Comparative Impact of Two Training Packages on Awareness and Practices of First Aid for Injuries and Common Illnesses among High School Students in India

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Abstract

Knowledge about various illnesses and their management is not satisfactory among high school students especially in rural areas in India. Various incorrect practices and myths associated with illnesses and injuries still exit. Training and education about correct management of injuries and illnesses for students is a sound and logical investment. A randomized controlled trial was undertaken among 120 students of ninth class (age group- 14-15 years) from a Government Senior Secondary School at Chandigarh, India. Students were randomly assigned to 2 groups (Group A and B) of 60 each using 'blocked randomization process'. Both groups were administered a pretested questionnaire for assessing their baseline knowledge, followed by on-the-spot demonstration the next day for assessing their skills. A training manual on 40 common childhood illnesses and injuries entitled 'Swasthya Chalisa' (which means 40 health conditions) prepared with the help of the experts, was distributed to all study students. In addition, group A was also provided with on-the-spot demonstration training session. Post intervention evaluation of the level of knowledge and practices of both groups was done 15 days after the intervention. A scoring system was devised to quantify the knowledge and practices of students on first aid. Informed consent of the principal, teachers, students and their parents was taken before conduction of study. It was observed that students lacked knowledge in subject areas like management of uncommonly encountered illnesses in childhood (viz. T.B, Backache etc), emergency conditions (viz. CO gas poisoning, respiratory tract obstruction, epilepsy, unconsciousness, burns, food poisoning) and some routine day-to-day conditions which are not taken seriously for treatment (acne, epistaxis, food-poisoning, and constipation). The mean group scores for both groups (Group A and B) on combined knowledge and skills were higher at post-intervention than pre- intervention. Increase in level of knowledge from pretest to posttest was greater for Group B than for Group A by 33%. Also, increase in level of skills from pretest to posttest was also greater for Group B than for Group A by 135%. Overall knowledge and skills increased to 43% in group B as compared to A. It is concluded that there is a need for strengthening the knowledge of students regarding common illnesses and injuries by incorporating these training and education as a part of school curriculum.

Key words: *Adolescents, First Aid, School Health, Curriculum, Self Care*

Introduction

First aid is defined as the assessments and interventions that can be performed by a bystander (or by the victim) immediately with minimal or no medical equipments.[1] The primary objective of first aid is to alleviate suffering, facilitate healing process and minimize damage. Often the first action taken for management of injuries and common illness decides the future course of disease and complication rates. In India, high school students lack knowledge regarding the appropriate first aid action to be taken for injuries and common illnesses.[2] Furthermore, the knowledge has been documented to be fragmented, disintegrated and nonsequential[2,3]. The concept of self-care among people in the community and students is also missing.[5] Various incorrect practices and myths associated with illnesses and injuries have also been reported among students.[2,5]

Students have the potential for changing the health scenario of the society if properly groomed and educated for healthful living. The enrollment in secondary school throughout country is close to 46.8 million.[6] A number of strategies have been tried in India to involve students in improving community health status including a Child To Parent Approach[7], Peer Teaching Programme[8], and *Chinnari* Doctors Scheme.[9] For optimum success of these approaches, it is essential that the students possess adequate knowledge about management of commonly occurring injuries and illnesses. Studies have documented that the response of students is usually enthusiastic for any training programme organized for them in first aid and basic life support system.[10]

It has also been documented in India that school health services are available for primary schools (6-11 years) but is optional for middle and secondary class students.[4,5] Further, frequent transfers of physical trainers, trained in first aid, hampers management of common illnesses and injuries in the schools.[2,3] Although school health programmes in India have been in existence since 1962, but limited emphasis on first aid exists in the educational curriculum.[2,4] Compared to this scenario, first aid is a more frequently taught subject in the health curriculum of home schools in other countries. Training on first aid action can go a long way in ensuring proper management of illnesses and injuries. Such training if given at a young age will be a good investment in itself.[5]

Purpose of Study

Against this background the present study was planned to achieve the following objectives.
1) To assess the knowledge and practices of first aid action to be taken for injuries and common illnesses among students; 2) To evaluate the comparative impact of administration of two training packages on the knowledge and practices of first aid action to be taken for common illnesses/injuries among students.

