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Prevalence of risk factors for obesity, hypertension, coronary artery disease and diabetes among under-graduate medical college students of Tamil Nadu

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ABSTRACT

Background: The present scenario indicates that NCD-related diseases are on the rise among young people. Once the behavioural patterns of an individual are established, it often persists throughout life and is hard to change. Research has documented that adolescence is the appropriate time period for appropriate intervention. The aim of the study was to assess the prevalence of various risk factors of hypertension, coronary artery disease and diabetes among the medical students.

Methods: A cross-sectional observational study was conducted among the medical college students of Annapoorna Medical College Hospital for a period of one year. A total of 406 students had participated in the study. A semi-structured and pilot tested questionnaire was used to collect the personal and demographic details of the students. Measurements such as BMI and blood pressure were recorded. Biochemical measurements such as fasting blood sugar and lipid parameters were measured.

Results: A total of 38 (17.9%) male students and 6 (3%) female students are at risk of developing diabetes, hypertension or CAD at a very early age as per their clinical and biochemical reports.

Conclusions: Promotion of supportive environment for strengthening student-based approaches and strategic delivery of health education is essential to target the risk behaviours among our future doctors.

Keywords: Risk factor, Diabetes, Hypertension, Coronary artery disease, Prevalence

INTRODUCTION

The changing lifestyles of mankind have led to the epidemiological transition, which means fall in communicable diseases and a rise in non-communicable diseases. Currently, non-communicable diseases are the leading cause of deaths in most of the countries. NCDs have a prolonged course of illness that does not resolve spontaneously and for which a complete cure is rarely achieved and the patients is on lifelong treatment.

Out of the 57 million deaths reported globally, 36 million (63%) deaths and 44% of disability-adjusted life-years (DALYs) are attributed to NCDs, principally cardiovascular diseases, diabetes, hypertension, cancers, and chronic respiratory diseases. India is facing a double burden of both communicable disease and NCD. Globally speaking, India experienced the highest loss in potentially productive years; when compared to communicable diseases, NCDs approximately contribute 235 million

DALYs, whereas the former leads to 222 million DALYs. 3,4

The present scenario indicates that NCD-related diseases are on the rise among young people. Once the behavioural patterns of an individual are established, it often persists throughout life and is hard to change. Recognizing the importance of this problem, a resolution was endorsed by the World Health Assembly calling upon member states to address the needs of the youth in the context of NCDs. The world health organization has already warned of increasing NCDs among adolescents as a major health problem. The importance of this age group also lies in the fact that many serious diseases in adulthood have their roots in adolescence.

Research has documented that adolescence is the appropriate time period for appropriate intervention. Teenagers start making individual choice and develop personal lifestyles. Many of these lifestyle choices are related to risk factors for non-communicable diseases, such as diet patterns, development of obesity, physical inactivity, cigarette smoking, alcohol consumption etc. These risky behaviours can result in disease outcomes such as cancer, obesity, hypertension, type 2 diabetes, which are among the leading causes of death in developing and developed countries. Also it is easier to inculcate healthy behavior of individuals at a young age rather than to modify behaviours at later ages or after the onset of disease. 8

In India, home to 253 million adolescents, the food processing industry is one of the fastest-growing sectors and accounts for about 50 percent to 60 percent of the consumption of edible sugar, salt, and fats. About 85 percent of food products consumed in India are processed. Soda consumption in Asia is also a particular challenge, especially among youth. Children are an important target for the food industry, as companies can influence their current dietary preferences, and can also lay the foundation for taste preferences and brand loyalty that can last into adulthood. Young people in Asia are caught in the changing world around them and growing up in an environment where they face major challenges eating a healthy diet and getting enough physical activity.

According to WHO, nearly three-quarters of adolescents in Southeast Asia have insufficient levels of physical activity meaning they do not engage in at least 60 minutes of moderate-to-vigorous-intensity physical activity every day. ¹² Sedentary activities are increasingly common. Aside from physical benefits such as helping maintain a healthy body weight and developing healthy bones, muscles, and organs, exercise can also ward off mental health conditions such as anxiety and depression that are common among young people. Physical activity among youth is also typically associated with lower levels of other NCD risk behaviors such as tobacco and alcohol use.

