# Life Style Related Risk Factors For Cardiovascular Diseases In Indian Adolescents

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**Citation**

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**Abstract**

Background and Objectives: Cardiovascular disease is the prevailing non-communicable cause of death and disability in the Indian subcontinent. Health behaviors and attitudes formed during childhood lay a strong foundation for lifetime health related behavior.Methodology: The present study was carried in 866 adolescents aged 11-16 years. CDC recommended GSHS questionnaire was administered to these students. The statistical analysis was done using SPSS version 13.0. To see the effect of risk factors on BMI and DBP, multivariate regression analysis was done.Results: In this study, 8.2% and 6.3% of boys had smoked and taken alcohol at least once in the last month, respectively. 13.6% of the subjects felt that there were no benefits of eating fruits and vegetables. 81.3% of the study subjects were eating fast food (Samosa, patties, noodles, etc.) in the past 7 days, out of which 5.1 % were eating out on all seven days. 36.8 % were taking carbonated drink ≥ 1 time/ day.

## INTRODUCTION

Cardiovascular disease is the prevailing non-communicable cause of death and disability in the Indian subcontinent, and will become the prevailing overall cause of mortality among the inhabitants of South Asia in the next 20 years. [1] Globally, deaths from Non Communicable Diseases are expected to climb from 28.1million deaths in 1999 to 49.7 million in 2020, an increase of 77% in absolute numbers. In proportionate terms, deaths are expected to increase share of the total from 55% in 1990 to 73% in 2020. [2]

Long term epidemiological studies support the concept that atherosclerosis has its inception in childhood, and it has also been shown that risk factors which accelerate it originate in the same age group. [3] It has further been shown in various studies that prevalence of risk factors for Non Communicable Diseases in childhood and adolescence bears a significant tendency towards development of disease in adulthood. Such research has documented that adolescence is the appropriate time period for appropriate intervention. During adolescence, teenagers start to make individual choices and develop personal lifestyles. Many of these lifestyle choices are related to risk factors for CHD, such as diet patterns and the development of obesity, physical activity, cigarette smoking, engaging in unprotected sex, use of OCPs, etc. And these risky behaviors can result in disease outcomes such as cancer, obesity, hypertension and other cardiovascular diseases, type 2 diabetes and HIV infection, which are among the leading causes of death developing and developed countries. [4] Also, it is easier to inculcate healthy behavior at a young age rather than to modify behaviors at later ages or after the onset of disease.

Until now risk factors like high B.P, obesity, smoking, alcohol consumption, low physical activity, etc. contributing to the development of Non Communicable diseases were more prevalent in the developed countries. However, the "World Health Report 2002: reducing risks, promoting healthy lifestyle", indicates a rise in their prevalence even in developing countries. A disturbing increase in the prevalence of overweight among children has taken place over the past twenty years in the developing countries as India, Mexico, Nigeria, and Tunisia. [5]

Therefore, trying to detect the presence of risk factors early in youth enables the planning and implementation of preventive intervention programmes targeted at reducing the likelihood of manifestation of cardiovascular disease in adulthood. [6]

## METHODOLOGY

The study was carried out among the students of Govt.

Model Senior Secondary school, Sector-56, Chandigarh (a part of field practice area of R.H.T.C). There were 896 school students in the age group of 11-16 years. Of these, 866 students voluntarily participated in the study. CDC recommended GSHS Questionnaire was used for assessment. [7,8] The dietary practices were assessed by putting questions on dietary preference, fast food consumption, etc .Physical activity was ascertained by asking for physical activity for at least 30 minutes per day during the past seven days and by the time spent at home in sitting activities like watching T.V and computer games,etc. Any trial of smoking/alcohol was asked for and if yes, then the frequency in last30 days.

Anthropometry and blood pressure recording of all subjects were done. Height was measured to the nearest cm. Weight was measured to the nearest 500gm.The blood pressure was measured using a mercury sphygmomanometer. Measurements were taken in the right arm of the subjects. An average of two readings was taken as final observation.

The statistical analysis was done using SPSS version 13.0.The frequency was calculated in percentages. To see the differences between sexes, chi-square test was used. To see the effect of risk factors on BMI and DBP, multivariate regression analysis was done.