Methods

The study was conducted in a purposively selected senior secondary school in an urban field practice area, Department of Community Medicine, Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh. First, the Principal investigator (PI) sought the consent of the school principal and explained about the nature and purpose of the study. Her approval of date and time for conducting the study was obtained. Thereafter, a meeting of trainers including the PI, health supervisor and health workers was organized for standardization of first aid procedures to be used in the study.

Study Design

A two-by-two factorial design (a type of randomized controlled trial design) was used to study the effect of two interventions (i.e. distribution of self-instructional training manual for Group A and self-instructional training manual plus on the spot demonstration for Group B).

Sample Size

Taking alpha error to be 0.05 (two sided) and beta error 0.20 (i.e. power=1-beta=0.80), and assuming baseline correct knowledge as 20% and expected rise in level of overall knowledge and skills among Group A and B to be approximately 50% and 70% respectively, a sample size of 50 students in each group (i.e. N=100) was estimated. A correctional factor multiplies the needed sample size by $1/ (1-R_0-R_1)$ where R_0 is drop out rate and R_1 is drop in rate. Drop out rates are those subjects who are assigned to an intervention group who fail to comply with the intervention, while drop in rates are those who are assigned to control group and begin taking the intervention. Taking R_0 to be 10% and R_1 to be 5%, a sample size of 120 students was calculated.

Selection of Students

All ninth grade students (14-15 years of age) of a purposely selected Government Senior Secondary School at Chandigarh India were enlisted. The study participants were then selected randomly using random number table from the list of students enrolled in the attendance register. Randomization was done to eliminate the bias and then students were provided with the option to change the groups. All the students preferred to remain in their original group.

Consent

Informed verbal consent from the principal, class teachers and the students were received before conducting study. Written consent from the parents of students selected for the study was also obtained. All the information was kept confidential.

Randomization

The selected study subjects were than randomized into two groups of sixty each using a 'Blocked Randomization process.' A block size of four students was selected, with two students in a block were assigned to Group A with the other two students were assigned to Group B. The order within the block was also randomized for their allocation in Group A and B. Then another block of four subjects was selected till the desired sample size of one hundred and twenty was reached.

T*raining Packages/ Intervention*

A training manual on first aid and common childhood illnesses and injuries entitled ***'Swasthya Chalisa'*** **(**which means forty health conditions) was prepared with the help of available texts. *'Hanuman Chalisa'* is a popular religious text in Hindu mythology recited by people when they face trouble and are afraid of anything, particularly ghosts. We used the word *Chalisa* from *Hanuman Chalisa* which means '40' since there were 40 remedies in our intervention. The "consensual validity" of the manual was identified by circulating a draft among experts in the fields of Community Medicine, Medicine, Pediatrics and Surgery. The final version of the manual incorporated the suggestions provided by the experts.

Data Collection

Pretest

For the collection of data, selected schools were visited on an appointed day. The PI addressed the selected students about the nature and purpose of the study on the training day. Then a pretested questionnaire in Hindi (local language) was administered to the students for assessing their baseline knowledge about first aid for injuries and common illnesses.

The questionnaire was divided into two parts, Part A and B. Part A which contained 114 questions (total marks-610) was further divided into three subparts. Thirty-eight questions (marks-114) were related to do's for management of illnesses, 38 (marks-114) were related to don'ts for management of illnesses, while 38 (marks-380) were related to general measures to taken for illness/injury. Part B consisted of 14 questions of 10 marks each (total marks-140) about stepwise methods for treatment of common illnesses. Thus the overall knowledge score was 750. Total time allotted for completing the questionnaire was three hours. The PI, health supervisor and a health worker supervised the session. The completed questionnaires were collected on the spot.