Though many studies had been conducted in assessing the prevalence of risk factors for non-communicable diseases, most of them were done on adults and only few studies had been conducted on adolescents and particularly very few had been conducted on medical students. So, the present study was undertaken to identify the risk factors for certain non-communicable diseases among the medical college students.

Aim

To assess the prevalence of various risk factors of hypertension, coronary artery disease and diabetes among the medical students.

METHODS

A cross-sectional observational study was conducted among the medical college students of Annopoorna medical College Hospital for a period of ten months between September 2016 and June 2017. The study was approved by the institutional ethical committee and the informed consent was obtained from all the students who had participated in the study. All the students in the medical college who had given the consent to participate in the study were included as our study population. A total of 406 students had participated in the study. A semi-structured and pilot tested questionnaire was used to collect the personal and demographic details of the students. Questions related to the risk factors of NCD's such as nutritional factors (frequency of eating foods rich in saturated fat or fast foods, frequency of eating vegetables and fruits/week), smoking habits, physical activity (regular practice of physical exercise, number of times/week and the duration of practice), time spending in TV watching or using computer were administered.

Measurements such as weight and height were obtained from a lightly clothed student and the BMI was calculated. Blood pressure (BP) measurement was measured student in the sitting position after 4 minute of rest. Systolic and diastolic blood pressure was identified at the beginning of the first and the fifth phase of the Korotkoff sounds using a mercury sphygmomanometer applying the appropriate cuff on the right arm. Biochemical measurements such as fasting blood sugar and lipid parameters were measured using clinical chemistry analyser ERBA (XL) and serum total cholesterol, triglyceride, HDL-C and fasting blood sugar were estimated. LDL-C was estimated indirectly using the Friedwald equation by taking 2ml of venous blood from the median cubital vein.

Data were entered and analysed using SPSS version 21. Mean and SD were calculated for all parametric variables and percentage for all non-parametric variables. Students T test was used to assess statistical significant difference between males and females, p<0.05 was considered as statistical significant.

RESULTS

Table 1: Socio-demographic profile of the study population.

Variable	Frequency	Percentage
Gender		
Male	212	52
Female	196	48
Age in years		
18	16	3.9
19	130	31.9
20	124	30.4
21	76	18.6
22	40	9.8
Year of Study		
1 st Year	6	1.5
2 nd Year	185	45.3
3 rd Year	137	33.6
4 th Year	80	19.6
Residence		
In-house resident	354	86.8
Day scholar	54	13.2
Father's occupation		
Business	32	7.8
Professional	60	14.7
Agriculture	214	52.5
Clerical /Office goers	102	25.0
Mother's occupation		
Home makers	259	63.5
Professional	19	4.7
Clerical /Office goers	81	19.9
Self employed	49	12.0

Table 2: Risk factors related to family history among the study subjects.

Family history (F/H)	Frequency	Percentage
F/H of Diabetes		
Father	117	28.7
Mother	32	7.8
Both	14	3.4
F/H of Hypertension		
Father	97	23.8
Mother	61	15.0
Both	38	9.3
F/H of Obesity		
Father	120	29.4
Mother	20	4.9
Both	9	2.2
Siblings	3	.7
F/H of smoking		
Father current smoker	140	34.3
Former smoker	3	.7
F/H of alcoholic		
Father current alcoholic	104	25.5
Former alcoholic	7	1.7

Tables 3: Various risk factors prevailing among the study subjects related to diabetes, hypertension and CAD.

Variable	Frequency	Percentage (%)	
Smoking			
Yes, Current	107	26.2	
Never	278	68.1	
Former Smoker	23	5.6	
Alcoholic			
Yes, Current	104	25.5	
Never	297	72.8	
Former Alcoholic	7	1.7	
Frequency of fruits and v	egetables inta	ke	
Daily	49	12.0	
Weekly once	188	46.1	
Occasionally	171	41.9	
Frequency of intake of ou	ıtside foods		
Occasional	193	47.3	
Weekly once	215	52.7	
Frequency of intake of fa	st foods		
Weekly once	146	35.8	
Occasional	262	64.2	
Eating snacks while watc	hing TV		
Yes	128	31.4	
No	280	68.6	
Physical activity			
Regular (daily 30 mins)	123	30.1	
Irregular (weekly once or twice)	165	40.4	
Never	120	29.4	
Sitting in front of computer or using mobile phone for >2 hrs/day			
Yes	239	58.5	
No	169	41.4	
Total number of students are pre-obese/obese base on their BMI	144	35.2	

