A Comparative Study to Assess the Knowledge of the Risk Factors and Identify Risk for Coronary Vascular Diseases (CVD) among Students Studying in Selected High Schools of Urban and Rural Areas of Gwalior

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ABSTRACT

The present study has been conducted to know assess the knowledge of the risk factors and identify risk for coronary vascular diseases (CVD) among students studying in selected high schools of urban and rural areas of Gwalior. The selection of sample was done through convenient sampling. The sample size was 300. The method of data collection was through demographic variables and self-structured knowledge questionnaire, compersion regarding risk for coronary vascular diseases (CVD) studying in selected high schools students.

KEYWORDS: knowledge, Comperative Study, Effectiveness, coronary vascular disease

INTRODUCTION

Coronary vascular disease (CVD) is responsible for about thirty percent of all death worldwide each year. In India at the onset of 21st century CVD accounts for nearly fifty percent of all deaths. It was noticed that there was a steady increase of heart disease from 1940 and 1967. So the World Health Organization concluded that heart disease is the world's most serious epidemic.

Coronary vascular disease is a type of blood vessel disorder that is included in the general category of atherosclerosis. Many risk factors have been associated with the CVD. Risk factor means 'any trait or habit that can predict an individual's probability of development of a particular disease.' The more risk factors you have the greater chance you have of developing CVD. Knowledge on risk factors of coronary vascular disease will increase the awareness of the risks and to promote preventive measures. The risk factors can be categorized as non-modifiable and modifiable. Unmodifiable factors are age, gender, ethnicity and genetic inheritance. Modifiable risk factors include elevated serum lipids, hypertension, smoking, obesity, physical inactivity and stress.

The data on risk factors obtained from several research studies reveals that, the risk factors are positively related to an increased incidence of CVD. Studies have also shown that the risk factors often have their roots in childhood. Findings from the Bogalusa study indicated that the pathological evidence for atherosclerosis in the aorta and coronary arteries begin in the early childhood. A 30-year study conducted in Framingham on 5,127 people between 30 and 60 years showed no signs of heart diseases. Every two years the participants underwent a

complete physical examination. At the end of the study it provided priceless profile information for predicting heart disease[3].

Risk factors in children are many, because, the risk behaviours are first established in childhood. The major risk factors of heart disease are hypercholestrolemia, obesity, sedentary lifestyle, hypertension and smoking. Off springs of parent with coronary heart disease have a significant increase in risk factors. National Cholesterol Educational Programme stated that high intake of saturated fatty acids increases the level of total serum cholesterol and low-density lipoprotein (LDL) cholesterol. Elevated serum cholesterol increases the risk of CVD. Most cases of hypercholestrolemia are a result of environmental factors. Childhood levels of total cholesterol and LDL are good predictors of adult level.

Hypertension is diagnosed when average systolic or diastolic blood pressure greater than or equal to the 95th percentile to the patient's age and sex. Hypertension disrupts the permeability of the arterial wall and contributes to the increased lipid deposition. This causes arterial stenosis and reduces the flow of blood.

The third major risk factor in CVD is cigarette smoking. The risk is proportional to the number of cigarettes smoked. Nicotine in cigarette smoke causes catecholamine release. These hormones cause increased heart rates, peripheral vasoconstriction and increased blood pressure. Nicotine also causes increased platelet adhesion.

Fast foods are fast killers. These foods do not contain enough vitamins. Junk food usually refers to foods with limited nutritional value. They are high in sugar, salt, fat and low or minimal in nutrient content. Fast food and junk food stalls in India never display their nutritional content and calorific value of foods. Nutrient deficiencies streaming from eating junk foods, fast foods, readymade foods and precooked foods can easily open the doors of illness.

Physical inactivity is the fourth major modifiable risk factor. Physically active people have increased high-density lipoprotein (HDL) cholesterol and exercise enhances the fibrolytic activity. This decreases the risk of clot formation.

Elevated levels of plasma insulin are common in adults and are often associated with CVD. Cross sectional studies both in children and adults have shown that hyperinsulinemia are associated with an adverse pattern of cardio vascular risk factors that include obesity.

