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Schoolchild as a health educator for parents regarding hypertension: A quasi-experimental study among school students of South India

Utsav Raj, Poonam Ramesh Naik¹, Abhay Nirgude¹

Abstract:

BACKGROUND: An alarming trend of sustained blood pressure elevation among children and adolescents has been found. Health education to schoolchildren in their formative age is the most effective method to be able to modify their habits, and further, they can be enrolled as an effective health educator for their parents.

OBJECTIVE: To study the effectiveness of health education module on study participants about prevention and control of hypertension (HTN) and the effectiveness of child as a health educator on parents' knowledge about prevention and control of HTN.

MATERIALS AND METHODS: This quasi-experimental study was conducted with a control group among high school students in two urban secondary schools. There were 110 students and 100 parents each in the intervention and control groups. Modular training with interactive teaching-learning methods was conducted for students in the intervention group. They, in turn, educated their parents.

RESULTS: Postintervention, the study results showed a higher median for various domains in the intervention group as compared to the control group among both students and parents. On applying Mann-Whitney test, this difference was statistically significant with $P < 0.001$.

CONCLUSION: The increase in the knowledge of parents belonging to the intervention group suggests the effective transfer of knowledge from the students to their parents.

Keywords:

Adolescents, health education, interactive teaching, modular training, prevention and control of hypertension

Introduction

Indian population is in its demographic, epidemiological, and nutritional transition which adds to its increasing burden of chronic diseases and obesity. Sustained blood pressure elevation among children and adolescents has also been found suggesting that hypertension (HTN) is not just limited to be a problem for adults only.^[1,2] High burden of cardiovascular risk factors and inadequate knowledge regarding it has been reported among the

school students in a study conducted in Delhi.^[3]

The prevention and management of HTN are major public health challenges worldwide. In spite of the increasing emphasis on drug therapy, lifestyle modification is still an important component.^[4] Community capacity refers to the community's own ability to bring about change^[5] and that means enhancing their skills, reorienting organizational priorities, building leadership and community ownership, and finding

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Department of
Community and Family
Medicine, AIIMS, Raipur,
Chhattisgarh, ¹Department
of Community Medicine,
Yenepoya Medical
College, Mangalore,
Karnataka, India

Address for correspondence:

Dr. Poonam Ramesh Naik,
Department of Community
Medicine, Yenepoya
Medical College,
Yenepoya (Deemed
to be University),
Mangalore - 575 018,
Karnataka, India
E-mail: [drpoonamnaik@
gmail.com](mailto:drpoonamnaik@gmail.com)

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resources to promote healthy eating and physical activity in a sustainable way.

School-going students can be considered as the most effective agent for spreading the knowledge to friends and family members. In the school academic curriculum, there is a wide gap between health awareness knowledge present in curriculum and actual imparted education^[6].

They need to inculcate awareness in the community through “child-to-family strategy” leading to health promotion and positive development of the community^[6]. Good habits are better inculcated during the formative years of life. Parents and teachers have a very important role to play in the growth and development of children. The amount of time young people spend in formal education in schools is an ideal setting for promoting adolescent health^[7].

Health-promoting schools go beyond the conventional model of simply providing information about health. They aim to create a setting where the school environment, policies, institutional culture, and linkages with external partners all contribute in improving the health and education outcomes of students^[8].

Promoting health knowledge is the target point of health education programs. HTN among high school students remain a vital issue of both a medical and social nature. Preventive actions against these diseases in adulthood will be far too late. This is why, from an early age, education should be given to promote physical activity and healthy eating habits and make them aware of the harmful effects of smoking and alcohol.

Health education to schoolchildren in their formative age is the most effective method as they are more open minded and likely to be receptive to changes in ideas and able to modify their habits, and further, they can be enrolled as an effective health educator for their parents. Health education of schoolchildren can be carried out in different ways and settings by imparting formal and informal Information–Education–Communication. Innovative approaches to education for health are essential to gain the interest, support, involvement, and commitment of students^[9].

Thereby, this study was conducted to measure the effectiveness of health education module on students belonging to high school and study the effectiveness of child as a health educator on parents’ knowledge about prevention and control of HTN.