On the next day, all study group students (Group A and B) were called one by one to a hall for on-the-spot demonstration for first aid skills**.** They were asked to pick up a slip from a box, which contained identical slips having names of various common illnesses. The students were asked to demonstrate the correct method for treatment for the illness listed on the selected slip within five minutes. All requisite materials for this purpose were provided to the students including water, utensils, bandage, salt, sugar, ORS packets. The demonstration was done individually by the students one by one on five tables placed at suitable locations in the hall. Five paramedical workers who had been trained to give stepwise marking for each procedure before hand were stationed at the demonstration sites in the hall for evaluation of the students using a checklist key for the correct procedures. They assessed each student for skills, marking using an established scoring sheet.

Training Session

A self-instructional training manual on first aid was administered to all the study students (Group A and B). An on - the - spot demonstration training session (one day after administering the pretest questionnaire) was arranged by the PI for Group B students only. Appropriate audiovisual aids were used for training of Group B students. The queries of

students of Group B, if any, were also answered. No such training session was used in Group A.

Posttest

Post intervention evaluation of the level of knowledge and practices of students of both the groups was done 15 days after the intervention. Same questionnaire was administered to all the study subjects (Group A and B).

Data Analysis

The net change between two groups (in either knowledge, skills or knowledge and skills) were expressed as

Net change =%change in Group (B) Minus %change in Group (A)

$$\frac{\text{Post Int. Group B- Pre Int. Group B}}{\text{Pre Int. Group B}} \text{ Minus } \frac{\text{Post Int. Group A- Pre Int. Group A}}{\text{Pre Int. Group A}}$$

Students from both groups were arbitrarily categorized as 'Good', 'Average' and 'Poor' based on average marks scored. The students who obtained more than 70% marks were categorized as 'Good', while those obtaining between 30% and 69% were categorized as 'Average' and those obtaining less than or equal to 30% marks were categorized as 'Poor'. The general guidelines of **'**Intention to Treat**'** were used for analysis**.** This means that once randomization has taken place, the data from all participants were included and counted in the group to which they are assigned. Percentages, range, and net change between interventions were used for analysis. MS-Excel and EPI INFO-6 package was used for analysis.

Results

A total of 120 students (60 each in Group A and B) of Senior Secondary School, Manimajra, Chandigarh participated in the study. In Group A, 60 students appeared for pretest and 55 in posttest. In Group B, 57 students participated in pretest and 58 in posttest. The reasons for dropouts in pretest were illness (1), unawareness of test (1), fear of poor performance (1) and in posttest were illness (2), forgetfulness (2), fear of poor performance (1), shift to another school (1), and unwillingness to participate due to unknown reasons (1). However, the reason for drop-in of one student of Group B in post test was illness during pretest.

Table1 shows that there was no statistical difference in the mean age, sex, residence, family size, and religion of the students of both groups. The difference between literacy level and occupation of parents of both the groups was also not statistically different.

The pre-intervention mean group score of Group A students for combined knowledge and skills regarding various illnesses and injuries was 241.2 (32.1%) with the range of 180.5 (24%) and 338 (45%), while post-intervention, it increased to 311 (41.5%) with the range of 187 (24.9%) and 528 (70.4%). The pre-intervention mean group score of Group B students for combined knowledge and skills regarding various illnesses and injuries was 213.1 (28%) with the range of 162.5 (21.6%) and 279.5 (37.2%), while post-intervention, it increased to 361.8 (48.2%) with the range of 205 (27.3%) to 588 (78.4%).

Table 2 shows the comparison of mean group scores (%) for knowledge regarding various illnesses and injuries between these two groups. It was observed that there was statistically significant difference in the overall knowledge after intervention. It was observed only knowledge of two illnesses, Upper Respiratory Tract infections (47%) and Diarrhea (40.3%) were satisfactory (>40%) at baseline (pre-intervention) among students in both groups. Knowledge regarding management of itching, CO gas poisoning, respiratory tract obstruction, epilepsy, unconsciousness, acne, Epistaxis, food-poisoning, and constipation were poor (<30%). At post-intervention, there were more than 15 percent increase in knowledge levels of upper respiratory tract infections, headache, dental pain, diarrhea, ear-discharge, fever, boils and CO gas poisoning. In comparison, level of knowledge increased by a meager 4.4% for itching and 3.7% for electric shock. It was also observed that gains in scores were comparatively more for students in Group B as compared to Group A in almost all types of injuries and illness.

