Hypertension Knowledge Intervention: A study on Awareness, Retention, and effect on Healthy Lifestyle Practices among Children

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Abstract

The high prevalence of hypertension and associated risk factors among school children indicate that hypertension is not restricted to older age but stems in childhood itself. Cognition related to the disease is a primary step in warranting its manifestation. Hence, this study aims to explore the efficacy of a 30-minute audio-visual hypertension knowledge intervention facilitated by a health psychologist in increasing awareness about hypertension; the retention of information, and its effect on healthy lifestyle practices among children. A sample of 100 children was recruited through purposive sampling and was assessed using the Hypertension Knowledge Test (HKT) and Healthy lifestyle Practice Scale for Children and Adolescents (HELIPSCA). Post assessing the baseline scores for HKT and HELPISCA,the children were re-administered HKT immediately after the first exposure, the second exposure (after two weeks), then after 6 weeks of first exposure, and followed up after an interval of 10 months along with a post-test administration of HELIPSCA. Results were statistically tested using paired *t-tests* which revealed a significant improvement in hypertension knowledge levels among the children. However, there was no significant change in the self-reported lifestyle practices of the children. This school-based knowledge intervention holds promise as an innovative method to raise school children's knowledge about hypertension through video-based educational intervention.

Keywords: Hypertension knowledge intervention, frequency of intervention, hypertension awareness, knowledge retention, healthy lifestyle practices.

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Hypertension is a primary causal factor for morbid conditions such as cardiovascular diseases, renal diseases, and premature deaths around the world, with developing countries bearing the brunt of the burden.High systolic blood pressure (SBP) was responsible for 10.8 million deaths in 2019 (Murray et al, 2020).The Indian population especially is going through a demographic, epidemiological, and dietary shift, which is contributing to the country's rising chronic disease burden.Banerjee et al. (2021) have reported high prevalence of hypertension and associated risk factors among school children indicating that hypertension (HTN) is not restricted to older age but stems in childhood itself. A study by Amritanshu et al. (2015) reported a prevalence of 4.7% hypertensives among children between 5-19 years. The occurrence of cardiovascular diseases among school children also is a warning sign for the Indian health care system and its impending encumbrance.

Awareness about hypertension is the first step in warranting the disease condition. Awareness encompasses the right cognition that builds a foundation for the desired behaviour to manifest. Despite hypertension being a major risk factor predicting cardiovascular mortality, a study by Divakaran et al. (2010) found that only 9.6% of the sample of children between Class 6 to Class 9 were aware of the preventability of hypertension. The gap in such crucial knowledge was also found in another study by Hariharan et al. (2018) in responses of children studying between Class 6 to Class 12 to an open-ended question “What do you know about high blood pressure/hypertension?”

It builds a strong case to formulate preventive interventions by empowering this group within the children’s age bracket by equipping them with adequate knowledge that would help them utilize cognition to motivate health promoting behaviour and avoid health risk behaviour particularly related to hypertension. This sort of “preventive readiness”is an essential prerequisite to implement reduction in risk factors scores among adults and other family

members (Monteiro &Hariharan, 2021; Monteiro & Hariharan, 2019). Though it has been established by literature that there is a positive impact of knowledge intervention among children, it is imperative to further explore the differential impact of the frequencies of knowledge intervention and its retention among children. This would help ascertain the number of repetitions that would strengthen the relationship between stimulus reception and response (behaviour). It has been noted that when children are exposed to rich knowledge related to hypertension, it has resulted in reduction of high salt food intake and reduction of cardiovascular risk scores among parents and family memberstoo (He, Brinsden, & MacGregor, 2014).The present study attempts to bridge this gap.

Research Questions

1. Will a hypertension knowledge intervention enhance hypertension related knowledge among school children?
2. Will the school children be able to retain the knowledge gained, 10 months post-intervention?
3. Will there be an improvement in the healthy lifestyle practices among school children, post hypertension knowledge intervention exposure?

