



## Knowledge of Rural Secondary School Students on First Aid Following Educational Intervention

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### Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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### ABSTRACT

**Introduction:** School life is an important part of children's lives, which has a direct impact on their physical and mental health. Knowledge of health promotion and prevention activities encourages initiating first aid activities in society.

**Objective:** To assess the level of knowledge of rural secondary school students following educational intervention on first aid.

**Methodology:** A quasi-experimental study was carried out among 320 secondary school students. Educational intervention on first aid was applied to compare the level of knowledge before and after the intervention. Data were collected by a self-administered structured questionnaire through randomly selected students.

**Results:** Findings showed that most of the respondents (84.2%) were between 12-15 years old

and their mean age was 14.3 years. It was also found that the majority 159 (58.5%) of the respondents were male and the rest of them 113 (41.5%) were female. Regarding family type distribution, the majority 192 (70.6%) of the respondents lived in a nuclear family and 80 (29.4%) belong to joint family. In addition, 43 (15.8%) students' fathers were farmers, 74 (27.2%) were businessmen and 43 (15.8%) were day laborers. Regarding textbook knowledge on first aid 270 (99.3%) respondents knew the meaning of first aid, 232 (85.3%) students gave their opinion about cleaning the skin with Dettol or savlon in case of injury and 228 (83.8%) students answered that bleeding should be reduced by applying pressure with a clean cloth. The study found that 22 (8.1%) respondents had a good knowledge of first aid interventions before the intervention while after the intervention, a good level of knowledge was found amongst 189 (69.5%) students. The study revealed that the use of ice during injury management was not significantly ( $\chi^2 = 0.529$ ,  $p > 0.05$ ) associated with the level of first aid knowledge statistically before the intervention while after first aid intervention, there was a significant association ( $\chi^2 = 7.235$ ,  $p < 0.05$ ).

**Conclusion:** Educational intervention on first aid improves the level of knowledge among secondary school students. Necessary measures should be taken to encourage health promotion and prevention activities during practical life.

*Keywords: Knowledge; rural secondary school students; first aid; educational intervention.*

## 1. INTRODUCTION

First aid is the providing of first and early care for an illness or injury, by a non-expert but the trained person, till medical treatment can be accessed. Immediate first aid when provided to patients who require emergency care makes a huge difference to the outcome [1]. School children with age bracket of 7 to 16 years are vulnerable to injuries and medical emergencies due to the higher level of involvement in sports and extracurricular activities. According to the Centre for Disease Control Prevention, sports and recreation-related injuries are reported for more than 2.6 million schoolchildren worldwide annually [2].

Over half of children in the UK would not know how to carry out life-saving first aid at the scene of an accident. The survey conducted by the British Red Cross and Toyota by the children's forum found that over half (60%) of children who are currently most at risk from road traffic accidents are those aged 14-18 years, did not have enough first aid knowledge to help themselves and others at the scene of a traffic accident. More than 1,100 children answered a series of questions about first aid and road safety. Over half (53%) of these children had never learned first aid. Research shows that many of these children's lives could have been saved if first aid was given at the scene before the arrival of the emergency services [3].

During the past quarter, a significant increase in adolescence forced the world to look into the

matter. The major part of the children had an accident on the way to school and back home. So the explanation of the dangers of the road will be extremely effective in the prevention of road accidents. In India, over 80,000 persons die in traffic crashes annually, over 1.2 million are injured seriously and about 3,00,000 are disabled permanently [4]. During this entire period (4years) out of 67,59,599 admissions, accidental poisoning accounted for a total of 650 cases (0.96%), out of which 130 cases (0.75%) were in 1997, 90 (0.58%) in 1998, 180 (1.2%) in 1999 and 250 (1.25%) in 2000 [5].

