ORIGINAL ARTICLE

Prevalence of Cardiovascular disease risk among Medical Students in South India

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Abstract

Key Words

Cardiovascular risk; Dietary habit; Risk behavior; Fruits and vegetables; Physical activity

Introduction

The magnitude and the speed of progression of the Cardiovascular Disease (CVD) epidemic in India is alarming; India already has the highest number of diabetics in the world (1); hypertension and obesity also is increasing and it has been projected that cardiovascular diseases will be the leading public health problem to fight against by 2020. This warrants collaborative efforts by the health care professionals, policy makers, public health departments and communities to engage in preventive lifestyle modification programmes and in that perhaps the health care professionals will have a significant role to play.

Physicians in particular are in a position where they can influence behavior change among population at different levels – by one to one contact, during community education programs and by helping design appropriate public health intervention programs. However the role of medical professionals in dealing with this public health problem will be influenced by their own knowledge, perceptions and practices and it will be pivotal in defining the goals of preventive programme for cardiovascular diseases in the future.

Aims & Objectives

This study assessed the prevalence of common cardiovascular risk factors including smoking, alcohol intake, fruits and vegetable and junk food intake, levels of physical activity, sedentary activity, obesity and high blood pressure among a sample of medical students in South India. It analyzed the risk difference across gender and the strength of association of the risk factors with pre-existing hypertension and obesity among medical students.

Material and Methods

Study setting and design - A cross sectional survey was conducted among the medical students in a private medical college in South India from March to September 2012. About three-quarters of the students in this medical institution were from the same state; rest was from the neighboring states. Majority of them were from families of middle and higher income group. The socio-cultural background of the students was more or less similar. Of the 498 students in regular batches of four professional years, 458 consented to participate in the study. The study was done as part of a Short Term Studentship (STS) project granted by Indian Council of Medical Research (ICMR) and the study was approved by the Institutional Review Board (IRB).

Risk assessment instrument - The risk factors for cardiovascular diseases were studied using the adapted version of WHO STEPS (Stepwise approach to chronic disease risk factor Surveillance) questionnaire. It was modified to make it locally relevant and the final questionnaire consisted of all the core items of the STEPS questionnaire except the biochemical

measurements which were excluded due to lack of fund support; a few additional questions considered necessary were incorporated. The questionnaire was piloted in 45 medical interns. A written consent was obtained from the students willing to take part in the study.

Variables - The daily intake of fruits and vegetables was assessed using a standard 200 gram cup. Five servings (portions) or 400gms of fruits and vegetables per day were taken as adequate as recommended by World Health Organization (WHO)[2] and ICMR [3]; Physical activity was categorized as adequate, if they practiced exercise or outdoor sports for at least 30 min/day for more than 5 days in the past week and inadequate if such activity was less than 5 days in a week[4]; smoking was defined as 'Current users' having used tobacco at least once in the last 30 days preceding the survey and 'Never users' not used tobacco even once in the lifetime. [5] Same definitions were used for alcohol consumption as well. The height, weight and blood pressure were measured by trained volunteers. The height was measured using a stadiometer, weight was measured using bathroom scale and blood pressure using a mercury sphygmomanometer. All these instruments were standardized and zero error was eliminated before taking the measurements.

Statistical analysis - The data thus collected was compiled, cleaned and analyzed to arrive at the results. Data was analyzed using univariate, bivariate and multivariate analysis. Descriptive analysis used mean and standard deviation (S.D) for continuous variables and marginal percentages for categorical variables. Chi square test was used to check the association of risk behavior including physical activity, fruit and vegetable intake, junk food and red meat intake and snacking habit with gender. Logistic regression analysis was done to find the independent association between gender, family history of CVD, dietary variables and physical activity with hypertension and obesity. The strength of association was expressed as odds ratios with 95% confidence interval (CI). A p-value of <0.05 (2-tailed) was considered significant. Statistical Package for Social Sciences (SPSS) version15.0 software was used for the analysis.

Results

The participation rate was 92% (458/498). Females were predominant (55.2%). The mean age of the medical students was 19.41±1.44 years. The mean systolic blood pressure and diastolic blood pressure of the medical students was 115.11±9.41 and 77.32±6.94 mm of Hg.

Table 1 shows that 64.2% of the participants had family history of CVD and nearly 40% of the students were overweight or obese. Hypertension was also observed in more than a quarter of the medical students respectively.

It was found that most of them (96.7%) consumed less than recommended quantity of fruits and vegetables per day and had a habit of taking junk foods (91.3%). Table 2 also shows that about 50% of them had long hours of sedentary activity and about one-third did not exercise or were involved in sports activity; snacking in between meals was reported as a habit by about 40% of medical students. . However consumption of alcohol and smoking were quite uncommon.