Research Objectives

In pursuit of the research questions, the following objectives of the study were formulated:

1. To examine if knowledge intervention increases the levels of hypertension knowledge among the school children
2. To examine if school children are able to retain the knowledge gained, 10 months post-intervention

3. To examine if there is an improvement in healthy lifestyle practice patterns post-intervention among the school children

Hypotheses

1. There will be an increase in hypertension knowledge levels post-intervention exposures among the school children.
2. There will be retention of hypertension knowledge 10 months post-intervention among school children
3. There will be an improvement in healthy lifestyle practice patterns post intervention among the school children

Method

Study design

This study is based upon a quasi-experimental interrupted time series design (Biglan, Ary, &Wagenaar,2000).

Sample

Using purposive sampling a sample of 100 children studying between Class 7 to Class 10 from a school in Nagaland was recruited. Table 1 shows a summary of the demographic characteristics of the children.

Table 1

Demographic characteristics of the Participants

Characteristics	*N*	*%*
Age		
12-14	39	39%
15-18	61	61%
Sex		
Male	50	50%
Female	50	50%
Class		
7	25	25%
8	25	25%
9	25	25%
10	25	25%
Percentage of Exam marks		
40%-59%	30	30%
60%-100%	70	70%

Note. N = 100. Mean age of participants=14.96years (*SD* = ±1.60)

Tools

The baseline and follow-up tests were conducted using the following questionnaires.

Hypertension knowledge test. (HKT). Developed by Andrew & Hariharan (2017), HKT has 22 items with 5 multiple choice options. The respondent has to choose one correct answer among them. The items cover hypertension knowledge majorly divided into four domains—general awareness of hypertension; lifestyle factors; causes, care and casualty of hypertension; and medical management. The right response for each item is given a score of 1 and the wrong response was given 0 scoresThe score of each subscale is totalled to get the overall hypertension knowledge level. Higher scores indicate higher levels of hypertension knowledge. Cronbach's α for this sample was found to be 0.79.

Healthy lifestyle practice scale for children and adolescents. (HELIPSCA). The scale developed for the purpose of this study consists of 28 items and aims to measure daily healthy lifestyle practices in children. This scale assesses the health behaviour of the subjects of this study covering dietary behaviour, exercise or physical activity, water intake, quality of rest or sleep, screen time, hygiene, and spiritual. The responses of the subjects can range on a 4-point Likert scale from Almost always = 4 to Never = 1. Forward scoring for positive items involves 4 = Almost always, 3 = Frequently, 2 = Rarely and 1 = Never. It is reversed scored for negative statements. A higher score indicated healthier lifestyle practices. Cronbach's α for the test was found to be 0.70.

Procedure

The permission from the Institutional Ethics Committee was obtained (Ref: UH/IEC/2021/176). School administration permissions were also sought to allow the conduction of the study. One school teacher was assigned to assist the investigator to facilitate the conduction of the study. Informed consent forms were sent to all the parents of those children from Classes 7 to 10. The children whose parents signed the informed consent were given the assent form to confirm their willingness to participate in the study. Children for whom both informed consent and assent were obtained were included in the study.

Intervention

The intervention provided to the children was a 30-minute video featuring a physician and a detailed explanation of all the aspects related to hypertension such as disease's prevalence, disease mechanism, causes and casualties, medical management, associated myths and mistakes, and the consequences of non-adherence. The informational video was exposed to the children on day 1 and day 14 from the onset of the study and the immediate impact of knowledge intervention was recorded each time through the administration of HKT. The

sessions were managed by a trained health psychologist who was also able to alleviate any health anxiety caused by the video and positively remind the children of their rights and responsibilities to good health.Hypertension knowledge test was conducted 5 times–first, to obtain baseline scores (pretest scores); second, immediately after first exposure of intervention; third, a week after the second exposure of intervention; fourth, a post intervention test after 6 weeks of first intervention exposure; and fifth, a follow up testing of hypertension knowledge levels done 10months post-intervention to observe knowledge retention. Healthy lifestyle practice was also measured two times – firstly prior to the week before exposure to the intervention video (pre-test)and the next administration was done8 months post-intervention.

Statistical analyses

Data were analysed using the IBM SPSS Statistics 23.0 version for descriptive statistics such as mean, SD, and percentage and paired *t* test to assess knowledge retention, and to assess changes in healthy lifestyles practices in children compared to the baseline scores.