Table 1 shows the socio-demographic profile among the study subjects. It is seen from the table that there is almost equal distribution of males and females and the age group varies between 18-22 years. Majority of the students are in house residents and about 50% of their parents are agriculturist. As the study area is a private medical college more than 90% of the students belong to the upper socio-economic class. The risk factors related to family history of diabetes, hypertension and CAD was assessed and it was found that nearly 25-30% of their parents have either diabetes, hypertension or obesity and 35% of their fathers were smokers and 25% were alcoholics (Table 2). Table 3 shows the various risk factors prevailing in our study subjects; the table shows that about 26% of the students are smokers and 25.5% are alcoholics and it is only among the male students.

Regular intake of fruits and vegetables were found to be very less. Intake of fast foods particularly outside foods was found to be very common among the study subjects. Only 30% of the students had the habit of regular physical activity for 30 mins/day and more than 50% of the students admitted that they have the habit of sitting in front of computer or mobile phone for more than 2 hours per day. In our study 35% of the students belong to preobese or obese category in which majority of them were males. Anthropometric measurements and biochemical parameters were compared between males and females, all the anthropometric measurements except the hip circumference and all the biochemical parameters except

the HDL cholesterol was found to be higher in males than the females and the difference was found to be statistically significant (Table 4). 16% of the male students are at the risk of developing hypertension as they are in the pre-hypertensive stage and 17.9% of the male students are in the prediabetic stage and 20% of the males have abnormal lipid levels, which might directly reflect on their smoking habits and alcohol consumption. A total of 38 (17.9%) male students and 6 (3%) female students are at risk of developing diabetes, hypertension or CAD at a very early age as per their clinical and biochemical reports (Table 5).

Table 4: Comparison of means of anthropometric measurements and biochemical parameters among male and female medical students.

Variables	Male (mean±SD)	Female (mean±SD)	P value
Height (cm)	171.46±14.81	159.37±6.03	< 0.0001
Weight(kg)	65.32±9.65	56.34±8.55	< 0.000
BMI	24.82±2.13	22.65±2.18	< 0.0001
Waist circumference(cm)	84.71±17.78	80.23±9.17	0.002
Hip circumference(cm)	90.44±22.68	92.54±8.57	0.224
Systolic BP	128±12	114±10	< 0.0001
Diastolic BP	84±10.5	76±8.6	< 0.001
Fasting blood sugar	98±12.5	92±9.4	< 0.001
Total cholesterol level	196±22.4	184±23.5	< 0.0001
LDL cholesterol	131±16.8	115±15.5	< 0.001
Triglycerides	195±21.6	170±10.8	< 0.001
HDL cholesterol	48±4.5	50±3.6	0.314

P value derived by student T test.

Table 5: Students at risk of developing diabetes/hypertension/CAD based on their clinical and biochemical values.

Variables	Males (n=212) (%)	Females (n=196) (%)	P value
BMI>24.9	39 (18.3)	11 (5.6)	< 0.001
BP>130/80 mmhg	34 (16)	2 (1)	< 0.001
Fasting blood sugar >100 mgs/dl	38 (17.9)	5 (2.5)	< 0.001
Total cholesterol >200 mgs/dl	42 (19.8)	7 (3.5)	< 0.001
LDL cholesterol >100 mgs/dl	44 (20.7)	5 (2.5)	< 0.001
Triglycerides >175 mgs/dl	48 (22.6)	13 (6.6)	< 0.001
HDL cholesterol <35 mgs/dl	36 (16.9)	8 (4)	< 0.001
Total number of students at risk	38 (17.9)	6 (3)	< 0.001

P value derived by chi-square test.

DISCUSSION

Though very few similar studies have conducted among medical students, but quite a few number of studies have done to determine the various risk factors among the college & school students in India as well as abroad. Most of the studies have concluded that different cardiological risk behaviours are widely prevalent among college and school students. ¹³

The current study was done to assess the presence of NCD risk factors among the young adult medical students in a tertiary institution, Salem, Tamil Nadu. All NCD risk factors including lifestyle habits (diet, exercise, and

smoking), BP and BMI were assessed. Students were screened and told about their measurement and given the appropriate recommendations.

