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Original Research Article

Magnitude of behavioural risk factors for cardiovascular diseases among college going young adults (18-25 years) in Mysuru, Karnataka, India

Lakshmi Malavika Nair[1], Madhu B.[2]*, Srinath K. M.[3], Anup Gopinath[4], Kavita Yadav[5]

[1]Final year MBBS student, JSS Medical College, JSS University, Mysuru, Karnataka, India
[2]Department of Community Medicine, [3]Department of General Medicine, JSS Medical College, JSS University, Mysuru, Karnataka, India
[4]Department of Community Medicine, PK Das Institute of Medical Sciences, Vaniamkulam, Kerala, India
[5]Consultant Research Associate, Centre for Policy Research, Chanakyapuri, Dharam Marg, New Delhi, India

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***Correspondence:**
Dr. Madhu B.,
E-mail: drmadhusri@gmail.com

ABSTRACT

Background: Sedentary lifestyle and unhealthy diet patterns increase the risk of cardiovascular disease (CVD). Estimating the magnitude of behavioural risk factors is vital for planners and policy makers to formulate appropriate and locally suitable interventions. The objective of this study was to estimate the magnitude and pattern of behavioural risk factors for cardiovascular diseases among college students (medical, dental, pharmacy, engineering and arts and science colleges) in Mysuru.
Methods: A cross sectional study was carried out among students of medical, dental, pharmacy, engineering and arts and science colleges in Mysuru using snow-balling technique. Based on CDC-BRFSS (Behavioral Risk Factor Surveillance System) and Cardiovascular Risk Assessment Questionnaire developed by Metagenics, New Zealand, a self-administered questionnaire was developed according to the local cultural and food practices , which was used to collect information on dietary pattern, exercise pattern, tobacco and alcohol consumption. Statistical analysis was performed using SPSS software (version 22) and P value of <0.05 was considered as significant.
Results: In the study, 45.8% of 970 study participants lead a sedentary lifestyle and 13.1% exercise in the gym regularly. Majority of students from Arts and Science College lead a sedentary lifestyle. Dietary pattern assessment revealed that 71% of the students consumed fried food frequently (highest among medical students - 82.4%). Medical and dental students also consumed the maximum amount of sweets i.e. 60.9% and 67.1% respectively. Non-vegetarian food was frequently consumed by 30% of medical and dental students. 47% of the current smokers were MBBS students. 37.8% of the students who consumed alcohol admitted to binge drinking.
Conclusions: Unhealthy behavioural risk factors for CVDs are higher among medical students, despite the fact that they know most about the detrimental effects of these practices. Developing strategies targeting these behavioural risk factors to improve the health status of college students play a crucial role in protecting the youth from cardiovascular diseases in future.

Keywords: Behavioural risk factors, Cardiovascular risk factors, Mysuru, Young adults

INTRODUCTION

Cardiovascular diseases (CVDs) are the leading cause of death globally: more people die annually from CVDs than from any other cause. An estimated 17.3 million people died from CVDs in 2008, representing 30% of all global deaths.[1] Of these deaths, an estimated 7.3 million were due to coronary heart disease and 6.2 million were due to stroke.[2] Low- and middle-income countries are disproportionally affected: over 80% of CVD deaths take place in low- and middle-income countries and occur almost equally in men and women.[1]

The study focuses on college students of 5 different colleges in Mysuru, each college offering a different course. Most students start smoking and consuming alcohol in their first year in college. There also seems to be an increasing trend in sedentary lifestyle among college students, and a lack of interest in taking care of their health. Indian young adults constitute more than 22% of the total country's population and are particularly vulnerable to the risk of CVDs.[3]

Most cardiovascular diseases can be prevented by addressing modifiable risk factors such as tobacco use, unhealthy diet and obesity, physical inactivity, high blood pressure, diabetes and raised lipids. The gravity of the situation can be understood by looking at the fact that even medical students are ignorant of, or choose to ignore, the consequences of their unhealthy lifestyle. To develop and target prevention efforts for young adults at risk of obesity and future chronic disease, we must understand the health-risk behaviors of this group. Very few college based studies have been conducted regarding prevalence of behavioural risk factors among college going young adults in the 18-25 years age group in Mysuru city. Thus, the study was intended to provide an insight as well as early recognition of these lifestyle risk factors among college going young adults which would help in planning awareness programs that could perhaps keep cardiovascular diseases at bay in their future.