Results

To pursue the objectives of the study, a paired *t* test was conducted to assess the effect of intervention exposures on each of the domains of hypertension knowledge and its total compared to their pre-test knowledge levels. The results of comparison of first exposure of intervention are consolidated in Table 2.

Table 2

Mean, Standard deviation and t-values of hypertension knowledge and its subscales among school children assessed immediately after first exposure of intervention

Outcome	Before intervention		Immediate impact of intervention (Exposure 1)				
	M	*SD*	*M*	*SD*	*t*	*P*	Cohen's *d*
Hypertension knowledge (total)	4.60	2.68	6.95	2.03	16.34	.000	0.99
General Awareness	1.21	1.04	1.87	1.15	7.72	.000	0.60
Lifestyle	1.23	1.11	2.40	0.82	11.41	.000	1.20
Causes, Care, Casualty Awareness	1.17	1.12	1.50	1.12	4.11	.000	0.29
Management of medication	0.99	1.04	1.18	0.86	2.41	.018	0.20

Note. N=100.

Similarly, the impact of the second exposure of intervention was assessed again by comparing the levels of knowledge scores obtained hitherto with the baseline scores. The results are presented in Table 3.

Table 3

Mean, Standard deviation and t-values of hypertension knowledge and its subscales among school children assessed immediately after second exposure of intervention

Outcome	Before intervention		Immediate impact of intervention (Exposure 2)				
	M	*SD*	*M*	*SD*	*t*	*P*	Cohen's *d*
Hypertension knowledge (total)	4.60	2.68	8.27	2.53	22.22	.000	1.41
General Awareness	1.21	1.04	2.16	1.09	9.33	.000	0.89
Lifestyle	1.23	1.11	2.36	0.79	10.75	.000	1.18
Causes, Care, Casualty Awareness	1.17	1.12	2.05	1.14	8.91	.000	0.78
Management of medication	0.99	1.04	1.70	0.98	7.12	.000	0.70

Note. N=100.

Further, the retention of hypertension knowledge levels was assessed again at Week 4 after a second intervention exposure or 6 weeks after first intervention exposure. The results are presented in Table 4.

Table 4

Mean, Standard deviation and t-values of hypertension knowledge and its subscales among school children assessed 6 weeks after first exposure of intervention

Outcome	Before intervention		Impact of intervention (6 weeks post exposure 1)				
	M	*SD*	*M*	*SD*	*t*	*P*	Cohen's *d*
Hypertension knowledge (total)	4.60	2.68	8.03	2.50	19.89	.000	1.32
General Awareness	1.21	1.04	2.08	1.11	8.44	.000	0.81
Lifestyle	1.23	1.11	2.31	0.84	9.84	.000	1.10
Causes, Care, Casualty Awareness	1.17	1.12	1.99	1.13	8.38	.000	0.73
Management of medication	0.99	1.04	1.65	0.96	6.69	.000	0.66

Note. N=100.

Finally, hypertension knowledge levels were followed up 8 months after the first intervention exposureand retention of knowledge wascompared with the pre-test scores. The results are presented in Table 5.

Table 5

Mean, Standard deviation and t-values of hypertension knowledge and its subscales among school children assessed 8 months after intervention

Outcome	Before intervention		Imapct of intervention (10 months after Exposure 1)				
	M	*SD*	*M*	*SD*	*t* (99)	P	Cohen's *d*
Hypertension knowledge (total)	4.60	2.68	7.94	2.43	19.30	.000	1.31
General Awareness	1.21	1.04	2.05	1.01	8.47	.000	0.82
Lifestyle	1.23	1.11	2.33	.75	10.48	.000	1.161
Causes, Care, Casualty Awareness	1.17	1.12	1.92	1.09	7.59	.000	0.68
Management of medication	0.99	1.04	1.64	0.96	6.58	.000	0.65

Note. N=100.

In parallel, behavioural manifestation of a strong cognitive base was assessed by comparison of pre-intervention levels of daily healthy lifestyle practices and the follow up scores of self-reported daily healthy lifestyle practices at 8 months post intervention. The results are presented in Table 6.