Methods

We conducted a quasi-experimental study with a control group among high school students in two secondary

Central Board of Secondary Education schools in urban area of Dakshina Kannada district of Karnataka. We selected two schools using simple random sampling from 34 CBSE schools of Dakshina Kannada district of Karnataka. We included students studying in the sixth, seventh, and eighth classes along with one of the parents.

The sample size was calculated using Open Epi software version 3 Andrew G. Dean and Kevin M. Sullivan, Atlanta, GA, USA. In a study conducted in a school in Delhi, 19% of students had adequate knowledge of risk factors and lifestyle modification. Assuming there will be a 20% absolute increase in the knowledge of risk factors and lifestyle modification in the intervention group, taking 1:1 allocation ratio, 80% power, and two-sided α of 0.05, the sample size was calculated. Thereby, the calculated sample size was 100. Considering 10% attrition, the final sample size was $100 + 10 = 110$ in each group (intervention and control). Thereby, the total number of participants was 220. An attendance register of respective class was used as the sampling frame. Using probability proportional to population size, students were selected from different classes. Parents of the selected students were enrolled as study participants.

The study was conducted in four phases.

Phase 1: Baseline assessment

We conducted a baseline assessment of knowledge of HTN among students and parents of both the schools. Data were collected by administering the knowledge assessment tool to both students and parents of the intervention and control groups. The study tool comprised questions to assess the knowledge regarding risk factors, protective factors, symptoms, complications, treatment, and management details using a validated questionnaire from the students. Additional information on lifestyle behavior, screening for HTN, and blood pressure values were collected from the parents. Each item included in the knowledge assessment tool was scored on a 2-point scale. Correct response was scored 1 and incorrect and don’t know response were scored 0.

Phase 2: Module formulation

Based on the baseline assessment of knowledge of HTN among students and their parents, we developed a health education module.

Phase 3: Intervention

Implementation of module-based health education on HTN was conducted for the school students in the intervention school. Module highlighted six domains, namely risk factors of HTN, i.e., modifiable and nonmodifiable, protective factors, symptoms

and signs of HTN, complications of untreated HTN, various treatment options, and preventive strategies of HTN including exercise and diet modification. Health education program comprised two sessions of 45 min each, one session at a time. These two sessions were conducted on 2 separate days of the same week.

Teaching–learning methods for this education program included interactive lecture, games, case-scenarios, role-play, and group discussions.

Print educational material comprising key points on HTN was distributed to the students to enable them to effectively deliver HTN-related information to their parents.

Phase 4: Postintervention assessment

Intervention school

Postintervention knowledge assessment was conducted among the students of intervention school twice, at 1 month, and 3 months' interval. After 1 month of the second session of health education program, postintervention assessment was conducted among the students belonging to intervention school and their parents using the same knowledge assessment tool.

Control school

The assessment was conducted for students belonging to control school and their parents at the same time intervals as that of the intervention school [Figure 1].

Data analysis and presentation of results

Data were analyzed using the Statistical Package for Social Sciences (SPSS), version 23 (Chicago. Inc., IL, USA). Continuous variables were expressed in terms of means (standard deviation) and median (interquartile range). The association of baseline scores with postintervention score between the two groups was tested for significance using the Mann–Whitney U-test. The association of baseline score with postintervention and long-term follow-up difference in the intervention group was tested using the Friedman test.

Ethical clearance

Ethical clearance was obtained from the YU Ethics Committee protocol no. 2016/042.

Results

A total of 220 schoolchildren (110 each from two private schools) were included in the study. The mean age of the schoolchildren was 12.32 years \pm 1.10 in the intervention group and 12.48 years \pm 1.45 in the control group. A total of 200 parents of the schoolchildren (100 each from two private schools) participated in the study. The mean age of the parents was 35 years \pm 4.20 in the