## RESULTS

### Figure 1

Table 1: Age and Sex Distribution of the school children

| Age (Years) | Male | Female | Total (%) |
|---|---|---|---|
| ≤11 | 100(21.7%) | 96(23.7%) | 196(22.6) |
| 12 | 98(21.3%) | 106(26.2%) | 204(23.6) |
| 13 | 107(23.2%) | 64(15.8%) | 171(19.7) |
| 14 | 76(16.5%) | 73(18.0%) | 149(17.2) |
| 15 | 55(11.9%) | 54(13.3%) | 109(12.6) |
| ≥16 | 25(5.4%) | 12(3.0%) | 37(4.3) |
| Total | 461 | 405 | 866 |

### Figure 2

Table 2: Summary of risk factors for Non Communicable diseases

| Risk factor | Male (n=461) | Female (n=405) | p-value |
|---|---|---|---|
| Sex | 461 | 405 | |
| BMI≥25 Kg/m2 | 05(1.08%) | 02(0.5%) | 0.458 |
| Systolic B.P(≥140mmhg) | 8(1.7%) | 3(0.7%) | 0.317 |
| Diastolic B.P(≥90mmhg) | 0 | 3(0.7%) | 0.101 |
| Smoking ≥once in last 1 month | 38(8.2%) | 0 | 0.001* |
| Alcohol ≥once in last 1 month | 29(6.3%) | 0 | 0.001* |
| H/o exposure to passive/parental smoking in past 7 days. | 357(76.6%) | 296(73.1%) | 0.159 |
| Physical activity ≥3 days/week(at-least 60 minutes) | 188(40.7%) | 97(23.9%) | 0.001* |
| Drink carbonated drinks≥1 time per day in past 30 days | 154(33.4%) | 165(40.7%) | 0.031* |
| Watching TV/Computer/video games≥3 hrs/day | 152(32.9%) | 87(21.4%) | 0.0001* |
| Fast food ≥3 times/week | 151(32.7%) | 114(28.1%) | 0.142 |

## OBSERVATIONS

A total of 866 subjects were studied of which 461(53.2%) were males and 405 (46.8%) were females. The study subjects belonged to age group 11-16 years.

## BMI

81.2% of the study subjects were underweight, i.e., BMI< 18.5Kg/m2, but surprisingly 65.8% described themselves as right weight. 0.5% were in preobese category and 0.3% were obese (obese1 and obese 2).

## EATING HABITS

13.6% of the subjects felt that there were no benefits of eating fruits and vegetables. 81.3% of the study subjects were eating fast food (Samosa, patties, noodles, etc.) in the past 7 days, out of which 5.1 % were eating out on all seven days. 36.8 % were taking carbonated drink ≥ 1 time/ day.

## PHYSICAL ACTIVITY

It was noted that 70.7% boys and 71.6% girls were not engaged in physical education class at school. Approximately 1/3 rd i.e. 40.7 % boys and 23.9% girls described themselves as being physically active for ≥ 3 days / week for at least 60 minutes. 32.9% of boys and 21.4 % girls spent ≥ 3 hours per day watching TV/computer games, etc.

## LIFESTYLE HABITS

8.2% of boys had smoked at least once in last one month. 6.3% of the boys had taken alcohol at least once in last one month. 76.6% of boys and 71.3% of girls were exposed to passive/parental smoking in the past seven days.

27.7% of the study subjects thought that a man lacks confidence when he smokes. 65.5 % of (67.9% boys and 62.7% girls) felt that smoking cigarette is definitely harmful

to health. Despite the intensive ante-smoking media messages, 16.6% (14.5% boys and 19% girls) had not seen any such message in the past 30 days.

## BLOOD PRESSURE

Systolic hypertension (BP >140 mm of Hg) was found in 1.7% boys and 0.7% girls. Diastolic hypertension (BP >90 mm of Hg) was found in 0.7% girls.

### Figure 3

Table 3: Risk Factors associated with BMI

Coefficients (a)

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | 38.151 | 12.721 | | 2.999 | .003 | 13.183 | 63.120 |
| | age | 1.070 | 1.074 | .034 | .996 | .319 | -1.038 | 3.179 |
| | sex | -4.909 | 5.342 | -.033 | -1.469 | .142 | -11.468 | 1.650 |
| | No. of times per day the study subject eat fruit | -8.607 | 2.626 | -.115 | -3.278 | .001 | -13.761 | -3.454 |
| | No. of times per day the study subject eat vegetables | -.747 | 3.088 | -.008 | -.242 | .809 | -6.809 | 5.315 |
| | No. of times per day the study subjects drink carbonated soft drinks | -.736 | 2.492 | -.010 | -.295 | .768 | -5.627 | 4.155 |
| | No of days in the past 7 days the subject ate a fast food including Samosas,patties,etc | 3.887 | 1.847 | .074 | 2.105 | .036 | .262 | 7.512 |
| | No. of days in the past 30 days the subject smoke cigarettes | -3.179 | 2.873 | -.039 | -1.107 | .269 | -8.819 | 2.460 |
| | No. of hours spent watching TV, computer games, listening to music,etc | .943 | 1.562 | .021 | .603 | .546 | -2.124 | 4.009 |
| | No. of days in the past 7 days of physical activity of at least 60 minutes/day. | .117 | .647 | .006 | .180 | .857 | -1.154 | 1.388 |

a Dependent Variable: BMI

Further from Table No.3, it is seen that BMI depends upon no. of times/day the study subject ate fruit. It was negatively correlated with BMI (Regression Coefficient=-8.607; t value being3.278; p≤0.001).BMI was positively correlated with the no. of days in the past 7 days the subject ate a fast food including samosa/patties,etc.(Regression Coefficient=3.887;t value=2.105;p≤0.036).