It was also observed that there was a substantial increase in students in the 'Average' category and the 'Poor' category in knowledge and skills after both interventional packages. However, the effects were more marked in Group B students (self-instructional training manual plus on - the - spot demonstration training) than in Group A (self-instructional training manual only). (See Table-3)

The increase in level of knowledge from pretest to posttest was greater for Group B than for Group A (by 33%). Also, there was statistically significant increase ($p<0.05$) in level of skills from pretest to posttest for Group B than for Group A (by 135%). Overall knowledge and skills increased to 43% in Group B.

Discussion

Knowledge about various illnesses, communicable and non-communicable disease and their management is not satisfactory among students of rural areas in India. This knowledge is fragmented, disintegrated and non- sequential.[4] There are various incorrect practices and myths associated with illnesses and injuries. Moreover, there is low utilization of formal medical services by injured persons in developing nations.[5]

Provision of knowledge about correct management of injuries and illnesses to students is a sound and logical investment. First, it will improve their health knowledge which in turn may lead to healthy life. Second, they may be used as a change agent in the family and community. Providing immediate first aid to someone requires knowledge on what should or should not be done in each situation.

Child to parent approach has the potential to bring visible improvement in health and education among the community[7] and it helps in enhancing community participation. Martella et.al[8] in their study also revealed that peer-teaching programme resulted in acquisition of first aid skills. The concept of teaching basic disease management skills to the students is not new. In Andhra Pradesh (India), students (8-14year olds) were trained under *Chinnari doctors* or little doctors' scheme, to handle small health emergencies in their villages.[9] They were given first aid kits and trained to handle emergencies like burns, accidents and fevers and to even prescribe basic medicines. In New Zealand, resuscitation skills such as cardiopulmonary resuscitation (CPR) are taught as an optional component of the New Zealand school curriculum.[10]

In this study, there was a good level of knowledge among the students regarding correct management of diarrhea and upper respiratory tract infections. This may be due to the fact that these are routinely occurring diseases in childhood. Nath et al[11] in a study in Bangladesh also reported that three fourth of students had correct knowledge of management of diarrhea. However, findings from this study showed that there was poor knowledge of students regarding relatively uncommon illnesses in childhood like tuberculosis, epistaxis, and backache. A study by Kyawt-Kyawt-Swe et al[12] in Myanmar depicts poor knowledge of malaria among rural school students. In addition to ignorance regarding these uncommonly occurring diseases, cultural and traditional beliefs were cited as other common reasons for major misconceptions about their treatment. However, a study conducted by Elzubier et al[13] among 5 higher secondary school students of Saudi Arabia suggested good knowledge about malaria and its treatment (77.7%), possibly due to the fact that malaria is a frequently occurring disease among childhood in that part of world.

There was poor knowledge among students in this study for other illnesses like itching, acne, constipation, dandruff and mild fever. Similar results have been shown in a study conducted by Nath et al,[11] where only around half of the children of Bangladesh aged 11-12 years knew first aid management of high fever. This may be due to the reason that although the above mentioned diseases are encountered routinely in day-to-day lives, these are not considered serious enough for consulting a physician.

The knowledge of students regarding management of emergencies like carbon monoxide poisoning, respiratory tract obstruction, unconsciousness, epileptic fit, burns and food poisoning were very poor in this study. Various studies conducted in different parts of world have also reported similar findings. A study by Zielinska et al[14] in 181 students of two secondary schools of Poland also shows that only 2% of the students knew how to provide first aid during an epileptic fit. Ghosh et al.[15] in a group of school children of Jamshedpur, India also quoted poor knowledge regarding management of burns. A possible explanation being that students considered management of emergencies as the sole responsibility of the physicians and thus do not want to take a risk in playing with life of someone. In this study, only one third of the students knew about correct management of injuries such as road side accidents, dog-bite and snake-bites. Other studies have also reported that various items like kerosene oil, mobile oil, mustard oil, urine, honey, plant bark extract, mud, alum and vinegar, talcum powder were used for injury management. However, in other studies, students have correctly told application of burnol, dettol, spirit on the wound.[17] Many incorrect practices were still prevalent among respondents such as spice/ chilly application for dog bite. Similar findings have been demonstrated in this study which

showed that only about one-third students knew about correct management of dog-bite.