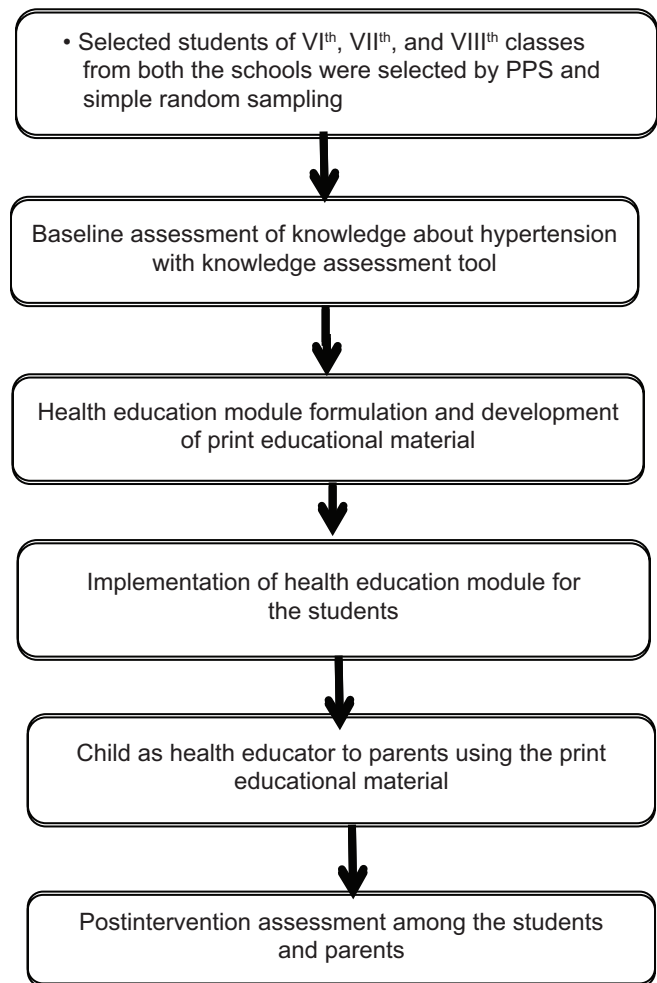


Figure 1: Flowchart depicting the procedure followed in this study

intervention school and 33 years \pm 5.3 in the control school.

There was no statistically significant difference in the baseline scores for the various domains between the intervention and control groups [Table 1]: Postintervention, the study results showed that the median for various domains was higher in the intervention group as compared to the control group. On applying Mann–Whitney test, this difference was statistically significant [Table 2].

There was a statistically significant difference across the median values at three time points (baseline and postintervention at 1 month and 3 months) [Table 3]. It was statistically significant in domains of protective factors, symptoms, complications, treatment, and management details of HTN with $P < 0.001$ [Table 4]. Postintervention, the study results showed that the median for various domains was higher in the intervention group as compared to the control group among parents. On applying Mann–Whitney test, this difference was statistically significant with $P < 0.001$.

Table 1: The difference in baseline scores between the intervention and control groups among students (n=110) for different domains

Domain	Median		Interquartile Q3-Q1		Median	Mann-Whitney U	P
	Intervention	Control	Intervention	Control			
Risk factor	3	3	5,1	4,2	3.009	3000	0.560
Protective factor	2	1	3,2	2,0	2.591	4697	0.010
Symptoms	1	1	2,0	2,1	1.095	5035	0.267
Complication	1	1	1,1	2,1	1.182	4984	0.186
Treatment	1	1	2,1	2,1	1.409	4994	0.215
Management of hypertension	1	1	2,1	2,1	1.409	4324	<0.001*

*Statistically significant

Table 2: The difference in postintervention scores between the intervention and control groups among students (n=110) for different domains

Domain	Median		Interquartile Q3-Q1		Median	Mann-Whitney U	P
	Intervention	Control	Intervention	Control			
Risk factor	7	4	8,5	5,3	5.536	1724	<0.001*
Protective factor	4	2	5,3	3,2	1.5034	1866	<0.001*
Symptoms	3	0	5,1	1,0	1.645	1907	<0.001*
Complication	3	1	4,2	1,1	1.959	793	<0.001*
Treatment	3	1	4,1	1,1	1.832	1915	<0.001*
Management of hypertension	3	1	3,2	1,0	1.659	954	<0.001*

*Statistically significant

Table 3: The association of baseline score with postintervention and long-term follow-up difference in the intervention group among students (n=110) for different domains

Domain	Median			Friedman test	P
	Pre	Posttest	Post - test 2		
Risk factor	3	7	8	105.440	<0.001*
Protective factor	2	4	4	97.577	<0.001*
Symptoms	1	3	4	59.397	<0.001*
Complication	1	3	3	137.234	<0.001*
Treatment	1	3	3	67.622	<0.001*
Management of hypertension	1	3	3	97.664	<0.001*

*Statistically significant

Discussion

This is the first study from India assessing the effectiveness of child as an educator for increasing parents' knowledge about prevention and control of HTN.