Objectives of the study

- To estimate the prevalence of behavioural risk factors among young adults in the age group of 18 to 25 years.
- To identify the difference in behavioural risk factors across various colleges.
- To identify the sex wise difference in behavioural risk factors.

METHODS

A college based cross sectional study was done in 5 colleges of Mysuru district. Colleges offering different courses were selected in order to assess the difference in magnitude and pattern of behavioural risk factors among students pursuing different career paths. The sample size for the study was calculated to be 1000 by using the formula $4pq/d^2$, where p, the prevalence of behavioral risk factors among college students was taken to be 10%, q= 100-p and 'd' the absolute error was taken to be 2%. Students from different study disciplines were recruited using snowball sampling, a purposive non-probability approach in which the researcher recruits a few volunteers who, on their turn, recruit other volunteers. In this manner, a total of 970 students were recruited to participate in the survey. The study was conducted on 210 Medical students, 152 Dental students, 169 Pharmacy students, 214 Engineering students and 225 commerce students and the health – risk behaviors among these categories of students were compared. College students aged between 18 to 25 years, who gave informed consent and who were willing to participate in the study were included. Those individuals who were not present at the time of interview were excluded from the study.

A questionnaire was used to collect data on demographic and behavioral risk factors. Socio-demographic factors like Age, Sex, Education, Religion and Native state were obtained from the participant.

The Health–risk behaviours were assessed based on the questionnaire of Behavioral Risk Factor Survey (BRFSS) developed by CDC Atlanta and Cardiovascular Risk Assessment Questionnaire developed by Metagenics, New Zealand.[4,5]

Physical activity

In the physical activity section of the questionnaire, respondents were asked questions about the frequency and duration of physical activity performed in a usual week. Questions were also asked to find out if they exercised in a gym regularly, if yes, for how long. Respondents were classified into sedentary and non-sedentary categories.

Diet

Questions were asked about the frequency of consumption of fried food, fish and non-vegetarian food. Questions about the amount of sweets and processed foods like biscuits and cakes were also asked. Frequency of consumption of nutritious foods like fruits and vegetables were also included in the questionnaire, along with excess salt intake in the form of pickle.

Tobacco consumption

Questions were asked to find out if they were a current or previous smoker, age at which they first started consuming tobacco, and if they had tried to quit smoking. Quantity and frequency was also noted.

Alcohol consumption

Age when they first started consuming alcohol was noted, along with frequency, participation in binge drinking, and increase in tolerance. Participation in binge drinking was defined as having five or more alcoholic beverages on an occasion during the past 30 days.[6]

Ethical aspects

Ethical clearance for the study was obtained from Institutional Ethics Committee of the JSS Medical College, Mysuru. Permission from the heads of the institutions were obtained before the interview. Free and informed consent was obtained from the participant for the questionnaire based interview.

Statistical analysis

Data entry was done using Excel sheet. Descriptive statistics like percentage (rates) was estimated for each of the variable. Chi- square test was used to compare the prevalence of risk factors across different weight categories across different courses. All statistical analysis were performed using SPSS software (version 22).

RESULTS

Table 1 shows the Socio-demographic characteristics of the study subjects. Among the 970 study participants, 48.9% (474) were aged between 20 and 22 years. The gender distribution was almost equal, 51% were males, and 49% were females. 44% of the students were from Kerala, 32% from Karnataka, and 22.6% from all other states.

Table 2 shows sex wise exercise pattern among study subjects. The data showed that nearly 60% of the girls lead a sedentary life, twice as much compared to the boys (33%).

