A School Based Intervention Model To Promote Healthy Life Style Among School Children For Prevention Of Risk Factors For Cardiovascular Disease In Bagalkot, Karnataka- A Quasi experimental study

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Abstract

Background: Non communicable diseases (NCDs) contribute to around 5.87 million deaths that account for 60 % of all deaths in India. India shares more than two-third of the total deaths due to NCDs in the South-East Asia Region (SEAR) of WHO. Four behavioral risk factors are responsible for significant proportions of these diseases- tobacco use, unhealthy diet, physical inactivity and harmful use of alcohol. Hence, school based Healthy life style curriculum development is the need of the hour for school children.

Objectives: 1. To promote healthy lifestyle, by implementing school based intervention program to prevent emergence of risk factors for Cardiovascular Diseases among school children.

2. To evaluate the intervention programme at the end of 2 year, in terms of Change in the knowledge and Practice of healthy lifestyle in study subjects.

Methods: A quasi-experimental study was conducted in the randomly selected schools of Bagalkot. A total of 598 students in intervention group and 575 students in control group participated in the study. After obtaining informed consent from institutional ethical committee, baseline information about the knowledge and practice about aspects of healthy lifestyle to prevent cardiovascular diseases was obtained. For intervention group, multicomponent programme was implemented based on CATCH (Child and Adolescent trial for Cardiovascular Health) Model and the Comprehensive School health programme Model by the USA, Center For Disease Control (CDC). After 2 years, post-interventional data was done.

Results: There was statistically significant change in the knowledge and practice among the intervention group when compared to control group. There was change in the knowledge about physical activity, healthy eating habits and physical activities. Regular physical activities, Yoga and Meditation were started. Majority of the students attained normal BMI after the intervention. Obesity reduced in the intervention group. Knowledge scores about ill-effects of tobacco and alcohol improved following intervention. Conclusion: The life style changes such as physical activity, yoga and Meditation are the need of the hour among the schoolchildren. The study results showed that regular physical activities and Yoga and meditation helps in maintenance of good health as well as prevents the cardiovascular diseases in the future life.

Key words: School based intervention, Healthy life style, Non-communicable disease

Introduction

Exclusive Non-communicable diseases (NCDs) contribute to around 5.87 million deaths that account for 60 % of all deaths in India[1]. India shares more than two-third of the total deaths due to NCDs in the South-East Asia Region (SEAR) of WHO. Four types of NCDs-cardiovascular diseases, cancer, chronic respiratory diseases and diabetes make the largest contribution

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to morbidity and mortality due to NCDs. Four behavioural risk factors are responsible for significant proportions of these diseases-tobacco use, unhealthy diet, physical inactivity and harmful use of alcohol. Major metabolic risk factors are obesity, raised blood pressure, raised blood glucose and raised blood total cholesterol levels[1].

Cardiovascular diseases (coronary heart disease, stroke, and hypertension) contribute to 45% of all NCD deaths followed by chronic respiratory disease (22%), cancers (12%) and diabetes (3%).[1] More than two-thirds of the adolescents aged 11-17 years are physically inactive in India as per WHO standards. The level of physical inactivity among adults is around 13%[1]. Prevalence of hypertension among adolescents is 40.1%, diabetes 14.3% overweight is 28.6% and obesity 12.8% as per Thakur et al[2] . A recent study conducted among 24,000 school children in south India showed that the proportion of overweight children increased from 4.94 per cent of the total students in 2003 to 6.57 percent in 2005 demonstrating the time trend of this rapidly growing epidemic. Those with BMI equal to or exceeding the 85th but are below 95th percentiles are defined overweight and are at risk for obesity related co-morbidities[3] Metabolic syndrome is defined as a constellation of risk factors, including obesity, dyslipidaemia, impaired glucose metabolism and elevated blood pressure, all major predictors for cardiovascular disease[4].

The prevalence of current tobacco smoking has shown a slight decline in males but the prevalence (23.6%) is still higher than the global prevalence of current tobacco smoking (22%). Tobacco use has been identified as single largest risk factor attributable to NCDs. Hence, this study was conducted to promote healthy lifestyle among school children.

Objectives:

1. To promote healthy lifestyle, by implementing school based intervention program to prevent emergence of risk factors for Cardiovascular Diseases among school children.

2. To evaluate the intervention programme at the end of 2 year, in terms of Change in the knowledge and Practice of healthy lifestyle in study subjects.