The timely administration of first aid in response to injuries and medical emergencies will help to reduce complications, the cost of treatment, and mortality among children. As schools do not usually have trained health care providers on-site, it is essential for teachers to be trained in first aid procedures. They also need to be updated periodically in their knowledge and skills to keep up with current first aid guidelines [6]. There is a rising trend in the number of motor vehicle accidents and the number of fatalities due to motor vehicle accidents in Pakistan. In a 40 years period from 1956 to 1996, there was a 14 fold increase in the number of motor vehicle accidents and a 16 fold increase in the number of deaths due to motor vehicle accidents [7]. Schoolchildren are at a particularly higher risk to sustain accidents and injuries at school. A study revealed that in a cohort of schoolchildren, the majority of injuries (88%) were directly related to physical activity. Moreover, almost 20% of all physical activity-related injuries occurred during school hours [8].

A school environment is a place where children and adolescents spend about a third of their day and, in it, students are often affected by clinical and traumatic injuries. In Brazilian capitals, 45.7% of the victims of falls that are treated in emergency services belong to the age group of 0-19 years and there is a statistical association between such incidents in adolescents and their occurrence in the school environment [9]. In approximately 25% of emergency care provided to adolescent victims of external causes, the school environment was the place of the injury [10]. Given these findings, studies have raised the importance of the school in preventing and treating accidents involving children and adolescents [11].

In today's world, there is no guarantee of life or security of life. So many accidents occur in many places like in schools, during traveling, when doing our daily activities. People's motive is just to get away from the place when the accident occurs. They do not come forward to help or to have some first aid care because they are not aware of giving first aid for injuries. We could see the same situations in the school also. A lot of care must be taken while the students are in the school's playground or in public places. So they must have awareness on first aid and that has to be given for the school teachers. Because, first aid training not only provides knowledge and skills to safe life but also helps to develop safety awareness and habits that promote safety at home, at work, during recreation, and on the streets and highways of both rural and urban areas.

## 2. METHODOLOGY

A Quasi-experimental study (Before & After study) was carried out among secondary school students (Class VIII, IX & X) in Bogura which was a rural area of Bangladesh, from April to August 2018. The purposive sampling method was applied to collect data from the students. There were 320 students in class 8, 9, and 10. Before intervention 280 students were randomly selected but unfortunately, 8 students were absent post-intervention. Finally, 272 students were selected for this study. The participants were selected based on inclusion criteria such as Secondary School students (class VIII, IX, and X) and mentally impaired students were excluded. Data were collected through a pre-tested modified Self-administered questionnaire and the Likert Scale was used to assess the level of knowledge on first aid.

## 2.1 Method of Intervention

- **Before intervention:** Self-introduction about the investigator and information regarding the nature of the study was explained. Informed consent was taken from each student and provide the self-administered questionnaire to the students.
- **Intervention:** The intervention was given by lecture 45 minutes through PowerPoint presentation. The intervention module was handed over to the participants individually with the aim to reinforce their knowledge in the future.
- **After intervention:** Evaluation of the educational intervention program was assessed after 14 days by the conduct of post-test self-administered questionnaire.

## 2.2 Scoring System

For the knowledge reported action items, and the responses were scored 1 or 0 (1 for correct and 0 for wrong). There were 32 questions for the knowledge assessment section. According to the scoring system minimum score is 0 and the maximum score is 32. Finally, the score was leveled as good, average, and poor.

## 2.3 Data Analysis

Statistical analysis of the results was obtained by using Statistical Packages for Social Sciences (SPSS-23). The results were presented in tables and figures. Data on qualitative characteristics were expressed as percent values, means, or absolute numbers as indicated. Comparisons among groups were made using a one-way analysis of variance (ANOVA) test. For all tests, a value of  $P \leq 0.05$  was considered statistically significant.