Table 3 shows course wise exercise pattern among study subjects which revealed that more than 50% of engineering, commerce and pharmacy students lead a sedentary lifestyle, while only 25% of MBBS students lead an inactive life. The data also reveals that hardly 15% of the students exercise in the gym regularly, despite having a well-equipped gymnasium in all of the selected colleges.70% of the study subjects who utilized the gym did so for at least 30 minutes.

Table 4 shows sex wise distribution of dietary pattern. Analysis of preferences of sweets and processed food items like cakes and biscuits reveal that 45% of the study subjects are less inclined to add it to their diet on a daily basis. The data also demonstrates that fish was not consumed by a large number of respondents (81.8%). The study also shows that 60% of the students do not consume any fruits. However, 60% of the students said they consume 1-2 servings of vegetables every day. 70% rarely drank soft drinks. 54% have salty foods like pickle regularly. Nearly 55% of the students consume non-vegetarian food regularly.

Table 1: Socio-demographic characteristics of the study subjects(N=970).

Variables	Number	%
Age		
18-19	413	42.58
20-22	474	48.87
23-25	52	5.36
Not answered	31	3.20
SEX		
Male	496	51.13
Female	474	48.87
Place of origin		
Kerala	427	44.02
Karnataka	310	31.96
Andhra Pradesh (undivided)	94	9.69
Northern, Central and Western India *	72	7.42
Tamil Nadu	45	4.63
North East India**	12	1.23
Not answered	10	1.03
Course studying		
MBBS	210	21.65
BDS	152	15.67
Pharmacy	169	17.42
Engineering	214	22.06
Commerce	225	23.19
Year		
First year	221	22.78
Second year	218	22.47
Third year	199	20.51
Fourth year	99	10.20
Intern	29	2.99
Not answered	204	21.03
Religion		
Hindu	767	79.07
Christian	59	14.23
Muslim	138	6.08
Others ***	3	0.3
Not answered	3	0.3

Northern, Central and Western India includes the states of Bihar, Chattisgarh, Goa, Gujarat, Haryana, Jharkhand, Maharashtra, Madhya Pradesh, New Delhi, Odisha, Punjab, Rajasthan, Uttar Pradesh, and West Bengal; **North East India includes the states of Manipur, Meghalaya, Mizoram, Sikkim, and Tripura; ***Others includes Buddhism, Jainism, and Sikhism religions.

Table 5 shows course wise distribution of dietary pattern. It is observed nearly 80% of medical students eat fried food frequently. Medical and Dental students also consumed the most amounts of sweets, processed foods and biscuits (60 and 70 % respectively). Alarmingly, over 50% of the students do not consume fruits at all, highest

being Engineering and Commerce students, where the percentage is approximately 66%. Further, 30% of Dental and Pharmacy students do not consume vegetables at all. Over 50% of Commerce students consumed pickle daily.

Lastly, analysis shows that 30% of students of Medical and Dental colleges consume non-vegetarian food on a daily basis.

Table 2: Sex wise exercise pattern among study subjects (N=970).

Physical activity parameters	Male	Female	Total	Chi square value	p- value
Exercise	**n (%)**	**n (%)**			
Sedentary	168 (33.9)	276 (58.2)	444 (45.77)	77.423	< 0.001
Once a week	93 (18.8)	90 (19.0)	183 (18.86)		
2-3 times a week	111 (22.4)	57 (12.0)	168 (17.32)		
4-5 times a week	57 (11.5)	21 (4.4)	78 (8.04)		
5+ times a week	64 (12.9)	25 (5.3)	89 (9.17)		
No data	3 (0.6)	5 (1.1)	8 (0.82)		
Total	496	474	970		

Table 3: Course wise exercise pattern among study subjects (N=970).