Materials and methods

This quasi-experimental study was conducted in the randomly selected high schools of Bagalkot from June 2015 to July 2017. Sample size was calculated based on the study conducted by warren etal[5], using OpenEpi

software version 2.3.1 taking 95% confidence level and 80% power of the study, there was reduction of obesity from 8% to 4% following intervention, which is taken as P1 and P2. Minimum sample size required for the present study was 556. A total of 598 students in intervention group and 575 students in control group participated in the study. After obtaining informed consent from institutional ethical committee, baseline information about the knowledge and practice about aspects of healthy lifestyle to prevent cardiovascular diseases was obtained using pre-designed proforma. For intervention group, multicomponent programme was implemented based on CATCH (Child and Adolescent trial for Cardiovascular Health) Model and the Comprehensive School health programme Model by the USA, Center For Disease Control (CDC[6,7]. Module was prepared, which was the tool for our intervention programme. Here the peer educators and teachers was trained by our team in various aspect of health promotion measures which includes nutrition education (healthy eating habits), physical activity and the Tobacco and Alcohol Education. After 2 years, post-interventional data was collected.

Statistical analysis: Data collected were entered in the Microsoft excel sheet and later analysed using SPSS software. Chi-square test for proportions and student t-test for quantitative data was applied. P<0.05 was considered as statistically significant.

RESULTS

In the present study, intervention group has 598 children and control group has 575 children (Table 1). Mean Academic performance in post-test intervention was found to increase from pre-test. (P value= 0.142), though statistically not significant. Mean SBP in post-test intervention was found to increase from pre-test value and was statistically significant (P value= 0.025). Mean DBP in both groups were almost the same. Calorie intake in post-test intervention group was found to be significantly more as compared to pre-test group. Duration of physical activity per week was found to be more in post-test group (Table2). Knowledge about ill effects of smoking, chewing tobacco and alcohol was found to increase significantly in post-test intervention group (Table 3). Knowledge about ill-effects of smoking was almost same in both pre-test and post-test control. Knowledge about ill-effects of tobacco chewing was found to be more in post-test control as compared to pre-test control but it was not statistically significant. Knowledge about ill-effects of alcohol was found to be more in pre-test control group as compared to post-test control group

and it was not statistically significant (P value=0.48) (Table 4). Knowledge about ill effects of smoking, tobacco chewing and alcohol in post-test group was found to be more in intervention group as compared to control group and this was statistically significant (Table 5). In pre-test and post-test intervention group a good proportion of participants (41.5% and 36.8% respectively) are doing at least one physical activity. But in pre-test and post-test control group, majority of participants (68.5% and 64.9% respectively) are not involved in any physical activity. Overall majority of participants (51.5%) are not doing any physical activity. (Table 6). In pre-test and post-test intervention group,

majority of participants play outdoor sports (62.4% and 45.1% respectively). While in both the control groups majority of participants does not play any kind of sports, i.e. 67.8% in pre-test control and 87.3% in post-test control (Table 7).

Table 1: Study subjects in the intervention and control group

Group	Number	Percentage
Intervention	598	50.9
Control	575	49.1
Total	1173	100.0

Table 2: Effect of intervention of different parameters in intervention group

Parameters	Group	Mean	SD	t	p
Academic performance	pretest-intervention	80.64	11.162	-1.470	.142
	postest-intervention	81.57	10.405		
Systolic Blood Pressure	pretest-intervention	105.81	10.096	-2.245	.025
	postest-intervention	110.17	46.328		
Diastolic Blood Pressure	pretest-intervention	69.71	8.022	.155	.877
	postest-intervention	69.64	7.410		
Calorie intake per day	pretest-intervention	1375.70	414.145	-3.599	.000
	postest-intervention	1469.31	471.240		
Duration of physical activity per week	pretest-intervention	41.81	47.135	-2.17	.02
	postest-intervention	46.8	28.2		

Table: 3: Knowledge about different aspects before and after education intervention

Score	Group	Mean	SD	t	p
Ill effects of smoking	Pretest-intervention	1.12	.716	-9.541	.000
	Postest-intervention	1.54	.791		
Ill effects of tobacco chewing	Pretest-intervention	.81	.651	-6.612	.000
	Postest-intervention	1.08	.750		
Ill effects of Alcohol	Pretest-intervention	.62	.716	-16.139	.000
	Postest-intervention	1.33	.778		

Table 4: Knowledge about different aspects (smoking & alcohol) before and after study period in control group

	Group	Mean	SD	t	p
Ill effects of smoking	pretest-control	1.08	.809	.798	.425
	post test control	1.04	.821		
Ill effects of tobacco chewing	pretest-control	.89	.784	-1.750	.080
	post test control	.98	.809		
Ill effects of Alcohol	pretest-control	.21	.516	0.69	.48
	post test control	.23	.458		