Certain modifiable risk factors for CVD have their beginnings in childhood. The incidence of adolescent obesity is dramatically increased and it is associated with the risk of hypertension, adverse lipid profile and type II diabetes mellitus. Children who are at risk for obesity related cardio vascular diseases should receive family based treatment. Nurses are responsible to help in primary care settings for diet modification and exercis.

NEED OF THE STUDY:
Cardiovascular diseases (CVD) comprise a group of diseases of the heart and vascular system. In India there are over 5 million persons suffering from CVD. The prevalence of CVD is reported to be two to three times higher in the urban population. The aetiology of CVD is multifactorial. Several risk factors are identified for developing CVD. The greater the number of risks factors present, the more likely one is to develop CVD. A novel approach to primary prevention of CVD is primordial prevention. Since the aetiology is multifactorial the prevention should be aimed at controlling or modifying as many risk factors as possible. Cardiovascular diseases remain a major cause of mortality, morbidity and disability. As a result therapeutic and preventive measures are taken to control CVD/CHD. Primary prevention of all major risk factors starts early in the lifetime. Prospective population based research studies reveal that lower age specific CVD and total mortality rates increases life expectancy.

A case control study was conducted in Karachi to investigate the risk factors of premature myocardial infarction among South Asians between the age group of 15 to 45. A standard questionnaire was developed and anthropometric measurement including height, weight, waist circumference and hip circumference were obtained. ECG, fasting blood glucose and lipid were measured within 24 hours of admission. The result of the study supported that the risk factors like tobacco use, ghee intake, raised fasting glucose, high cholesterol level, parental history of CVD, low income and low level of education are associated with premature acute myocardial infarctions.

The investigator also observed that there is a need to understand the inter relationship of each risk factor to CVD. Prevention of the disease is more effective than treating the disease. The development of overweight in childhood is linked with increased rates of hypertension, hyperlipidemia, type II diabetes and early atherosclerotic lesions. In the near future we may face more epidemic of CVD. Thus the investigator with self-interest and experience is motivated to assess the knowledge and risk status on risk factors of CVD. Identification of knowledge on

risk factors of CVD will help at primary, secondary and tertiary level of prevention and to minimize the CVD risk factors, thereby minimizing the future associated morbidity and mortality.

OBJECTIVES-
Objectives of the study

1. To assess the knowledge of the risk factors of coronary vascular diseases among students studying in selected high schools of urban and rural areas of Gwalior.

2. To identify the risk of coronary vascular diseases among students studying in selected high schools of urban and rural areas of Gwalior.

3. To compare the knowledge of the risk factors of coronary vascular diseases among students studying in selected high schools of urban and rural areas of Gwalior.

4. To compare the risk and knowledge of the risk factors of coronary vascular diseases among students studying in selected high schools of urban and rural areas of Gwalior.

OPERATIONAL DEFINITION:

1. **Knowledge:** In this study, knowledge refers to the correct responses of the students to the knowledge questionnaire on risk factors of coronary vascular diseases.

2. **Risk factors:** Factors in the environment, or chemical, psychological, physiological or genetic elements that are thought to predispose an individual to the development of a disease[19]. In this study the risk factors refers to obesity, physical inactivity, dietary factors, heredity, gender, and habits such as smoking and alcoholism.

3. **Risk:** The term risk refers to the chance of danger to any disease[19]. In this study risk refers to the risk factors of CVD such as obesity, physical inactivity, dietary factors, heredity, gender, habits and stress which will help to categories the students as low, moderate and high risk for developing CVD as elicited by self-administered tool to identify risk for CVD.

4. **Urban:** In this study urban refers to high school students studying in the schools which are situated in the city or town (Gwalior city).

5. **Rural:** In my study rural refers to high school students studying in the schools which are situated in villages (kedarpur & Veerpur).

6. **Students:** In this study students refer to those who are studying in 10th standards in selected high schools in urban and rural areas of Gwalior.

HYPOTHESIS:
To achieve the stated objectives the following hypotheses were formulated at 0.05 level of significance.