Physical activity parameters	MBBS	BDS	Pharmacy	Engineering	Commerce	Total	Chi square value	p-value
N=970	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**			
Sedentary	54 (25.7)	83 (54.6)	70 (41.4)	109 (50.9)	128 (56.9)	444	132.221	<0.001
Once a week	36 (17.1)	20 (13.2)	38 (22.5)	41(19.2)	48 (21.3)	183		
2-3 times a week	67 (31.9)	17 (11.2)	28 (16.6)	32 (15.0)	24 (10.7)	168		
4-5 times a week	27 (12.9)	19 (12.5)	15 (8.9)	10 (4.7)	7 (3.1)	78		
5+ times a week	26 (12.4)	13 (8.6)	10 (5.9)	22 (10.3)	18 (8.0)	89		
Not answered	0	0	8 (4.7)	0	0	8		
Total	210	152	169	214	225	962		

Table 4: Sex wise distribution of dietary pattern (N=970).

Dietary pattern	Sex		Total	Chi square value	P-value
	Male (n=496)	**Female (n=474)**			
Fried food					
Less than once a week	123 (24.8)	156 (32.9)	279	20.490	< 0.001
1-2 times a week	208 (41.9)	214 (45.1)	422		
3-6 times a week	122 (24.6)	66 (13.9)	188		
Everyday	43 (8.7)	38 (8)	81		
Vegetables					
Usually none	104 (21)	93 (19.6)	197	15.697	0.003
1-2 serves/day	284 (57.3)	304 (64.1)	588		
3-4 serves/day	90 (18.1)	49 (10.3)	139		
5 or more/day	18 (3.6)	27 (5.7)	45		
Soft drink					
Less than 500 ml/week	289 (58.3)	408 (86.1)	697	95.945	< 0.001
500 ml – 1 litre/week	151 (30.4)	52 (11)	203		
1-2 litre/week	56 (11.3)	13 (2.7)	69		
Non vegetarian food					
Never	104 (21)	100 (49)	204	18.850	< 0.001
Rarely	102 (20.6)	126 (26.6)	228		
Sometimes	165 (33.3)	179 (37.8)	344		
Often	125 (25.2)	69 (14.3)	194		

Table 5: Course wise distribution of dietary pattern (N=970).

Dietary pattern	Course					Total	Chi square value	p-value
	MBBS	BDS	Pharmacy	Engineering	Commerce			
Fried food								
Less than once a week	37 (17.6)	36 (23.7)	48 (28.4)	75 (35)	83 (36.9)	279	43.520	
1-2 times a week	101 (48.1)	61 (40.1)	79 (46.7)	80 (37.4)	101 (44.9)	422		
3-6 times a week	46 (21.9)	35 (23)	31 (18.3)	41 (19.2)	35 (15.6)	188		
Everyday	26 (12.4)	20 (13.2)	11 (6.5)	18 (8.4)	6 (2.7)	81		
Sweets and processed foods								
Usually none	82 (39)	50 (32.9)	73 (43.2)	117 (54.7)	115 (51.1)	437	31.258	
1-2 serves daily	109 (51.9)	79 (52)	82 (48.5)	88 (41.1)	89 (39.6)	447		
More than 2 serves daily	19 (9)	23 (15.1)	14 (8.3)	9 (4.2)	21 (9.3)	86		
FISH								
Rarely	177 (84.3)	113 (74.3)	136 (80.5)	196 (91.6)	171 (76)	793	64.774	
1-2 times a week	30 (14.3)	21 (13.8)	18 (10.7)	14 (6.5)	35 (15.6)	118		
3-6 times a week	1 (0.5)	14 (9.2)	8 (4.7)	4 (1.9)	14 (6.2%)	41		
Everyday	2 (1)	4 (2.6)	2 (1.2)	0	5 (2.2)	13		
Fruit								
Usually none	106 (50.5)	93 (61.2)	92 (54.4)	141 (65.9)	149 (66.2)	581	31.643	0.002
1-3 pieces	88 (41.9)	41 (27)	58 (34.3)	63 (29.4)	58 (25.8)	308		
4 or more pieces	16 (7.6)	18 (11.8)	17 (10.1)	9 (4.2)	18 (8)	78		
Vegetables								
Usually none	29 (13.8)	29 (19.1)	47 (27.8)	50 (23.4)	42 (18.7)	197	40.064	0.001
1-2 serves	140 (66.7)	93 (61.2)	97 (57.54)	129 (60.3)	129 (57.3)	588		
3-4 serves	36 (17.1)	27 (17.8)	17 (10.1)	27 (12.6)	32 (14.2)	139		
5 or more serves	5 (2.4)	3 (2)	7 (4.1)	8 (3.7)	22 (9.8)	45		
Salt savouries								
Daily	28 (13.3)	44 (28.9)	54 (32)	83 (38.8)	121 (53.8)	330	114.079	
3-4 times a week	57 (27.1)	26 (17.1)	33 (19.5)	40 (18.7)	45 (20)	201		
Once a week	24 (11.4)	12 (7.9)	22 (13)	14 (6.5)	18 (8)	90		
Occasional	101 (48.1)	70 (46.1)	57 (33.7)	77 (36)	41(18.2)	346		
Non veg food								
Never	47 (22.4)	13(8.6)	28(16.6)	90(42.1)	26(11.6)	204	140.657	
Rarely	36 (17.1)	29(19.1)	30(17.8)	51923.8)	82(36.4)	228		
Sometimes	64 (30.5)	65(42.8)	74(43.8)	56(26.2)	85(37.8)	344		
Often	63 (30)	45(29.6)	37(21.9)	17(7.9)	32(14.2)	194		