The study population was composed of 408 medical students whose age ranged from 18-22 years with a mean of 20.15 ± 1.23 . Males and females represented about 52% and 48% respectively. In a similar study done among the medical students in New Delhi in 2009 -2010, found 91.2% belonged to 17-22 years age group with mean age of 20 (±3.6) years and the proportion of males (62.4%) was higher than females (37.6%). In the present study the students reported that 28% of the parents had hypertension and 23% had diabetes, which is almost

similar to the study done by Mahmood et al¹⁴ carried among medical students of Barielly, in which he reported that nearly 30.3% of students had a family history of hypertension while 41.4% had a family history of diabetes and in another study done on Pakistani medical students nearly 33% had a family history of coronary artery disease 15 . In the current study the prevalence of smoking and alcohol was almost 25%, which is very high among the students community when compared to the study done by Ismail et al, the prevalence of smoking was only 2.5% and another study conducted in Uttar Pradesh, India and Saudi Arabia found a prevalence of 4.5% and 3.1%, respectively, whereas in a study done by Rustag et al, the prevalence of alcohol consumption was almost 30%.16-19

The current study shows that 12% of the students had the habit of taking fruits and vegetables daily, which is almost similar to the study done on the students community in New Delhi but in a study done by Manna it was quoted that 29% of students had the habit of taking fruits and vegetables daily. 19,20 The present study shows that almost 35% of the students prefer to take junk foods on a regular basis, which is comparatively lower than the study done by Ismail et al in which he quoted that 65% of them regularly take junk foods, whereas another study conducted in Guwahati, Assam, India reported that only 9% of the students had the habit of consuming junk foods regularly. 16,21 Poor food habits and excess salt intake by medical students was also reported by Škėmienė et al. 22 This is a matter of concern as stay in the medical college did not promote healthy behavior among students.

Adequate exercise can reduce the burden of many diseases. It is estimated that 2 million deaths are caused due to inadequate physical activity.²³ In our study 30% of the students had the habit of regular physical activity, which is almost in par with the results quoted by Ismail and another study done on students in Uttar Pradesh, study conducted at Ahmedabad, Gujarat, India showed that 15.2% of the students exercised daily and 56.3% exercised weekly, which was much lower compared to the present study. 16,17,24 Low physical activity and long hours of sedentary work was reported in other studies too carried out among university students (22%-62%). 25,26 Breaks during continued sedentary activity (i.e., standing up, walking down the hall, and others), regardless of physical activity level or energy expenditure of breaks have been reported to reduce a number of individual CVD risk factors. 27,28

The present study had shown that the mean BMI, blood pressure and waist circumference were comparatively higher in males than the females similarly most of the biochemical parameters like fasting glucose, cholesterol levels, LDL levels were also higher among the males. As our objective is to find out the prevalence of risk factors among the students we did not see for any association between the anthropometric measurements biochemical parameters with that of pre-hypertension and pre-diabetes. Studies have found an association of

dyslipidemia, overweight and glucose intolerance with prehypertension.²⁹⁻³¹ A population study in China in 1154 subjects found that total cholesterol and triglycerides were significantly higher in pre-hypertensives compared to normotensives but LDL and HDL were similar; BMI and waist circumference were of course higher among the prehypertensives.²⁹ The Puducherry study too reported similar relation to the lipid profile.³² Our study had proven that 18% of the males and 3% of the female medical students had risk factors related to diabetes, hypertension and CAD.

CONCLUSION

Modifiable risk factors for diabetes, hypertension and coronary are widely prevalent among medical students community. The prevalence of risk factors at this stage bears significant tendency towards development of disease in future. Primary prevention of the disease by risk factor reduction has better benefits compared to secondary prevention in these diseases. Promotion of supportive environment for strengthening student-based approaches and strategic delivery of health education is essential to target these risk behaviours among our future doctors. Although our findings are related to upper class young adults this might very well be valid for other sections in the state, considering the pace at which social and educational development is happening.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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