H_1: There will be significant difference in the mean knowledge score regarding the risk factors of coronary vascular diseases among students from selected high schools in urban and rural areas of Gwalior.

H_2: There will be significant difference between the risk of coronary vascular diseases among students from selected urban and rural areas of Gwalior.

H_3: There will be a significant correlation between the level of knowledge and the risk of coronary vascular diseases among students from selected high schools in urban and rural areas of Gwalior.

H_4: There will be significant association between the risk and selected factors regarding coronary vascular diseases among students of selected high schools in urban and rural areas of Gwalior.

H_5: There will be an association between risk for coronary vascular disease and selected baseline characteristics such as age, monthly income, and family history of heart disease.

RESEARCH APPROACH
A descriptive comparative approach is a research design that involves comparing and contrasting two or more samples on one or more variables, often at a single point of time. A descriptive comparative approach has been used to determine the knowledge on risk factors and risk for CVD among students studying in selected schools of urban and rural areas of Gwalior.

RESEARCH DESIGN
A researcher's overall plan for obtaining answers to the research questions for testing the research hypothesis is referred to as the research design[18]. It spells out the basic strategies that the researcher adopts to develop information that is accurate and interpretable. A comparative survey utilises set criteria to contrast two or more groups of designated variables. A descriptive comparative design was used in this study. The study was intended to assess the knowledge on risk factors and identified risk for CVD among high school students studying in urban and rural areas.

RESEARCH SETTING
The setting is where the population is being studied and where the study is carried out. The investigator had selected four high schools, two from urban areas and two from rural areas of Gwalior. The high

schools in urban area were Carmel convent High School and Silver bells high schools while from rural areas were Bhartiyam vidhya niketan High School, kedarpur and Saraswati Shishu Mandir Veerpur. All the students were studying in 10th standard in English medium high schools.

POPULATION

Population is the aggregate of objects, animate or inanimate, under study in any statistical investigation. In this study the population consists of 3255 students studying in selected high schools in urban (2033) and rural areas (1222) of Gwalior

SAMPLE SIZE

Sampling refers to the process of selecting a portion of the population to represent entire population[18]. For the present study 150 students studying in 10th standard in urban and rural areas who fulfilled the sampling criteria were selected. The list of all English medium schools in Gwalior was collected. From this, two high schools from urban and two from rural areas were selected using convenient sampling method. The population consisted of 150 students from urban schools and 150 from rural schools (total 300). The first and second high schools in urban area had two, divisions whereas all two high schools in rural areas had two divisions each in 10th standard high schools in rural area respectively. The total numbers of students (boys + girls) were 154 in schools of urban area and 150 in schools of rural area. Out of these students were selected from each school by lottery method.

CRITERIA FOR SAMPLE SELECTION
Criteria for sample selection
Inclusion criteria
The samples were selected with the following predetermined set of criteria:
1. Students from English medium high schools.
2. The students who were studying in 10th standard in selected schools of urban and rural areas in Gwalior.

3. Students who were willing to participate in the study.
4. Between the age of 14 and 17 years.

Exclusion criteria
1. Students diagnosed to have coronary vascular diseases.

Those students whose parents are in the medical profession

RESULTS
Plan for data analysis
Data analysis is the systematic organisation and synthesis of the research data and the testing of the research hypotheses using those data. The data will be entered into a master sheet. Descriptive and inferential statistics will be used for data analysis. The data will be analysed as shown below:

Section I: Sample characteristics would be analysed by frequency and percentage.

Section II: Comparison of knowledge of risk factors of CVD between students studying in urban and rural areas would be made by mean, standard deviation, mean percentage and unpaired 't' test.

Section III: Comparison of identified risk for CVD between students studying in urban and rural areas would be made by mean, standard deviation, mean percentage and unpaired 't' test.

Section IV: Correlation between knowledge and identified risk for CVD between students studying in urban and rural areas of Gwalior would be found using Karl-Pearson coefficient of correlation.

Section V: Risk and selected factors of coronary vascular disease among students from urban and rural areas would be analysed by Karl-Pearson coefficient of correlation.