Table 6 shows pattern of consumption of tobacco among study subjects**.** 91% of the respondents never smoked. Of the 9% regular smokers, most started during college. Only about 8% of the regular smokers smoked more than 20 cigarettes in a day. However, 55% of the smokers smoked more than 100 cigarettes (10 Indian packs) in their lifetime. Further, 40% of the smokers smoked everyday. 7% of the total study subjects (n=970) reported being a victim of passive smoking. 55.5% have tried to quit.

Table 7 shows course wise distribution of tobacco consumers. Nearly 50% of the smokers are students of the medical college. Of the 71 students who reported being a victim of passive smoking, over 90% were boys.

Table 8 shows pattern of consumption of alcohol among study subjects. Nearly 75% of the students started consuming alcohol after entering PUC and college. Of the 135 participants who consumed alcohol, 37% admitted to binge drinking (more than 4 drinks at a time on a frequent basis). 62% confirmed an increased tolerance to the effects of alcohol. 60% of the binge drinkers are medical students.

Table 6: Pattern of consumption of tobacco among study subjects (N=970).

Tobacco Status	Number	Percentage
Current Smoker	64	6.59
Previous Smoker	24	2.47
Never	882	90.92
Age		
Secondary school till 14	6	6.81
Higher secondary 15-16	7	7.95
PUC 17-18	37	42.04
College 19-20	30	34.09
21+	4	4.54
≥20 cigarettes/day		
Yes	7	7.95
No	81	92.04
At least 100 cigarettes in the lifetime		
Yes	49	55.68
No	23	26.13
Not sure	16	18.18
Smoking frequency		
Everyday	36	40.90
Some days	35	39.77
Not at all	9	10.22
Not sure	8	9.09
Tried to quit		
Yes	49	55.68
No	31	35.22
Not sure	8	9.09
Total	**88**	**100**
Passive smoking		
Yes	71	7.31
No	899	92.68
Total	**970**	**100**

Table 7: Course wise distribution of tobacco consumers (n=88).

Tobacco status	Course					Total	Chi square value	p-value
	MBBS	BDS	Pharmacy	Engineering	Commerce			
Current smoker	30 (46.9)	6 (9.4)	8 (12.5)	2 (3.1)	18 (28.1)	64	42.491	<0.001
Previous smoker	4 (16.7)	1 (4.2)	7 (29.2)	3 (12.5)	9 (37.5)	24		

Table 8: Pattern of consumption of alcohol among study subjects (n=135).