There was a significant rise in post intervention scores for the diseases that students had prior good knowledge before training. These diseases included upper respiratory tract infections, diarrhea, and fever. However, students ranked poorly in post-intervention scores for emergencies like carbon monoxide gas poisoning, respiratory tract obstruction, poisoning, burns and electric shock as well as for minor illnesses like itching and common injuries. Results of this study were in concurrence with the study conducted by Ghosh et al[15] in a group of school children of Jamshedpur where the researchers reported poor post-training knowledge acquired by students regarding management of burns. The students were more likely to know more about those illnesses about which they already knew and which are routinely encountered in their lives. However, the results are contradictory with the study by Mandiracioglu et al[18] among primary school children in Turkey which suggested a significant rise in post-test scores after training in level of knowledge and attitudes of rural children in management of poisoning. In another study by Miro et al[19,] high school students in Spain improved the mean knowledge scores from 42% to 63% for CPR after a basic cardiopulmonary resuscitation program entitled PROCES (Programa de Reanimacio Cardiopulmonar Orientat a Centres d'Ensenyament Secundari).

Conclusion

Knowledge and skills of the students regarding first aid of common illness and injuries increased significantly by distributing first aid manual and on the spot demonstration rather than just distributing first-aid manual only. Students lacked knowledge in subject areas like management of uncommonly encountered illnesses in childhood (viz. T.B, Malaria, Backache), emergency conditions (viz. CO gas poisoning, respiratory tract obstruction, epilepsy, unconsciousness, burns, food poisoning) and some not so serious routine day-to-day conditions (itching, acne, Epistaxis, food-poisoning, and constipation). However, the students fared well for routinely encountered illnesses in childhood including upper respiratory tract infections and diarrhea. There was a significant increase in post intervention scores of the diseases that students had prior good knowledge before training such as upper respiratory tract infections, diarrhea, and fever. However, they ranked poorly in post intervention scores for emergencies and common injuries/ illnesses which were generally considered unimportant for seeking treatment. Although, there was a definite change in post intervention scores for students from 'poor' to 'average' in both groups of students, they can be improved further. The management of emergencies and common injuries/ illnesses is important to both students and their family. Therefore, there is a definite need for strengthening the knowledge of these subject areas among students by regular quality training programmes on first-aid in schools. These programs should be incorporated in their curriculum. Teachers should also be trained so that they may further train their students. Medical Colleges may also be involved in facilitating these trainings.

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Table 1. Demographic Profile of Study Participants

Profile	**Group B (n=57)**		**Group A (n=60)**	
Age (years)	**No.**	**%**	**No**	**%**
12-13	13	22.8	11	18.3
14-15	36	63.1	42	70
16-17	8	14.1	7	11.7
χ^2 =0.61, df=2, p=0.5				
Sex				
Male	34	59.6	37	61.7
Female	23	40.4	23	38.3
χ^2 =0.043, df=1,p=0.9				
Residence				
Urban	52	91.2	54	90
Rural	5	8.8	6	10
χ^2 = 0.037, df=1,p=0.9				
Family size				
<5	15	26.3	14	25
>=5	42	73.7	46	75
χ^2 = 0.047, df=1,p=0.9				
Religion				

Hindu	39	68.4	45	75
Muslim	4	7	4	6.7
Sikh	12	21.1	10	16.7
Others	2	3.5	1	1.7
χ^2 = 0.04, df=1,p=0.9				

Table 2. Mean Group Score (%) of Knowledge on First Aid and Common Childhood Injuries and Illnesses Before and After the Training