Section VI: Association between risk for coronary vascular disease and selected variables would be analysed by chi-square test.

Section I: Sample characteristics
Table 1: Frequency and percentage distribution of sample characteristics among students studying in urban and rural areas

N = 75 + 75 = 150

Sl. No.	Variable	Urban		Rural	
		f	%	f	%
1.	Age (in years)				
	14 – 15	65	87	64	85
	16 – 17	10	13	11	15
2.	Religion				
	Hindu	60	80	27	36
	Muslim	11	15	20	27
	Christian	4	5	28	37
	Any other	-	-	-	-

3.	Occupation of father				
	Unemployed	2	3	5	7
	Labourer/coolie	3	4	26	34
	Semi-skilled	17	23	32	43
	Technical	16	21	11	15
	Professional	37	49	1	1
4.	Occupation of mother				
	Unemployed	51	68	57	76
	Labourer/coolie	1	1	5	7
	Semi-skilled	8	11	4	5
	Technical	6	8	6	8
	Professional	9	12	3	4
5.	Monthly income (in rupees)				
	< 3,000	4	5	5	7
	3,000 – 4,000	6	8	13	17
	4,000 – 5,000	12	16	14	19
	> 5,000	53	71	49	57
6.	Family pattern				
	Nuclear family	70	93	63	84
	Joint family	5	7	12	16
	Extended family	-	-	-	-
7.	Education of father				
	Primary	1	1	14	17
	SSLC	18	24	16	21
	PUC/Diploma	16	21	29	39
	Graduate	31	41	15	20
	Postgraduate	9	12	1	1
8.	Education of mother				
	Primary	3	4	17	23
	SSLC	20	27	18	24
	PUC/Diploma	24	32	26	35
	Graduate	20	27	13	17
	Postgraduate	12	8	1	1
9.	Does anyone have heart disease?				
	Yes	8	11	5	7
	No	67	89	70	93
10.	Source of health information				
	Newspaper	16	21	20	27
	Magazine	13	17	11	15
	Books	18	24	18	24
	Television	28	37	26	35

The data presented in Table 1 shows the following:

Age

Majority of the students in urban area (87%) and rural area (85%) were in the age group of 14-15 years.

Religion

Majority of the students studying in urban area (80%) were Hindus whereas in rural areas only 36% were Hindus and 37% were Christians.

Occupation of father

Nearly half (49%) of the fathers of students studying in urban area were professionals whereas among students studying in rural area 43% were semi-skilled workers.

Occupation of mother

Most of the mothers of students studying in urban area (68%) and students studying in rural area (76%) were unemployed.

Income of the family
Family income of majority of the students studying in urban area (71%) and students studying in rural area (57%) was above Rs. 5,000.

Family pattern
Majority of the students studying in urban area (93%) and students studying in rural area (84%) belonged to nuclear families.

Education of father
In the urban area most of the subjects' fathers were graduates (41%) while in the rural area 39% had studied up to PUC or were diploma holders.

Education of mother
Many of the mothers of both the students studying in urban area (32%) and rural area (35%) had studied up to PUC or were diploma holders.

Family history of heart disease
Among the students studying in urban area 11% had family history of heart disease while among the students studying in rural area it was 7%.

Section II: Comparison of knowledge of risk factors of coronary vascular disease among students studying in urban and rural areas
This section deals with the analysis of knowledge score.

Table 2: Distribution of knowledge score of students studying in urban and rural areas

N = 75 + 75 = 150

Knowledge level	Range	Urban		Rural	
		f	%	f	%
Average	8-10	0	0	7	9
Good	11-13	47	63	68	91
Very good	14-16	28	37	0	0

Maximum score = 16

The data presented in Table 2 shows that majority of the subjects from the urban area (63%) and 91% from rural area had good knowledge score between the range of 11-13 and 37% students from urban area had very good knowledge score between the range of 14-16.