Age when they started consuming alcohol	Number (n=135)	Percentage
Secondary school (till 14)	7	5.18
Higher Secondary (15-16)	14	10.37
PUC (17-18)	47	34.81
College (19-20)	55	40.74
21+	12	8.88
Binge drinking		
Yes	51	37.77
No	82	60.74
Tolerance		
Yes	84	62.22
No	50	37.03

DISCUSSION

Cardiovascular diseases are the leading cause of morbidity and mortality in the world as well as in India. Risk factors for the occurrence for CVDs include both non-modifiable and modifiable risk factors. Modification of behavioural risk factors can act as a primary prevention thereby reducing the risk of CVD.

The study revealed that about 45% of the students lead a sedentary lifestyle. Analyzing the data across various colleges revealed that only 25.7% of MBBS undergraduates lead an inactive life, while in the other colleges, the percentage for the same was around 40-50 %. In a study conducted in Delhi among college students, 42.6% of the students reported occasional or nil physical activity.[7]

The minimum recommendation of taking at least 5 servings/day of fruits and vegetables was complied by less than 10% of the students. In the study conducted in Delhi, the percentage was almost the same (12%).[8] Consumption of fast foods was significantly higher among boys (75%) as compared to girls (63%). It was also significantly higher among medical college students (nearly 80%). There was also a stark difference between males and females when it came to soft drink intake: 41.7% of the boys drank more than 500 ml of soft drink in one week, while only 13.7% of the girls did so. High salt intake by adding extra salt or by eating items, such as sauces/ pickles, and others, was reported by 54.7% of students, most of whom were commerce students (over 70% of them consumed salt savouries frequently). Nearly 60% of students from all the colleges consumed non-vegetarian frequently, except engineering college, where 42.1% students were vegetarian. Fish was not a popular food item in any of the colleges, which could be due to the fact that Mysuru is not a coastal city, and the availability and choice of fish based foods is relatively less. However, it was noticed that students of the dental college and college of commerce consumed the most amount of fish, which could be attributed to the fact that a vast majority of the students were from Kerala, where fish is part of the staple diet in most households.

Cheap and easily available fast foods are readily replacing a healthy and balanced diet with plenty of fruits and vegetables. Unhealthy diet is a significant focus point when it comes to medical college students. A similar conclusion was reached by a study conducted among medical college students by Škėmienė L *et al*, as well as by a study conducted in Delhi.[9] MBBS undergraduates seem to be universally least bothered about eating healthy, which is a serious cause of concern.

Tobacco use

Only 6.6% of the students were current smokers, of which nearly 50% were medical students. Further, 7% of the students were passive smokers, 91.5% of them being boys. Again, nearly 50% of passive smokers were medical students. This could be due to the fact that most of the students stay in the college hostel, and students sharing rooms with smokers end up being victims of passive smoking.

Alcohol use

Alcohol consumption was reported by around 14% of the students, 37% of whom admitted to indulging in binge drinking in a frequent basis. Alcohol consumption is significantly higher among students elsewhere: the youth risk behavior surveillance in United States reported that nearly 40% of the students consumed alcohol, while a similar study conducted in Delhi reported that the percentage for the same was about 30%.[10]

CONCLUSION

Prevalence of behavioural risk factors is on the rise, and the younger generations are spiraling into a bleak future of disease and disability. There is gross lack of awareness about the health benefits of exercise, as most of the students lead a sedentary life. An exception to this is seen in the medical college, where nearly 75% of the students partook in some sort of physical activity. Another noteworthy prevalence noticed exclusively among medical students is the higher percentage of students who consume alcohol. A nationwide behavioural risk factor surveillance system in India for the young individuals, targeted at college going students, similar to the behavioural risk factor surveillance system of the United States (BRFSS) is necessary to plan and implement strategies for reducing the burden of non-communicable diseases. It is vital that students should be advised on how to take care of their health, and the importance of doing so.

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