Illness and Injuries	Group-B Score			Group A Score		
	Before training	After training	Gain in Score	Before training	After training	Gain in Score
Pain						
Headache	32.1	58.8	26.7	39.4	47.7	8.3
Earache	30.5	43.5	13.0	33.4	38.4	5.0
Dental	33.4	57.1	23.7	37.3	50.7	13.4
Backache	33.7	52.7	19.0	40.7	50.8	10.1
Abdomen	27.2	45.0	17.8	33.9	40.6	6.7
Injuries and Bites						
Sting-bite	31.6	53.2	21.5	38.5	46.9	8.4
Snake-bite	30.9	47.3	16.4	31.1	41.3	10.2
Dog-bite	36.7	57.2	20.5	38.1	50.5	12.5
Injury	32.6	43.1	10.5	36.1	43.7	7.5
Sprain	27.6	42.1	14.4	34.1	37.6	3.5
Fracture	33.9	47.7	13.8	35.6	46.1	10.5
Poisonings						
General	31.9	44.5	12.7	32.1	37.8	5.7
Carbon Monoxide	28.5	47.9	19.4	30.4	41.3	11.0
Food	26.2	36.6	10.4	27.7	31.0	3.3
Infections						
Fever	35.2	60.4	25.2	39.1	54.8	15.8
Upper Respiratory	43.3	66.5	23.2	51.3	60.6	9.3
Ear-discharge	31.7	54.8	23.1	33.5	43.3	9.8
Redness in Eye	37.7	54.6	16.9	36.8	45.4	8.5
Diarrhea	38.8	62.7	23.8	41.8	53.7	12.0
Vomiting	29.8	45.7	15.9	32.0	43.1	11.1
Fungal	30.3	39.1	8.8	31.5	40.2	8.7
Boils	31.6	50.8	19.2	38.5	49.8	11.3
Acne	30.2	39.4	9.2	29.4	39.3	9.9
Dandruff	34.9	50.8	15.9	36.6	45.9	9.3
Tuberculosis	38.0	57.7	19.6	39.6	49.7	10.1
Malaria	34.9	53.8	18.9	40.2	45.6	5.4
Jaundice	28.2	46.1	17.9	32.5	41.8	9.3
Immediate Life threatening						
Eye/Ear Obstruction	30.8	43.0	12.2	30.9	35.5	4.6
Respiratory Obstruction	27.6	39.5	12.0	28.7	33.7	5.0
Unconsciousness	26.7	43.5	16.8	29.8	38.4	8.6
Bleeding	34.1	46.9	12.8	34.3	38.7	4.3
Electric Shock	30.1	37.8	7.7	32.1	31.8	-0.3

Epilepsy	26.9	44.9	18.0	28.4	35.4	7.0
Burns	29.8	43.9	14.1	31.8	38.7	6.9
Heatstroke	30.9	40.0	9.1	29.9	36.6	6.7
Others						
Epistaxis	27.8	48.6	20.8	29.6	37.5	7.9
Constipation	27.4	36.3	8.9	28.8	30.6	1.7

Table 3. Grading of Knowledge and Skills Before and After Intervention Packages by Groups

Grading of Students	**Group B**		**Group A**	
	Pre-intervention (n=57)	**Post-intervention (n=58)**	**Pre-intervention (n=60)**	**Post-intervention (n=55)**
Knowledge				
Good (>=70%)	0	1	0	0
Average (>30-69%)	6	56	17	51
Poor (<=30%)	51	1	43	4
x^2= 117.8, DF=2, p<0.001			**x^2= 116.5, DF=2, p<0.001**	
Skills				
Good (>=70%)	0	9	5	4
Average (>30-69%)	9	38	20	33
Poor (<=30%)	48	11	32	18
x^2= 117.1, DF=2, p<0.001			**x^2= 114.2, DF=2, p<0.001**	
Overall Knowledge/Skills				
Good (>=70%)	0	1	0	1
Average (>30-69%)	19	56	33	47
Poor (<=30%)	38	1	24	7
x^2= 114.7, DF=2, p<0.001			**x^2= 114.2, DF=2, p<0.001**	