Table 3: Area-wise mean, mean percentage and standard deviation of knowledge score of students studying in urban areas

N = 75

Area	Max. score	Mean	Mean %	SD	Remarks
Meaning	2	1.420	71.0	0.573	Good
Risk factors	2	1.650	82.5	0.557	Very good
Causes	8	6.680	85.0	0.974	Very good
Symptoms	1	0.830	83.0	0.327	Very good
Prevention	3	2.560	85.0	0.499	Very good

Maximum score = 16

The data in Table 3 shows that the subjects had very good knowledge score in the areas of "meaning" (71.0%), "risk factors" (82.5%), "causes" (85.0%), "symptoms" (83.0%) and "prevention" (85.0%).

Table 4: Area-wise mean, mean percentage, and standard deviation of knowledge score of students studying in rural areas

N = 75

Area	Max. score	Mean	Mean %	SD	Remarks
Meaning	2	1.386	69.30	0.634	Good
Risk factors	2	1.480	74.00	0.577	Good
Causes	8	5.880	73.50	0.715	Good
Symptoms	1	0.693	69.30	0.464	Good
Prevention	3	2.173	72.43	0.554	Good

Maximum score = 16

The data in Table 4 and Figure 5 shows that the subjects had good knowledge score in the areas of "meaning" (69.3%), "risk factors" (74%), "causes" (73.5%), "symptoms" (69.3%) and "prevention" (72.43%).

Table 5: Mean, standard deviation, mean difference and 't' value of knowledge of risk factors of coronary vascular disease among students studying in urban and rural areas

N = 75 + 75 = 150

Group	Mean	SD	Mean difference	't' value
Urban	13.146	0.818	1.526	10.292 Significant
Rural	11.620	0.818		

tα 1.960 (P < 0.05)

The unpaired 't' test value as presented in Table 5 shows that there is significant difference between knowledge of risk factors of CVD among students in urban and rural areas (t_{148} = 10.292, P < 0.05). Hence the alternate hypothesis is accepted.

Table 6: Area-wise mean, standard deviation and 't' value of knowledge of risk factors of coronary vascular disease among students studying in urban and rural areas

N = 75 + 75 = 150

Variable	Urban		Rural		't' value
	Mean	SD	Mean	SD	
Meaning	1.42	0.57	1.38	0.63	0.405
Causes	1.66	0.55	1.46	0.57	5.729*
Risk factors	6.58	0.97	5.88	0.71	1.870
Symptoms	0.88	0.32	0.69	0.46	2.847*
Prevention	2.55	0.55	2.17	0.49	0.486

(tα= 1.960, P < 0.05) * = Significant

The unpaired 't' test value as presented in Table 6 shows that there is significant difference between the causes and symptoms since the calculated value is higher than the table value (t_{148} = 5.729, P < 0.05).No significant difference was found between meaning, risk factors and prevention of risk factors of CVD.

Section III: Comparison of identified risk for coronary vascular disease among students studying in urban and rural areas

This section deals with the analysis of risk for CVD among students studying in urban and rural areas.

Table 7: Distribution of students according to their identified risk for CVD

N = 75 + 75 = 150

Risk status score	Inference	Urban		Rural	
		Frequency	Percentage	Frequency	Percentage
1 – 30	Low risk	62	83	73	97
31 – 50	Moderate risk	13	17	2	3
51 – 70	High risk	-	-	-	-

Maximum score = 70

Table 8: Mean, standard deviation and 't' value of identified risk for coronary vascular disease among students studying in urban and rural areas

N = 75 + 75 = 150

Group	Mean	SD	Df	't' value
Urban	25.80	4.420	148	3.353 Significant
Rural	23.53	3.839		

t_{148} = 1.960, P < 0.05

The data presented in Table 8 shows that there is significant difference between the identified risk for CVD between students studying in urban and rural areas (t_{148} = 3.353, P < 0.05). Hence the alternate hypothesis is accepted.

