

## Assessment of Knowledge on Cardiovascular Disease Risk Factors and Healthy Lifestyle Practices in High School Children

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### Abstract

**Background:** Cardiovascular disease (CVD) is the major cause of deaths in India. Risk factors like high blood pressure, tobacco use, high sedentary activities, obesity and positive family history are linked to CVDs. Improving the knowledge and adopting healthy lifestyle since childhood may decrease the risk of CVDs. The present study was conducted to assess the knowledge and healthy lifestyle practices linked to cardiovascular risk factors among middle age school children.

**Material and Methods:** A total of 484 middle age group school children of 6<sup>th</sup> to 8<sup>th</sup> class were considered. A semistructured self-administered questionnaire that comprises the questions about knowledge on cardiovascular complications and physical activity assessment questions was distributed and all subjects were undergone physical examination.

**Results:** The level of knowledge on CVD was adequate in 23.22% (95% CI: 20.46%-25.98%), moderate in 64.14% (95% CI: 59.78%-68.50%) and poor in 12.64% (95% CI: 10.24%-15.04%) participants. There was a significant association between lifestyle routines i.e. tobacco use and physical activity with BMI, blood pressure and cardio respiratory reserve ( $p < 0.05$ ).

**Conclusion:** The level of knowledge and healthy life style practices linked to cardiovascular risk factors among middle age school students was not adequate. General screening for conventional risk factors and implementation of intervention session at school level is important to improve health lifestyle practices and knowledge of CVD at young age.

**Keywords:** Cardiovascular diseases, Knowledge, Physical activity, Middle age school children

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### Introduction

Non communicable diseases (NCDs) are the major global health concerns, which account for 47% and 60% of global disease burden and deaths respectively [1]. According to WHO more than 17 million deaths were reported due to coronary heart disease in 2019 [2]. India claimed one fifth

of CVD related deaths worldwide distinctly in younger people [3]. Early age of onset, rapid disease progression and increased morality rate are the major concerns of CVD in India [4]. Several modifiable characteristics including obesity, inadequate physical activity and

tobacco use; and non-modifiable socio demographic and socioeconomic characteristics may influence the cardiovascular health [5]. Few long-term studies reported that atherosclerosis and CVD risk factors tend to exhibit during childhood and adolescence that course into adulthood along with tobacco use, family history, obesity and hypertension [6-8]. NCDs disrupt the productive midlife that directly hits the person's economic growth and productivity.

Healthy lifestyle practices and behavioural patterns are the major factors that influence cardiovascular health which adopted from young age itself. Early detection and prevention of CVD risk factors in children may be effective method of disease prevention of premature CVD in India. Improving the knowledge and awareness on predisposing risk factors is helpful to optimize the risk of cardiovascular diseases. Besides documented cardiovascular risk factors, knowledge on the cardiovascular risk factors among school children are limited which need effective intervention. With above reference, the present study was designed to assess the knowledge and healthy lifestyle practices linked to cardiovascular risk factors among middle age school children.

### Materials and Methods

The present cross sectional study was conducted in the Department of Community Medicine at Mahavir institute of Medical Sciences, Vikarabad and MNR Medical College and Hospital, Sangareddy from December 2021 to April 2022. According to the study by George *et al.* (2014), 25.4% of school children reported sufficient knowledge on cardiovascular diseases [9], by considering the above outcome we estimated sample size of 484 middle age group school children. There are 28 high schools available in the Sangareddy. Among that 14 schools were selected in the lottery method. A total of 5 schools were selected for the main study. From each school 90 students of sixth,

seventh, and eighth standards were selected through simple random method. Study proposal was reviewed and approved by institutional ethics committee.

### Inclusion criteria:

- Middle age high school children belong to 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> stand.
- Willing to participate in the study

### Exclusion criteria:

- Subjects with preexist cardiovascular disorders
- subjects with respiratory complication and other systemic disorders,
- With psychological complications
- Subjects with skeletal deformities
- Subjects with comorbidities to physical activity
- Absent during school visits and data collection
- Not willing to participate in the study

A semistructured self-administered questionnaire was developed and check for internal consistence by conducting pilot study with 30 subjects. The Cronbach's alpha score was 89.24 for total items in the questionnaire. The subjects of pilot study were excluded from main study. Before collecting the data, written informed consent was obtained from parent, guardian or teacher and study details was explained to the participants.

A semistructured self-administered questionnaire that comprises the questions about knowledge on cardiovascular complications and physical activity assessment questions was distributed among the study subjects to collect the relevant data. After collecting the questionnaire information, all subjects were undergone physical examination. The socioeconomic distribution of participants was conducted by following Standard of living index (SLI) scale [10].