Table 6

Mean, Standard deviation and t-values of healthy lifestyle practice among school children

Outcome	Before intervention		10 months after intervention				
	M	*SD*	*M*	*SD*	*t*	P	Cohen's *d*
Healthy lifestyle practices	70.75	11.84	71.87	10.26	-1.74	.085	0.10

Note. N=100.

Concisely put, there was a significant improvement in hypertension knowledge scores retained even after 10 months post intervention exposure. However, daily healthy lifestyle practices were not found to have a significant change post knowledge intervention.

Discussion

While the holistic hypertension targeted intervention in this study was found to be effective in increasing the children's knowledge about hypertension, the same was insufficient to have an impact on their health behaviour.

Hence, in concurrence, the first hypothesis is accepted that stated that there will be an increase in hypertension knowledge levels post intervention post repeated intervention exposures among the school children. It was also confirmed that the knowledge levels were retained after 10 months of intervention exposure. Previous studies have recommended the implementation of school-based intervention programmes that aim to lower the risk of hypertension and target a change in the level of knowledge and awareness about its causes, consequences, treatment, and control among school children. This is the first pillar to promotion of health safe behaviour. In a study conducted in Delhi by Yadav and Khokar (2021), school-aged adolescents' knowledge of CVDs improved considerably after receiving intervention compared to baseline.

The present study confirms the change in perception of disease among children through a simple 30-minute audio-visual educational intervention. Ferreira et al. (2016) also found that imparting knowledge about a disease through audio-visual resources improved students' knowledge and retention capacity. This format has been found to be superior than written material and been proven to be very effective in increasing knowledge and promoting health behaviour change for various chronic illnesses including cancer screening, heart failure self-care adherence, and HIV testing (Tuong, Larsen, & Armstrong, 2014).

Young school going children are an unexplored population segment who are eligible to promote health education about hypertension. The importance of school going children is that they are at anreceptive age, and thus, may absorb and disseminate powerful educational messages using their agency. Furthermore, behaviours learned at a young age frequently persist

into adulthood, resulting in significant reduction in morbidity and mortality (Curie et al., 2010). Through school children, parents and significant adults can also be the recipients of information dissemination. For instance, in a school-based study conducted by Monteiro and Hariharan (2021), there was a significant increase in hypertension knowledge before and after intervention. This study also discovered that by educating children about hypertension, the children were able to act as change agents in the management of hypertension in their hypertensive adult family members. Along with a strong informative structure, the intervention was coupled with a daily self-regulatory monitoring system for children to help them track the adults' hypertensive adherent behaviour.

Further, in view of the findings of the daily healthy behavioural practices there was no significant improvement found in the health behaviour of the children of this study, leading to the rejection of the second hypothesis. There are several reasons for low expectations for immediate preventiveness and hesitance to adopt healthy lifestyle changes. Owing to the silent nature and slow and late effects of hypertension progression, it may be difficult to translate cognition into behaviour. The current structure of academic time and multitude of nutrition deficit resources available in schools may not be providing adequate opportunities for health-promoting behaviours. Furthermore, indulging in gratifying behaviours like junk food that is oily and salty, watching television, playing video games, and easy accessibility to numerous fast-food outlets, restaurants and supermarkets may have discouraged children from embracing healthy alternatives. Moreover, as discussed previously, behavioural manifestation was not a formalized objective or outcome of the intervention which aimed to only increase the cognition related to hypertension. It is exclaimed cognition alone cannot be sufficiently be expected to translate into healthy behaviour. This is in line with health behaviour theories which state the essentiality of several other factors that propel health promotive behaviour.

Conclusion

This school-based knowledge intervention holds promise as an innovative method to raise school children's knowledge about hypertension. In addition, the video-based educational intervention could also improve retention capacity in school children. While further extensive enquiry is needed, this improved knowledge and retention could lead to better recognition and control of hypertension in the community. Hence, the educational module could potentially be replicated in all schools in hypertension-endemic countries. The findings also suggest that health education interventions should incorporate more effective strategies for transforming knowledge into practice.

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