### Figure 4

Table 4: Risk Factors associated with Diastolic B.P

Coefficients(a)

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | 71.902 | 1.473 | | 48.806 | .000 | 69.011 | 74.794 |
| | Sex | .733 | .514 | .049 | 1.425 | .155 | -.277 | 1.742 |
| | No. of times per day the study subject eat fruit | -.577 | .418 | -.048 | -1.380 | .168 | -1.398 | .244 |
| | No. of times per day the study subjects drink carbonated soft drinks | -.116 | .401 | -.010 | -.290 | .772 | -.903 | .670 |
| | No of days in the past 7 days the subject ate a fast food including Samosas,patties,etc | .486 | .298 | .057 | 1.628 | .104 | -.100 | 1.071 |
| | BMI | .011 | .006 | .068 | 1.991 | .047 | .000 | .022 |

a Dependent Variable: dbp

From Table No.4, it is seen that BMI is positively associated with D.B.P (Regression coefficient=0.011; t value=1.991; p≤0.047).

## DISCUSSION

The present study was a cross sectional one, which tried to elicit the risk factors contributing to the development of non-communicable diseases in 11-16 year students from a school in the periurban area of Chandigarh. The school was co-educational one, located in the outskirts of Chandigarh.

The present study shows that 0.5 % was in the preobese category and 0.3% was obese. These could be explained on the basis of the fact that the school being a Govt. Model School located in a periurban area where usually the students come from the lower and middle SES family. In a study by U Kapil et al [9] the prevalence of obesity in affluent school children was 7.4%. Results of a study [10] from Punjab revealed that the children in the age group of 11 to 17 years as overweight in 11.6% and 4.7% in urban and rural areas respectively. It was observed from the present study that 70.7% boys and 71.6% girls were not engaged in physical education class and, 32.9% boys and21.4% girls spent ≥ 3 hours per day watching TV/ computer games, etc. in a similar study at Delhi [5] ; 54.4% boys and 69.3% of girls were not engaged in sports at school / or at home. This could be because of the greater stress being laid on academics in the school and at home.

Regarding the life style related habits, in this study, 8.2% and 6.3% of boys had smoked and taken alcohol at least once in the last month, respectively. In a similar study at Delhi [5] 3.6% boys and 1.3% girls have smoked at least once in the past month. Alcohol was seen to be consumed at least once by 30.1% and 26.8% girls. It was also observed from the present study that 76.6% of boys and 71.3% girls were exposed to passive/parental smoking in past seven days.

Individuals undergo a major life transition when moving from childhood to adolescence -they face the many physiological changes of puberty, while also experiencing the psychological transitions. They spend more time with their friends and less under parent's supervision so their greatest source of influence is peers.

Despite the intensive anti smoking media messages, 16.6 % had not seen any such message in the past 30 days. In a similar study at Delhi [5] A.K Singh et al found that 28.3% boys & 26% girls had consumed alcohol in the past 6 months.3.6% of boys & 1.3% girls had smoked more than once in the last one month.

Systolic hypertension (BP ≥140 mm) was found in 1.7% boys and 0.7% girls. Diastolic hypertension (> 90 mm) was found in 0.7% girls. In a study at Jaipur [11] Gupta et al found hypertension in 9%boys&6.1% girls. A.K Singh et al [5] found Systolic hypertension in 11.82% boys& 3.03% girls. Diastolic hypertension was found in 3.58% boys & 0.43% girls.

## CONCLUSION

The present study was cross-sectional one with an almost

equal no. of boys &girls. One of the major drawbacks of this study is that the sample is not representative of adolescents of all socio-economic strata. This study provides a pointer to the rising presence of risk factors in periurban school children.

Health behaviors& attitudes formed during childhood lay a strong foundation for lifetime health related behavior patterns. So, the primary prevention lifestyle techniques can be applied to young adolescents & these lifestyle interventions should involve participation of home, family, school, community & these should be holistic incorporating changes in lifestyle, diet, physical activity. A combined approach should be undertaken so that intervention strategies are implemented at home, family level, at school, and within community.

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