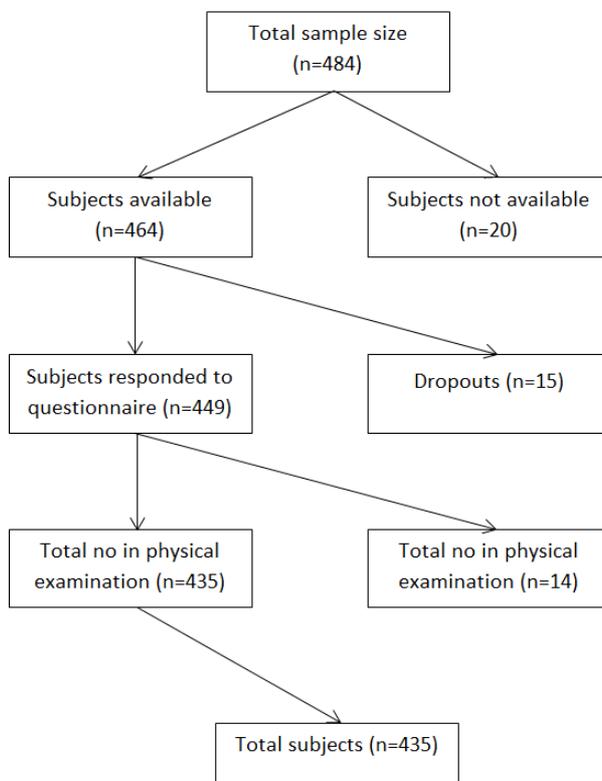
### Statistical analysis

The collected data was analyzed by SPSS version 23.0. Descriptive statistics was used to analyse categorical variables and

represented in frequency and percentages. The association analysis between continuous variables was conducted using Chi-square test.  $P < 0.05$  was taken as significant result.

**Result**

The estimated sample size was 484. But, a total of 435 students were responded and participated in the study.

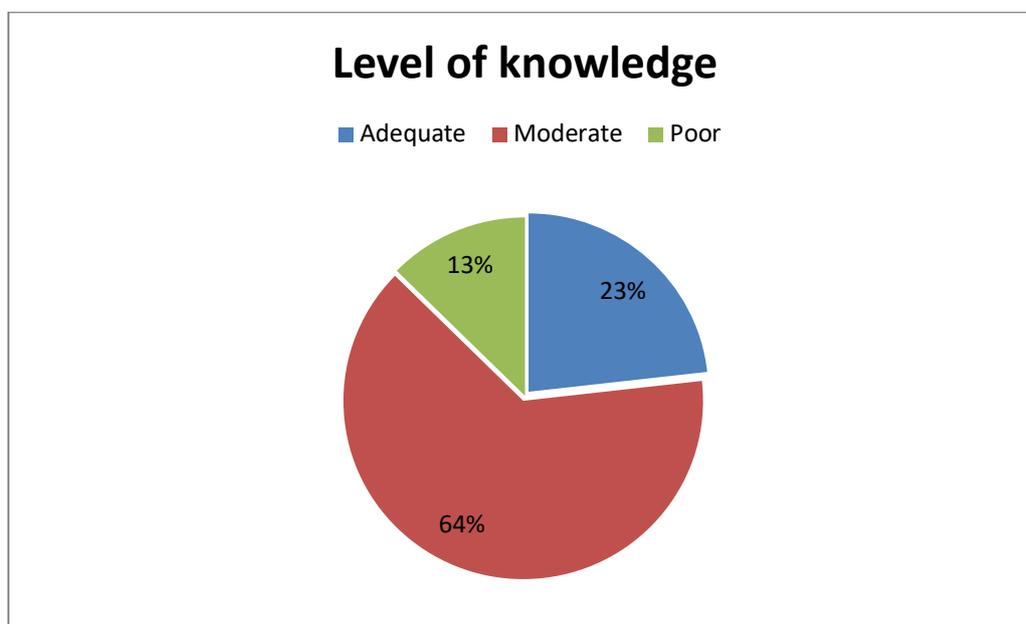


**Figure 1: Schematic representation of sample distribution.**

**Table 1: Socio-demographic and economic details of study participants and family.**

Socio-demographic variables	Total participants (n=435)	
	Frequency	Percentage
<b>Age (In years)</b>		
10	89	20.45%
11	103	23.68%
12	126	28.96%
13	92	21.15%
14	25	5.75%
<b>Gender</b>		
Boys	214	49.20%
Girls	221	50.80%
<b>Study class</b>		
6 <sup>th</sup> class	131	30.12%
7 <sup>th</sup> class	145	33.33%
8 <sup>th</sup> class	162	37.24%
<b>Place of living</b>		
Urban	181	41.60%
Rural	254	58.40%
<b>Educational status of parent/guardian</b>		
Primary	44	10.11%