Further analyzing the patterns of risk behavior among male and female medical students, it was found that there were significant differences in physical activity and eating habits across gender as shown in table 3. It was found that female medical students were less involved in active sports and physical activity. Unhealthy eating patterns were seen more among males; the odds of taking red meat was about five times more, taking more than 4 eggs/week about four times more, eating junk food was two and a half times more and snacking habit about two times more in males than in females. A significantly higher proportion of male medical students had the habit of taking fruits and vegetables as compared to females (OR=0.44); however no such difference was noted when the recommended criteria of > 5 servings of fruits and vegetable intake per day was applied.

Table 4 shows the results of logistic regression analysis checking the independent association between potential risk factors and hypertension and obesity. All three predictors which also show significant association with dependent variable in multivariate logistic regression analysis also show significant association in bivariate analysis as well. However the odds ratio shows a stronger association with hypertension and a less strong association with obesity in univariate analysis. Multivariate analysis of predictors showed that a family history of CVD carried a highest risk of developing hypertension and an adequate level of physical activity was protective for developing hypertension; whereas male gender and family history of CVD had significant association with obesity. Taking four or more eggs per week was associated with reduced risk of obesity among medical students.

Discussion

The cardiovascular diseases' epidemic is fast catching up with the developing world. The studies

have shown that Indian population is more prone to develop CVD; they develop it at a younger age (6) and have a lower cutoff for overweight/obesity (7). Having known the role of medical professionals in addressing the increasing prevalence of cardiovascular diseases in India, this study was done to understand the prevalence of risky behavior and other risk factors for CVDs in a sample of medical students.

The study participants were in their late adolescence and early adulthood. This is a stage of formation of habits, behaviors and attitude that remain through the life. It was found that more than 60% of the participants had family members with history of CVD. This is a reflection of alarming rise in prevalence of CVD among the general population. About a quarter (24.7%) of the medical students was overweight or obese, according to the WHO international cutoff values of BMI. More than 23kg/m2 and more than 27kg/m2 for overweight and obesity respectively were taken for Asian Indians (3, 7). This cutoff gave a higher prevalence of overweight or obesity. It was also found that 13.3% of students were underweight as well. Boo N Y *et al* (8) has reported a similar nutritional status, both over-nutrition and under-nutrition among a sample of medical students in Malaysia; 30% of them were overweight or obese and 15% were underweight.

Furthermore the assessment of dietary habits revealed that only 15.9% of students consumed adequate quantity of fruits and vegetables every day. A study done by N Rustagi *et al*(9) in Delhi also reported that only 12% of medical students complied with the recommended quantity of fruit and vegetable intake per day. Unhealthy eating habits like taking junk foods (91.3%), adding extra salt to diet (75.5%) and snacking between meals (38.6%) were also highly prevalent among medical students. The low levels of physical activity, almost no involvement in sports and games and long hours of sedentary activity were worrisome trend among the medical students. The significant finding of very low proportion of students' smoking (5%) and consuming alcohol (5.9%) however was encouraging. N. Rustogi *et al* (9) also have found a low use of tobacco (7%) and alcohol (28.85) among medical students of Delhi.

The study also found that male medical students had higher consumption of eggs, red meat and junk foods and also they had the snacking habit in between meals. Similar findings were reported by Shaimaa B *et al* (11). Further the study showed that significantly more number of male students participated in physical activity (66.3% vs 37.9%; p<0.001) and sports activities (72.2% vs 24.1%; p<0.001). Qualitative studies may be undertaken to find out the causes of different eating habits and physical activity patterns across gender.

Logistic regression analysis showed that males have two and half times higher odds for developing obesity after adjusting for all other potential risk factors. Similar findings were reported by Boo N Y *et al* (8) in a study among Malaysian medical students. A family history of CVD was the other significant risk factor associated with hypertension and obesity. The study also brings forth an interesting observation that higher egg intake had a protective effect against obesity. This should be interpreted with caution and further studies are required to establish this association. One such study published in International journal of Obesity in 2008 (12) concluded that an egg breakfast enhanced weight loss among overweight or obese people.

Conclusion

The medical students who will be the future role models, community educators and policy makers themselves had very poor compliance to recommended healthy dietary intake and physical activity. The students had poor access to better lifestyle environment; academic performance demanded long hours of sedentary activity. There is an urgent need to intervene to bring about a change in the students' health behavior. Randomized control trials have confirmed the beneficial effects of structured educational programs to change lifestyles for prevention of development of CVDs (13). Such programs with structured dietary practices and exercise regimes need to be incorporated to the medical curriculum.