Table 9: Area-wise comparison of identified risk for coronary vascular disease between students studying in urban and rural areas

N = 75 + 75 = 150

Areas	Urban		Rural		SD	't' value
	Mean	SD	Mean			
Family history	0.720	1.44	0.77	1.63		0.032
BMI	1.017	1.64	0.72	1.07		1.458
Physical activity	8.250	2.67	6.03	2.73		4.726*
Food pattern	12.630	2.57	12.20	2.27		1.024
Habits	0.160	0.63	0.05	0.32		0.126
Expression of tension	2.840	1.13	2.89	0.98		0.277

$t_{148} = 4.273$, $P < 0.05$ * = Significant

The data presented in Table 9 shows that there is significant difference between the physical activity ($t_{148} = 4.273$, $P < 0.05$) of students studying in urban and rural areas. There is no significant difference in other areas such as family history of heart disease, BMI, food pattern and expression of tension between students from urban and rural areas.

Section IV: Correlation between knowledge on risk factors and identified risk for coronary vascular diseases among students from urban and rural areas

H_{03}:   There will be no correlation between the level of knowledge and risk factors of coronary vascular disease among students from selected schools in urban and rural areas of Gwalior.

Table 10: Coefficient of correlation of knowledge on risk factors of CVD and identified risk for CVD among students from urban and rural areas

N = 75 + 75 = 150

Variable	Urban			Rural		
	Mean	SD	'r' value	Mean	SD	'r' value
Knowledge	13.14	0.982	0.091	11.62	0.818	0.159
Risk	25.80	4.420		23.53	3.830	

$r_{148} = 0.217$, $P < 0.05$

The data presented in Table 10 shows that there is no correlation between knowledge of risk factors of CVD and identified risk for CVD in students studying in urban (r=0.091, P > 0.05) and rural areas (r=0.159, P > 0.05). Hence the null hypothesis is accepted.

Section V: Risk and selected factors of CVD among students from urban and rural areas

This section deals with the analysis and interpretation of selected factors of CVD among students studying in urban and rural areas.

Table 11: Mean, mean percentage score, and standard deviation of selected risk factors of CVD among students from urban and rural areas

N = 75 + 75 = 150

Risk factors	Max. Score	Urban			Rural		
		Mean	SD	Mean score	Mean	SD	Mean score
Family history	8	1.06	1.62	13	0.80	1.64	10
BMI	6	1.04	1.62	17	0.85	1.14	14
Physical activity	4	2.66	1.24	66	0.86	1.41	22
Exercise	4	2.08	1.47	52	1.57	1.39	39
Participation in sports	4	1.88	1.26	47	1.72	1.31	43
Use of leisure time	4	1.55	0.20	39	1.36	1.49	34
Food pattern 1	6	4.12	1.66	69	3.74	1.43	52
Food pattern 2	6	4.34	1.42	73	4.32	1.32	72
Junk food	6	4.48	1.42	75	4.16	1.41	69

The data presented in Table 11 shows the risk and selected factors of CVD. The mean percentage of family history of heart disease was 13% and 10%, body mass index – 17% and 14%, physical activity – 66% and 22%, exercise – 52% and 39%, participation in sports – 47% and 43%, use of leisure time – 39% and 34%, food

pattern 1 – 69% and 62%, food pattern 2 – 73% and 72%, and junk food – 75% and 69% for students studying in urban and rural areas respectively.

Table 12: Mean, standard deviation and 'r' value of risk and selected factors of CVD among students studying in urban and rural areas

N = 75 + 75 = 150

Risk factors	Urban			Rural		
	Mean	SD	'r' value	Mean	SD	'r' value
Family history	1.066	1.620	0.384*	0.800	1.643	0.377*
BMI	1.040	1.622	0.425*	0.853	1.147	0.036
Physical activity	2.660	1.244	0.285*	0.863	1.410	0.315*
Exercise	2.080	1.477	0.300*	1.573	1.369	0.240*
Participation in sports	1.880	1.261	0.345*	1.720	1.351	0.055
Use of leisure time	1.690	1.550	0.202	1.360	1.494	-180.000
Food pattern 1	4.120	1.660	0.327	3.746	1.434	0.158
Food pattern 2	4.340	1.409	0.428*	4.324	1.325	0.083
Junk food	4.480	1.427	0.183	4.166	1.412	0.013

