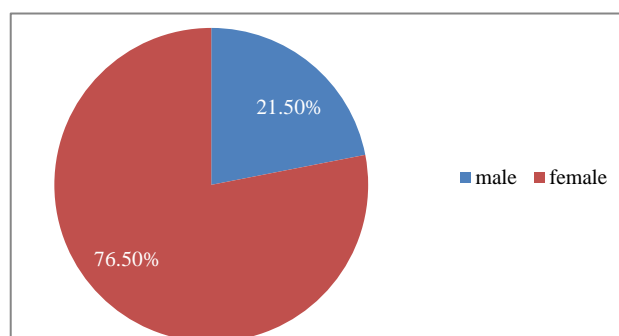
### **Occupation of parents**

**Father occupation:** Majority of them (37%) were professionals, 28.5% were manual labours, 20.5% were

doing business, 10.5% were unskilled, 3.5% were unemployed.

**Mother occupation:** Majority of them (64%) were unemployed, 18% were professionals, 8% were manual labours, 6.5% were unskilled workers and 3.5% were doing business.

Majority of the study population (73%) were staying at hostel and (27%) were not staying with parents.



**Figure 1: Gender distribution of the study population.**

### **Risk factors**

**Smoking-** Prevalence of smoking found to be 4% among study population.

**Alcohol-** Prevalence of alcohol consumption among study subjects found to be 2.5% among study population

**Thyroid disorder-** No history thyroid disorders among study subjects.

**Parents obesity-** According to the study population, 16% of them thought that their parents were obese or overweight and 8% of them thought that their siblings were obese/overweight.

**Diet- related risky behaviour-** Majority of study subjects are non-vegetarians (96%).

### **Diet frequency**

Majority of the study subjects (65.5%) rarely have breakfast. 23% of study subjects have 3-5 servings of breakfast per week. 4.5% of study population have 7 servings of breakfast per week. 7% of study population never had breakfast.

### **Fruits and vegetables**

Majority of the study subjects (81%) rarely have fruits and vegetables. 53.5% of study subjects have 3-5 servings of fruits and vegetables per week. 57.5% of study subjects have 7 servings of fruits and vegetables per week. 8% of study population have 0 servings of fruits and vegetables per week.

### Cereals and pulses

Majority of the study subjects (38.5%) have 3-5 servings of cereals and pulses per week. 34% of the study subjects have 1-2 servings per week. 23.5% of the study subjects have 7 servings per week. 4% of the study subjects have 0 servings per week.

### Fried items

Majority of the study subjects (54%) have 1 to 2 servings of fried items per week. 28% of the study subjects have 3-5 servings of fried items per week. 11.5% of the study subjects have 0 servings of fried items per week. 6.5% of the study subjects have 7 servings of fried item per week.

**Table 1: Frequency of food intake and types of food intake.**

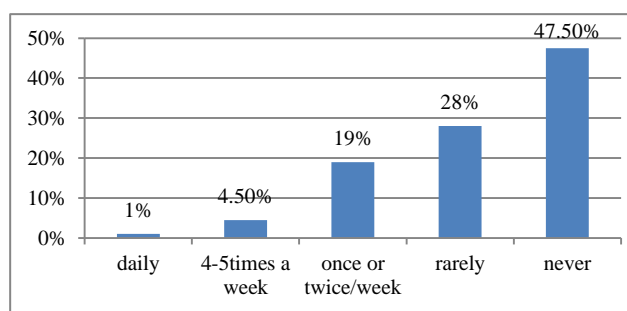
	Never (%)	Daily (7 Times) (%)	Mostly (3-5 Times) (%)	Rarely (1-2 Times) (%)
<b>Breakfast</b>	7	4.5	23	65.5
<b>Cereals and pulses</b>	4	23.5	38.5	34
<b>Fruits and vegetables</b>	8	57.5	53.5	81
<b>Fried items</b>	11.5	6.5	28	54
<b>Bottled drinks and other junk foods</b>	76	6.5	18	99.5
<b>Milk products</b>	6	44	18	31.5
<b>Fast food and bakery items</b>	26	2.5	15.5	56

### Bottled drinks and other junk foods

Majority of the study subjects (99.5%) have 1-2 servings of bottled drinks per week. 18% of the study subjects have 3-5 servings of bottled drinks per week. 76% of the study subjects have 0 servings of bottled drinks per week. 6.5% of the study subjects have 7 servings of bottled drinks per week.

### Milk products

Majority of the study subjects (44%) have 7 servings of milk products per week. 31.5% of the study subjects have 1-2 servings of milk products per week. 18% of the study subjects have 3-5 servings of milk products per week. 6% of the study subjects have 0 servings of milk products per week.



**Figure 2: Frequency of eating from outside.**

### Fast food and bakery items

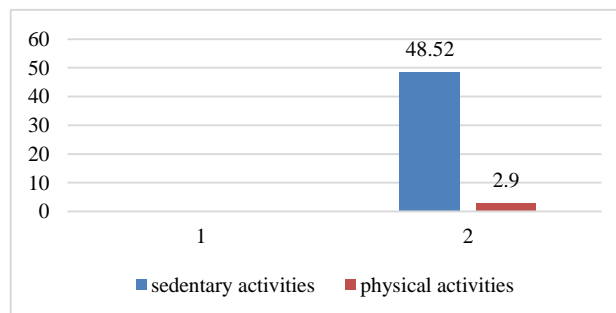
Majority of the study subjects (56%) have 1-2 servings of fast food and bakery items per week. 26% of the study subjects have 0 servings per week. 15.5% of the study subjects have 3-5 servings per week. 2.5% of the study subjects have 7 servings per week.