Table 5: Knowledge about different aspects between intervention and control group

	Group	Mean	SD	t	p
Ill effects of smoking	postest-intervention	1.54	.791	10.374	.000
	post test control	1.04	.821		
Ill effects of tobacco chewing	postest-intervention	1.08	.750	2.204	.028
	post test control	.98	.809		
Ill effects of Alcohol	postest-intervention	1.33	.778	31.399	.000
	post test control	.13	.458		

Table 6: Physical activity in the study subjects before and after intervention

Group	Physical Activity				Total
	None	1 physical activity	2 physical activity	3 and >3 physical activity	
pretest-intervention	252	248	51	47	598
	42.1%	41.5%	8.5%	7.9%	100.0%
postest-intervention*	177	210	92	91	570
	31.1%	36.8%	16.1%	16.0%	100.0%
pretest-control	394	107	31	43	575
	68.5%	18.6%	5.4%	7.5%	100.0%
post test control**	362	94	11	91	558
	64.9%	16.8%	2.0%	16.3%	100.0%
Total	1185	659	185	272	2301
	51.5%	28.6%	8.0%	11.8%	100.0%

*P=0.004 **p=0.45

Table 7: Indoor and outdoor sports in the study subjects before and after intervention

Group	Sports				Total
	none	indoor	outdoor	both	
pretest-intervention	151	70	373	4	598
	25.3%	11.7%	62.4%	0.7%	100.0%
postest-intervention	88	37	257	188	570
	15.4%	6.5%	45.1%	33.0%	100.0%
pretest-control	390	13	171	1	575
	67.8%	2.3%	29.7%	.2%	100.0%
post test control	487	3	46	22	558
	87.3%	.5%	8.2%	3.9%	100.0%
Total	1116	123	847	215	2301
	48.5%	5.3%	36.8%	9.3%	100.0%

DISCUSSION

A Quasi Experimental study (Intervention model) was carried out to promote Healthy lifestyle among school children for prevention of cardiovascular Diseases in schools of Bagalkot city. In the present study, intervention group has 598 children and control group has 575 children.

In the present study, the mean Academic performance in post-test intervention group was improved from pre-test. (P value = 0.142). Physical activity and healthy nutritious diet enhances healthy growth and development, increases concentration and better academic scores. It improves social skills and brain development and helps children feel confident about themselves to do better in school.

Jessie-Lee D etal[8] in a Cross-Sectional Study showed that unhealthy lifestyle behaviors are positively associated with poor in elementary school students

in a school board in Nova Scotia, Canada during 2014. The associations were statistically significant. Consumption of ≥1 sugar-sweetened beverage, breakfast skipping and not being physically active were the reasons for poor academic performance.

In this study it was also found that duration of physical activity per week was found to be more in post-test intervention group when compared to pre-test. There was increase of about 35 hours of physical activity/week following intervention. This difference of physical activity after intervention was statistically found to be significant.

When we compare different parameters between intervention and control group, the duration of physical activity/week is more in post-test intervention group as compared to post-test control group and is statistically significant.

Similar finding was observed in a study by Russell R et al[9] those in the intervention schools engaged in significantly more among medium to vigorous physical activity than children in control schools. This difference remained significant.

In pre-test and post-test intervention group a good proportion of participants (41.5% and 36.8% respectively) are doing at least one physical activity.

Three types of physical activities were found in 16% of the individuals in post test intervention when compared to pre test intervention (7.9%). That means the intervention group subjects increased the number of physical activities from one to two and three. This could be the effect of training of peer educators and teachers monitoring of the students for physical activity by the teachers and project management team.

But in pre-test and post-test control group, majority of participants (68.5% and 64.9% respectively) are not involved in any physical activity. In the control group there was not much change in the physical activity during post test.

In the post test intervention group, both indoor and outdoor activities were increased from 0.7 to 33% of the subjects whereas in the post test control group there was a slight increase i.e., from 0.2 to 3.9%.

Calorie intake in post-test intervention group was found to be significantly more (about 94 calories) as compared to pre-test.

Mean systolic blood pressure in post-test intervention group was increased from 105- 110 mm Hg) and was statistically significant (P value = 0.025) Mean diastolic

blood pressures in both groups were almost the same.

Knowledge about ill effects of smoking (Mean score increased from 1.12 to 1.54), chewing tobacco (Mean score increased from 0.81 to 1.08) was found to increase significantly in post-test intervention when compared to pre-test and is statistically significant. Similarly increase in the knowledge regarding ill effects alcohol (Mean score from 0.62 to 1.33) among post intervention groups and it was statistically significant.