r_{23} = 0.232, P < 0.05   * = significant

The data presented in Table 12 shows that there was significant correlation between the risk and selected factors such as family history (r = 0.384, P < 0.05), BMI (r = 0.425, P < 0.05), physical activity (r = 0.285, P < 0.05), exercise (r = 0.300, P < 0.05), participation in sports (r = 0.345, P < 0.05) and food pattern 2 (r = 0.428, P < 0.05) among the students studying in schools of urban areas. Among those studying in rural areas significant correlation was found between the risk and selected factors like family history of heart disease (r = 0.377, P < 0.05), physical activity (r = 0.315, P < 0.05) and exercise (r = 0.240, P < 0.05).

Section VI: Association between coronary vascular disease and selected variables

Table 13: Chi-square values showing the association between risk for coronary vascular disease and selected variables in students studying in urban and rural areas

N = 150

Variable	Urban			Rural		
	≤ median	≥ median	χ^2	≤ median	≥ median	χ^2
Age in years						
14 – 15	35	31	0.02	28	36	0.02
16 – 17	4	5		4	7	
Monthly income (in rupees)						
≥ 4,000	38	32	1.04	27	30	1.03
≤ 4,000	1	4		11	7	
Family history of heart disease						
Yes	6	1	1.60	4	1	1.47
No	36	32		29	41	

(χ^2 = 3.84, P < 0.05)

The data presented in Table 13 shows that chi-square computed between risk for CVD and selected variables like age, monthly income, and family history of heart disease were not found to be significant at 0.05 level of significance in students studying in urban and rural areas. Hence the alternate hypothesis is accepted.

DISCUSSION

Sample characteristics

Majority of the students in urban area (87%) and rural area (85%) were in the group of 14-15 years. The above findings of the study were consistent with a survey conducted among the adolescents in USA. The age of the children was 12 to 17 years. Majority of the students from urban area were Hindus (80%) and 37% from rural area were Christians. Majority of fathers (49%) of the students from urban area were professionals, whereas 43% fathers of students from rural areas were semiskilled workers. Most of the mothers of students from urban area (68%) and rural area (76%) were unemployed. Majority of the students' family income in urban area (71%) and rural area (57%) was above Rs. 5,000. Majority of the students from urban (93%) and students from rural (84%) belonged to nuclear families. In the urban areas most of the students' fathers were graduates (41%) while in the rural area 39% had studied up to

PUC or were diploma holders. Among the students from urban area 11% had history of heart disease, while among students from rural area it was 7%. The findings of a study conducted in Iowa to identify adolescents with adverse coronary risk factors level revealed that the history of parental CHD was rare. This result is consistent with the result of the present study. Television was the chief source of health information for students of both urban (37%) and rural areas (35%).

Section II

Students from urban schools were more knowledgeable ($x_1 = 13.146$) than those from rural schools ($x_2 = 11.620$) (t ≡ 10.292, P < 0.05). The finding of a survey conducted among high school students in Michigan revealed that most of the students lack knowledge regarding the risk factors of CVD. This finding is contradictory to the findings of the present study. Another study conducted at Kansas showed that adolescents possess knowledge on cardiovascular risk factors. Majority of the participants agreed that obesity, smoking and high fat diet may lead to heart disease. These findings are consistent with the present study findings[26].

Section III

There is significant difference in identified risk factors of CVD among students from urban and rural schools (t=3.353, p<0.05). Area-wise comparison of risk factors of CVD among students from urban and rural areas showed that, there is a significant difference in physical activity (t=4.273, p<0.05) and no significant difference in areas like family history of heart disease, BMI, food pattern, habits and expression of tension. A similar study was conducted in Ludhiana among school students in urban and rural areas in the age of 11-17 years to evaluate the prevalence of hypertension and obesity. The mean BMI of hypertensive population in both urban and rural areas was significantly higher than the respective normotensive population. Mean BMI in urban normotensive group was 20.34 ± 3.72 kg/m^2; hypertensive group – 24.91 ± 4.92 kg/m^2; BMI in rural normotensive group – 18.41 ± 3.41 kg/m^2; hypertensive group – 2.37 ± 3.71 kg/m^2 (P < 0.01). The findings were similar in a study conducted in Jaipur among adults. Prevalence of various factors was determined. The prevalence of tobacco use and smoking was significantly greater in urban (50.0%) as compared to rural groups (25.4%), while obesity, hypertension, diabetes, LDL, cholestrolemia were significantly greater in urban adults (P<0.05).