Upper primary	80	18.39%
Intermediate	65	14.94%
Graduate and above	201	46.20%
Illiterate	45	10.34%
<b>Occupation of parent/guardian</b>		
Skilled	103	23.68%
Semiskilled	127	29.20%
Professional	88	20.22%
Business	83	19.08%
Unemployed	34	7.82%
<b>Economic category (Standard of living index scale)</b>		
Low	132	30.34%
Medium	238	54.71%
High	65	14.94%
<b>Family history of non-communicable diseases</b>		
Present	44	10.12%
Absent	391	89.88%



**Figure 1: Details about level of knowledge on cardiovascular risk factors and prevention measure among study participants**

The level of knowledge and preventive measures of cardiovascular complication was adequate in 23.22% (95% CI: 20.46%-25.98%), moderate in 64.14% (95% CI: 59.78%-68.50%) and poor in 12.64% (95% CI: 10.24%-15.04%) participants (Graph 1).

**Table 2: Details of life style characteristics among study participants**

Lifestyle routines	Total participants (n=435)	
	Frequency	Percentage
<b>Dietary habits</b>		
Vegetarian diet	124	28.51%
Non-vegetarian diet	278	63.91%
Junk food	33	7.58%
<b>Consumption of tobacco</b>		

Present	25	5.75%
Absent	410	94.25%
<b>Duration of sedentary activities (hours spent per day)</b>		
<3 hours	387	88.96%
>3 hours	48	11.04%
<b>Physical activity</b>		
Adequate	191	43.91%
Inadequate	244	56.09%

**Table 3: Details of physical examination among study participants**

physical examination	Boys (n=214)	Girls (n=221)
	Frequency (%)	Frequency (%)
<b>BMI</b>		
Normal	107 (50%)	73 (33.04%)
Overweight	22 (10.28%)	32 (14.48%)
Obese	24 (11.21%)	19 (8.58%)
Less weight	61 (28.50%)	97 (43.90%)
<b>Cardio-respiratory details</b>		
Excellent	45 (21.03%)	40 (18.10%)
Good	145 (67.76%)	143 (64.70%)
Weak	24 (11.21%)	38 (17.20%)
<b>Blood pressure</b>		
Pre-hypertensive	10 (4.68%)	14 (6.33%)
Hypertensive	09 (4.20%)	11 (4.98%)
Normal BP	195 (91.12%)	196 (88.69%)

**Table 4: Association between lifestyle routines with BMI, blood pressure and cardio respiratory reserve of study participants**

	Dietary habits			Tobacco use			Sedentary activities			Physical activity		
	Odds ratio	95% CI	P value	Odds ratio	95% CI	P value	Odds ratio	95% CI	P value	Odds ratio	95% CI	P value
BMI (Obese+overweight)	1.23	0.98 - 1.59	0.001	1.87	1.45 - 2.21	0.001	1.04	0.62 - 1.48	0.033	1.64	1.48 - 1.96	0.001
Blood pressure	1.18	0.74 - 1.46	0.207	1.94	1.58 - 2.47	0.001	0.98	0.77 - 1.36	0.113	2.28	1.85 - 2.39	0.001
cardiorespiratory reserve	1.37	1.08 - 1.62	0.251	2.10	1.72 - 2.48	0.001	1.34	0.98 - 1.58	0.468	1.52	1.14 - 1.85	0.001

## Discussion

Cardiovascular disease remains a major global health concern; knowledge and awareness on cardiovascular risk factors is essential for early recognition of the complications and for healthy life style practices [11]. The present study was

designed to evaluate the knowledge on cardiovascular risk factors among middle age school children. Female participants were more common than males. Majority participants were living in rural areas (58.40%) than urban areas (41.60%).

Majority participants were studying in private schools than government schools.

In view of family socioeconomic details, majority parents were semiskilled employees (29.20%) followed by skilled (23.68%), professional (20.22%), business (19.08%) and unemployed (7.82%). A study by George GM *et al.*, on cardiovascular risk factors and its knowledge on school children (n=485) of 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> class reported the mean age of 12.8 years in government schools and 12.1 years in the private schools with male predominance (60.8%). Nearly all fathers of private and 98.5% of government school students were employed [9]. Divakaran B *et al.*, on lifestyle risk factor of non-communicable diseases among school children found male predominance (51.5%) [12]. A study by Sandar Kyi *et al.*, found that 66% of the fathers were engaged in self-employment [16].