Postintervention results showed a higher median for various domains in the intervention group as compared to the control group. Maiti *et al.*^[10] in their study on the impact of nutritional awareness package among secondary school students reported improvement in knowledge scores. Leena and D'souza^[11] in their study on health education on prevention of worm infestation among children reported a significant difference in the pre- and post-health education knowledge scores ($t = 2.06, P < 0.05$). Majority of the participants, i.e., 68.8% of school students, answered correctly regarding etiology, and about half of the participants (42.9%) maintain dietary practices. This

school-based intervention program is promising as an innovative method to raise awareness among students' knowledge about HTN and promote early screening for HTN. There was a significant difference in the scores at three time points, and the scores were high at 1 and 3 months. The Friedman test of differences among repeated measures was conducted, and this difference was statistically significant. This shows that the students were able to retain the knowledge even 3 months postintervention program.

A statistically significant difference was seen between the intervention and control groups among the parents. Students were able to deliver HTN-related information to parents as evident from the results. A similar finding was observed by Lwin *et al.*^[12] in Singapore among Grade 5 students who were involved in raising awareness on HTN among their family members. A study conducted in North Carolina involving students as educators for parents reported an increase in the number of participants providing correct responses.^[13] Maiti *et al.* reported a decrease in the number of participants receiving poor grades postintervention through child as an educator for different communicable diseases such as malaria, tuberculosis, and diarrhea.^[6] Bhole *et al.*^[14] in their child-to-parent study found that the children in the intervention group showed improved knowledge of leprosy in the posttest. Parents belonging to the intervention group also showed a significant improvement in their knowledge about leprosy which was not evident in the control group. Almost 20% of parents indicated their child as a source of information in the posttest. Our study reported similar findings

Table 4: The difference in postintervention scores between the intervention (n=100) and control (n=100) groups among parents

Domain	Median		Interquartile Q3-Q1		Median	Mann-Whitney U	P
	Intervention	Control	Intervention	Control			
Risk factor	7	5	8,6	7,3	6.000	2517.500	<0.001*
Protective factor	4	3	4,3	4,2	3.000	3020.500	<0.001*
Symptoms	2	1	3,1	2,0	2.000	3020.500	<0.001*
Complication	2	2	2,1	3,1	1.000	3020.500	<0.001*
Treatment	3	1	3,1	2,1	2.000	3020.500	<0.001*
Management details	3	3	3,1.25	3,1	3.000	3020.500	<0.001*

*Statistically significant

highlighting the effectiveness of child as a health educator for noncommunicable disease.

The study has few strengths. We used simple random sampling to select the schools, thus limiting the selection bias. Module development was based on the baseline assessment of knowledge, thereby we tried to bridge the gap. We recommend the use of this module for further similar sessions in schools. Interactive teaching-learning methods were used in health education sessions, thereby ensuring learning by active participation.

The study has few limitations. First, the study was conducted in schools from urban area. Thereby, we may not be able to generalize the findings to schools in rural settings. Second, we have not been able to assess the effect of any confounders such as socioeconomic status, age, and educational status of parents.

The study has few implications and recommendations. First, the study showed higher scores in the intervention group among both students and parents. Health and family welfare department in collaboration with department of education can adopt this model of child as a health educator. Second, with the rising burden of noncommunicable diseases and its potential for prevention, health education plays an important role. Creating awareness among children and disseminating this information on various noncommunicable diseases to parents will address both primordial and primary levels of prevention. Third, the modular training comprising interactive teaching-learning methods may have led to high scores at 1 and 3 months. Training methods should thereby ensure active participation addressing sustainability of effects.

Conclusion

Our study found improvement in awareness of knowledge on HTN among school students using an educational intervention module and innovative teaching-learning methods. Implementing this educational program in school curriculum is essential to develop healthy lifestyle at an earlier age. The increase in the knowledge of parents belonging to the intervention group suggests the

effective transfer of knowledge from the students to their parents. This reflects the positive outcome of child as a health educator concept through this study and should be considered at the policy level.

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Conflicts of interest

There are no conflicts of interest.

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