Section IV

There was no correlation between knowledge on risk factors of CVD and identified risk for CVD among students of urban and rural areas (r=0.217, P<0.05). The findings of a study conducted among adult Canadian population revealed similar findings. The result showed that people at greater risk of CVD were less able to recall important CVD risk factors. The odds ratio of reporting and association of the risk and knowledge varied between 0.16 for lack of knowledge to 0.55 for smoking.

Section V

The findings of the study showed significant correlation between the risk and selected factors such as family history (r=0.384, 0.377, P<0.05), physical activity(r=0.285, 0.315, P<0.05), exercise (r=0.300, 0.240, P<0.05) in urban and rural areas respectively. There is a significant correlation between risk and selected factors in students from urban area such as BMI (r=0.425 P<0.05), participation in sports (r=0.345, P<0.05) and food pattern (r=0.327, 0.428, P<0.05). The findings of the present study are similar to a study conducted in Karachi among subject aged between 15-45 years. The result revealed that smoking, use of ghee, lack of education (P<0.001 for each) and parental history of myocardial infarction (P<0.05) were all associated with higher risk of acute myocardial infarction[17].

Section VI

The findings of the study showed that there was no association between risk for coronary vascular disease and selected variables like age, monthly income, and family history of heart disease in students studying in urban and rural areas The findings of a study conducted among school children in Turkey showed high risk for CVD in children of middle and higher socioeconomic status[53]. This finding is contradictory to the findings of the present study.

NURSING IMPLICATION
Nursing administration

The findings of the study could be utilised by the nursing administrators to provide quality care to the clients in the community. They should encourage the staff and the students to carryout similar research in different populations and different settings to find out the knowledge and risk factors of CVD, so that necessary nursing interventions can be carried out and the problem can be tackled. Nursing administrators should organise periodic in-service educational programmes for the staff and students in collaboration with both the community and the medical department for imparting knowledge on risk factors of CVD. The hospital should have a policy to provide health education material to all inpatients and outpatients. The nurses can encourage higher authorities to conduct outreach programmes in the community to improve the knowledge of the clients on CVD.

Nursing education

The nurse educators have the responsibility to update the knowledge of the nursing personnel on the knowledge of risk factors of CVD. The findings of a study can serve as guidelines for the nurse educators for planning and conducting educational programmes for the student nurses regarding the assessment of the risk factors of CVD. The curriculum should lay emphasis on the problem of obesity-related cardiovascular diseases in childhood and its consequences in adulthood. These students when posted in the wards or in the community should be able to give health education to the patients, students, teachers and parents regarding the risk factors of CVD, especially related to obesity. The nursing students should be made aware of their role in health promotion and disease prevention. The students should be motivated to plan innovative approaches to provide health education in different settings and in the community.

Nursing practice

The nurse plays an important role in healthcare delivery system. Primordial prevention is one of the important components because the cause of CVD is multifactorial. One of the modes of primary prevention is health promotion achieved through health education that brings about change in lifestyle and behaviour. The nurse has a major role in the preventive aspects. The nurse should be able to explore the risk factors of CVD so that action can be taken to prevent and reduce the disease burden. The study findings will help the nurse to organise community health education programmes and school awareness programmes bringing out educational and audio-visual material regarding risk factors of CVD and associated problems.

Nursing research

The findings also emphasise an extensive need to evaluate the effectiveness of planned awareness programme on risk factors of CVD among school students. The nurses could conduct longitudinal study on the prevalence of CVD from childhood to adolescent period. The student can be guided to evaluate the various determinants of risk factors of CVD in hospitals and at the community level. The hospitals and community should allocate the budget, personnel and facilities for research on risk factors on CVD and its prevention.

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