In current study, according to standard of living index scale score, 54.71% participants were under middle economic category, 30.34% were under low and 14.94% were under high economic category. 10.12% of participants had positive family history of non-communicable diseases. George GM *et al.*, found that families with more than rupees 80000/- income was seen only in students of private schools (14.7%). The family history of cardiovascular diseases was seen in 19.3% of children [9]. A study by Divakaran B *et al.*, found 2.9% of student had positive family history of cardiovascular diseases [12].

In current study, the level of knowledge and preventive measures of cardiovascular complication was adequate in 23.22% (95% CI: 20.46%-25.98%), moderate in 64.14% (95% CI: 59.78%-68.50%) and poor in 12.64% (95% CI: 10.24%-15.04%) participants (Graph 1). George GM *et al.*, found that 25.4% of children had adequate, 54.4% had moderately adequate and 20.21% had inadequate knowledge upon risk factor and preventive strategies of cardiovascular diseases [9]. A study by

Divakaran B *et al.*, reported that 84.8% students had low levels, 14.4% had medium levels and only 0.8% had high levels of awareness on non-communicable disease. Majority participants were not aware of the complications related to the cardiovascular diseases [12]. Sandar Kyi *et al.*, found that 11%, 63% and 26% of students had poor, fair and good levels of knowledge on cardiovascular risk factors.

Majority participants were non-vegetarians (63.91%), followed by vegetarian (28.51%) and prefer junk food (7.58%). 5.75% of participants consume tobacco and tobacco related products. 11.04% of participants were spending more than 3 hours per day in watching television, mobile and internet, whereas in 88.96% of participant it was less than 3 hours. Participants with adequate physical activities was seen in 43.91%, but 56.09% of participants had inadequate physical activities (Table 2). George GM *et al.*, reported that 43.8% of children were physically active for one hour a day and 57% of children spent more than 3 hours a day for sedentary activities [9]. A study by Divakaran B *et al.*, reported that 27.7% of children were daily engaged with exercise, 45.9% of children occasionally and 26.4% of children were not engaged with any kind of exercises [12].

The physical examination of the participants showed that 28.50% of boys and 43.90% of girls were under less weight compared to their standard BMI. 11.21% of boys and 8.52% of girls are obese and 10.28% of boys and 14.48% of girls are found under overweight category. A study by George GM *et al.*, reported that 6.8% of boys and 4.7% of girls are obese and 4.7% of boys and 4.7% of girls are overweight. The cardiorespiratory reserve was weak in 11.21% of boys and 17.20% of girls, good in 67.76% of boys and 64.70% of girls and excellent in 21.03% of boys and 18.10% of girls. 4.20% of boys and 4.98% of girls were hypertensive and 4.68% of boys and 6.33% of girls are pre-hypertensive in nature (Table 3). George GM *et al.*,

reported that 9.3%, 5.1% and 0.8% of government school children reported their BP under prehypertension, stage 1 and stage 2 hypertension respectively. Whereas in private school, 15.3%, 8.5% and 2% reported prehypertension, stage 1 and stage 2 hypertension respectively [9] Sharma *et al.*, among children aged 4-17 years reported that 22% were overweight and 6% were obese [13]. Marwaha RK *et al.*, reported that the prevalence of obesity was 18.6% among boys and 16.5% among girls between 12-18 years [14] In current study, higher number of overweight and obese students was observed in private schools. These findings are in accordance with findings of Raj M *et al* [15]. There was a significant association between lifestyle routines i.e. tobacco use and physical activity with BMI, blood pressure and cardio respiratory reserve ( $p < 0.05$ ). Dietary habits and sedentary activities was significantly associated with BMI ( $p < 0.05$ ) (Table 4). George GM *et al.*, reported that blood pressure was significantly associate with family history, BMI, and sex [9] Sandar Kyi *et al.*, reported that there were no significant difference between sex, educational status of parents, occupation of parents and life style related perceptions ( $p > 0.05$ ) [16].

Periodical conduction of heart health education programs at schools is important for children to be able to take care of themselves healthy and to know healthy living practices, and lifestyle choices which keep themselves away from the risk of cardiovascular diseases. The present study assessed the levels of knowledge and practice among students and further intervention studies are required to assess the levels of knowledge, attitude and healthy practices among children, adolescents and parents.

### Conclusion

The study reported significant association between tobacco use and physical activity with BMI, blood pressure and cardio respiratory reserve. However, the levels of knowledge and healthy life style practices

among middle age school students were not satisfactory. Implementation of awareness programs about risk factors for cardiovascular diseases among school children can motivate towards healthy lifestyle practices, adequate daily physical activity, and healthy dietary intake.

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