Recommendation

The medical curriculum should have fixed hours devoted to principles of healthy eating and lifestyle management; physical activity sessions spread across the year will help in improving physical fitness of medical students. The medical colleges should have provisions for healthy food in canteens and try to create an enabling and relaxed environment for students through sports, extra-curricular activities and greater teacher-student interactions.

Limitation of the study

Biochemical parameters like blood glucose and cholesterol levels in medical students could not be done due to paucity of funds which could have given an insight into these risk factors of cardiovascular health.

Relevance of the study

The study reveals that cardiovascular disease and its risk factors are not limited to the middle aged or older population; teens and young adults are equally prone to it in present lifestyle situation. This also highlights who should be our target population and how early the intervention programs need to be started.

Authors Contribution

BP: Concept and Design of the Study, Analysis and Interpretation of Data, Revision of the article and Final approval, VN: Acquisition of data, Interpretation of data, Drafting the article and Final Approval, MS: Analysis and Interpretation of data, Drafting the article, Final Approval, RI: Analysis and Interpretation of data, Revising it critically for important intellectual content and Final Approval.

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Tables

TABLE 1PREVALENCE OF CARDIOVASCULAR RISK FACTORS AMONG MEDICAL STUDENTS

Risk Factor	Females (%)n=253	Males (%)n=205	Total (%)n=458
Family History of CVD	173 (68.4)	121 (59)	294 (64.2)
Overweight/Obesity	88 (34.8)	87 (42.7)	175 (38.2)
Pre-hypertension /Hypertension	47 (18.6)	77 (37.6)	124 (27.1)

TABLE 2CARDIOVASCULAR RISK BEHAVIOR AMONG MEDICAL STUDENTS (N=458)

Risk Behavior	No. of students(%)
Inadequate Fruit & Vegetable Intake (<5 servings/day)	443 (96.7)
Intake of Junk Foods	418 (91.3)
Extra Salt Intake(>5 grams/day)	346 (75.5)
Sedentary activity (>=4hours/day)	218 (47.6)
Snacking Habit (>=4days/week)	177 (38.6)
No Exercise or sports	163 (35.6)
Egg intake (>=4nos./week)	85 (18.6)
Red Meat (>=4days/week)	66 (14.4)
Alcohol consumption	27 (5.9)
Smoking	23 (5)

TABLE 3 RISK DIFFERENCE SEEN ACROSS GENDER AMONG THE MEDICAL STUDENTS

Risk Behavior	Males (%)n=205	Females (%)n=253	Odds ratio (95% CI)	p-value
No Exercise	69 (33.7)	157 (62.1)	0.31 (0.22-0.44)	<0.001
No Sports	57 (27.8)	192 (75.9)	0.12 (0.08-0.18)	<0.001
Fruit &Vegetable Intake (<3 servings/day)	164 (80)	228 (90.1)	0.44 (0.26-0.75)	<0.01
Red meat (>=3days/week)	50 (24.4)	16 (6.3)	4.78 (2.80-8.37)	<0.001
Egg intake (>=4/week)	61 (29.8)	24 (9.5)	4.04 (2.55-6.48)	<0.001
Junk Food (>=4days/week)	119 (58)	88 (34.8)	2.59 (1.85-3.63)	<0.001
Snack habit (>=4days/week)	94 (45.9)	83 (32.8)	1.73 (1.24-2.43)	<0.01

TABLE 4 LOGISTIC REGRESSION ANALYSIS SHOWING INDEPENDENT ASSOCIATION OF POTENTIAL RISK FACTORS FOR HYPERTENSION AND OBESITY

Variable	Hypertension OR (95% CI)	Obesity OR (95% CI)
Male Gender	1.10 (0.50-2.43)	2.53 (1.43-4.49)*
Family history of CVD	2.68 (1.06-6.77)*	1.99 (1.08-3.64)*
Adequate physical activity	0.32 (0.15-0.68)*	1.62 (0.78-3.35)
Fruits and vegetables consumption(>=3servings/day)	1.10 (0.40-3.03)	1.36 (0.64-2.88)
Junk Foods (>=4days/wk)	1.22 (0.50-3.00)	0.86 (0.41-1.77)
Egg intake (>=4nos./wk)	1.40 (0.58-3.39)	0.30 (0.12-0.75) *
Red Meat (>=3days/wk)	0.39 (0.10-1.43)	0.81 (0.36-1.85)
Snacking habit (>=4days/wk)	1.38 (0.65-2.93)	1.10 (0.62-1.95)