### Anthropometric measurement

The mean (SD) height of the study population is 160.67cm ( $\pm 7$ ) with minimum height of 146 cm and maximum height of 182 cm. The mean (SD) weight of study population is 54.56 cm ( $\pm 11.49$ ) with minimum weight of 35kg and maximum of 88 Kg with mean (SD) BMI of the study population is 21.04 ( $\pm 3.73$ ) with minimum BMI of 13.80 and maximum of 35.93. The mean (SD) waist circumference of the study population is 71.60 ( $\pm 11.24$ ) with minimum 17 cm and maximum 108 cm. The mean (SD) hip circumference of the study population is 80.71 ( $\pm 10.8$ ) with minimum 19.0 cm and maximum 112 cm. The mean (SD) waist: hip of the study population is 0.87 ( $\pm 0.08$ ) minimum of 0.68 and maximum of 1.19.

**Leisure time activity:** Leisure time activities of past 3 months among study subjects were assessed and the data is given below:

Mean time spent for sedentary activities was 48.52 hours and the times spend for physical activities were 2.9 hours per week.



**Figure 3: Leisure time activity.**

## DISCUSSION

Many risk factors can help predict the likelihood of CVD: heredity, Male gender, advancing age, cigarette smoking, high blood pressure, diabetes mellitus, obesity, lack of physical activity, dyslipidemia and homocysteine level. The more risk factors a person has, the greater the likelihood of developing heart diseases.<sup>6</sup>

Abdominal obesity was defined as a waist circumference of  $\geq 90$  cm in men or  $\geq 80$  cm in women.<sup>7</sup> Amongst the study subjects 43 subjects were underweight i.e. BMI  $< 18$ . According to Asian classification 111 study subjects were within normal limit i.e. BMI 18-23. According to WHO classification of BMI 152 study subjects were within normal limit i.e. BMI 18-25 while a cross sectional study conducted by Kutty et al found higher BMI in males as compared to that in females.<sup>8</sup>

According to Asian classification 43 study subjects were overweight. The waist: hip ratio of 30 male subjects were above 1 i.e. above the normal limit. The waist: hip ratio of 59 female subjects were within normal limit i.e. 0.85.

In our study population, 8% of them thought that their siblings were obese/overweight.

Hypertension is known as the 'Silent Killer' as it doesn't deliver manifestations. This implies when a individual has hypertension, they don't feel any agony, or have other physical indications of ailment. This absence of side effects makes it hard to figure out who has hypertension, as determination requires estimation of circulatory strain. Early counteractive action, discovery, and control of hypertension, decrease CVD chance. In any case, they are critical for lessening CVD chance.

The systolic BP of 180 subjects were within normal limit i.e.  $< 140$  mm of Hg. Among the study subjects the systolic BP of 20 subjects were above 140 mm of Hg. Among the study subjects the diastolic BP of 178 subjects were within normal limit i.e.  $< 90$  mm of Hg. Among the study subjects the diastolic BP of 22 subjects were above 90 mm of Hg. Among them the systolic BP of 41 male subjects and 145 female subjects were less than 140 mm of Hg. And diastolic BP of 38 male subjects and 150 female subjects were less than 90 mm of Hg. This is in concordance with a hypertension prevalence study done in Kerala recently where prevalence of hypertension was 24% (in age less than thirty years) with male preponderance.<sup>9</sup>

Among the study subjects 2.5% were consuming alcohol. All were males.

Among them 60% belongs to class II socio economic status according to Modified BG Prasad classification of Socio economic status and they were residing in urban area. Among them all were occasional drinkers. Among the study subjects 4.5% were having the habit of

smoking. All were males. Among them 70% belongs to class II Socio economic status according to Modified BG Prasad classification of Socio economic status and 69% were residing in urban area. Among the study subjects 28.5% of them were involved in adequate physical activity ( $> 150$  minutes per week). Among them all were involved in moderate physical activity.

## CONCLUSION

The results of this survey is so alarming that the college going youth population are involving in risk behaviors without being aware about the sequel. A focus on an increased awareness among college students through health education, peer education and counselling might influence the target population in adopting and supporting health promotion activities. The disturbing prevalence of hazard factors in youthful populace illustrates the requirement for organised endeavors for the usage of national-level programs to avoid cardiovascular diseases.

### Recommendations

#### At individual level

- The shift of weightage from calories towards value of nutrients present in food
- Find a doctor and have regular wellness exams.
- Be physically active. Involve in minimum of 150 minutes of moderate physical activity or 75 minutes of High intensity physical activity per week.
- Adopt healthy habits. Avoid smoking, alcoholism and also passive smoking.
- Adopt healthy and balanced dietary habits. Avoid junk foods and soft drinks

#### At institutional level

- Impart physical activity sessions during academic curriculum preparation.
- Never encourage selling of high calorie foods in and around the institutions.
- Proper health education and health campaigns.
- Encourage physical and sports activities.

Prohibit the use of cigarettes and alcohol inside and around the educational institution.

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*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

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