Knowledge about ill-effects of tobacco chewing was found to be little more in post-test control as compared to pre-test control but it was not statistically significant. Knowledge about smoking and alcohol was almost same in pre and post test control.

Radhakrishnan Jayakrishnan[10] in his study among adolescent students in Thiruvananthapuram district of Kerala found that the overall prevalence of self-reported ever users of tobacco in the current academic year was 7.4%, while that of ever alcohol users was 5.6%. Similar observations were made in aspects of knowledge assessment as our study wherein scores revealed a significant increase in the mean knowledge scores after post training evaluation (mean score = 10.34) when compared to pre training evaluation (mean score = 9.26).

Knowledge about ill effects of smoking (posttest-intervention mean score 1.54 when compared to post test control mean score 1.04), tobacco chewing (posttest-intervention mean score 1.08 when compared to post test control mean score 0.98) and alcohol (post test-intervention mean score 1.33 when compared to post test control mean score 0.23) in post-test group was found to be more in intervention group as compared to control group and this was statistically significant.

In pre-test and post-test intervention group, majority of participants (55.9% and 84.2% respectively) believed that passive smoking is definitely harmful for health. Increase in the knowledge here in this group can be attributed to educational intervention. In pre-test and post-test control group, majority of participants (56.8% and 73.5% respectively) believed that passive smoking is probably not harmful. Increase in the knowledge was not found in the control group.

Our study findings were similar to RS Bharadwaj[11] study wherein there was a gross lack of knowledge, regarding second hand smoking among the school children. With a short interactive session of one hour, majority of students gained sufficient knowledge regarding active as well as passive smoking, to the

extent that more than 50% of them felt confident enough to give advice and request active smokers in order to discourage this habit if situation arose.

In pre-test and post-test intervention groups, majority of participants (76.1% and 94.2% respectively), said they will definitely not smoke if offered by best friend - after intervention student's attitude improved.

While in pre-test and post-test control groups, 44.7% in pre-test and 59.2% in post-test group, said they would definitely smoke if offered by best friend.

In the intervention and control group during pre test and post test, majority of participants answered one ill effect regarding knowledge about ill-effects of chewing tobacco. There was increase in the knowledge in post-test intervention as well a post test control group. But the increase in the knowledge was found to be more in post intervention than the post control group.

According to the study by Abidh Ibrahim et al[12], 78.23% said that they were aware of effects of smoking on health.39.83% and 14.78% thought it would lead to lung disease and heart disease respectively. 7.8%of the smokers were aware that smoking leads to cancer.

As per one more study by Ram Vinod Tiwari[13], 63% boys and 83.2% girls said that consuming chewable tobacco cause Oral Cancer.92% boys & 96% girls told that Smoking is harmful to health.

In the intervention and control group during pre test and post test, majority of participants gave just one correct answer about ill-effects of smoking. There was increase in the knowledge in the number of ill effects 27.9% to 33.6% (2 ill effects) and 1.5% to 13% (3 ill effects) in the intervention group.

In our study, knowledge about ill effects of alcohol increased from pre-test to post test in the intervention group. (one ill effect: from 38.7%-53.1%, Two ill effects: 9.8%- 27.8% and 3 ill effects from1.4-8.2%).

The present study findings were almost similar to the study of Vaibhav et al[14], who reported that, in pre test adolescents were having on average 43.43% knowledge regarding ill effects of alcohol consumption and in post test, average 65.33% knowledge regarding ill effect of alcohol consumption and conclude that there is significant difference between pre-test and posttest knowledge score of adolescents.

Conclusion and Recommendations:

The life style changes such as physical activity, yoga and meditation are the need of the hour among the schoolchildren. The study results showed that regular physical activities, and Yoga and meditation helps in maintenance of good health as well as prevents the cardiovascular diseases in the future life. Regular Physical activity, yoga and Meditation should be included and implemented strictly in the school curriculum. Nutrition education should start from the home and there should be continued nutritional education in the school curriculum and monitoring should be done with respect to junk foods. The topics such as ill effects of smoking, chewing tobacco, and consumption of alcohol should be included in the school syllabus as this study showed improvement in the knowledge about the same the intervention .

These activities can be carried out in the form of health education (by the teachers, peer educators and health professionals), role play, by conducting jathas, competition such as quiz, poster competition, essay competition and sports competition. The government should make a policy towards prevention of cardiovascular disease among school children by using our school based curriculum model. The school authorities, parents and school children should adhere to the strict implementation of legislation related to substance abuse.

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