## 3. RESULTS

Out of the 227 students, the mean age of the students was  $14.3 \pm 1.24$  years. The majority of the students i.e. 159 (58.5%) were male and 113 (41.5%) students were female. Students of class 8 (58.5%), class 9 (30.9%) and class 10 (26.1%) were the participants. It was found that most of the students were Muslim i.e. 255 (93.8%) and only 17 (6.3%) students were Hindu. According to the distribution of family type, the majority of the students i.e. 192 (70.6%) were from a nuclear

type of family and 80 (29.4%) belonged to the joint type of family. Regarding housing conditions, the majority of the students i.e. 191 (70.2%) lived in kaccha houses that 26 (9.6%) students lived in pakka houses. Majority of the family i.e. 192 (70.6%) had 2-5 members & 80 (29.4%) participants had 6-9 members. The monthly income of the students' families revealed that the mean monthly income of the family was 10084.56 Tk. while minimum income was 3000 Tk. and the maximum was 26000 Tk. It was observed that 118 (43.4%) students' father was farmer, father of 10 (3.7%) students were unemployed. Regarding mother's occupation, mother of 241 (88.6%) students were housewives & 15 (5.5%) were day laborers (Table-1).

Overall, preintervention knowledge on first-aid management was poor but after the intervention, it was raised (Table 2). The level of first aid knowledge and ice application in injury was not significant before intervention ( $\chi^2 = 0.529$ ,  $p > 0.05$ ) but after first aid intervention, significant association ( $\chi^2 = 7.235$ ,  $p < 0.05$ ) was found between them. Students' answer of cleaning with detol or savlon was not significant ( $\chi^2 = 0.175$ ,  $p > 0.05$ ) before intervention. But after the intervention, there was a significant association between level of knowledge and cleaning with detol or savlon ( $\chi^2 = 17.492$ ,  $p < 0.01$ ) (Table 3).

#### 4. DISCUSSION

It is a Quasi-experimental study (before & after interventional study). The study was designed with a view to seeing the difference between knowledge on first aid before & after intervention among high school students. The study found that most of the students i.e. 229 (84.2%) were between 12-15 years and only 43 (15.8%) were between 16-18 years old. It was also found that the mean age was 14.3 years among the school children. Mobarak et al. [12] studied a similar study which was carried out among 360 male secondary school children in Taif, Saudi Arabia. The mean students' age was  $17.4 \pm 1.21$  years. Regarding sex distribution, the majority of the students i.e. 159 (58.5%) were male and 113 (41.5%) found female in this study. Baru et al. [13] found 56.7% of the students were female, 43.3% were male. In this study, it was found that the majority of the students who participated were from class 8 and which was about 117 (43.0%). It was found that most of the students i.e. 255 (93.8%) were Muslim and only 17 (6.3%)

were Hindu. According to the distribution of family type, the majority of the students i.e. 192 (70.6%) were from a nuclear type of family and 80 (29.4%) belonged to the joint type of family. Regarding housing conditions, the majority of the students i.e. 191 (70.2%) lived in kaccha houses that 26 (9.6%) students lived in pakka houses. Majority of the family i.e. 192 (70.6%) had 2-5 members & 80 (29.4%) participants had 6-9 members. The monthly income of the students' families revealed that the mean monthly income of the family was 10084.56 Tk. while minimum income was 3000 Tk. and the maximum was 26000 Tk. It was observed that 118 (43.4%) students' father was farmer, father of 10 (3.7%) students were unemployed. Regarding mother's occupation, mother of 241 (88.6%) students were housewives & 15 (5.5%) were day laborers.

Most of the students 270 (99.3%) believe first aid means immediate action and only 2 (0.7%) have no knowledge about first aid. According to the findings of first aid management of drowning, 245 (90.1%) respondents answered to rescue the victim first and 27 (9.9%) do not respond. The study also found that 216 (79.4%) students answered that throat and mouth should be cleaned while 215 (79.4%) respondents knew about the removal of wet cloths.

During conducting the study I found that 243 (89.3%) respondents knew that burned parts should be drowned in cold water but after the intervention, it was raised to 264 (97.1%). It was also found that 206 (75.7%) respondents had given their opinion that burned places should be covered with cotton but after intervention 164 (60.3%) chose sterile gauze or bandage to cover the burned area. It also revealed that 171 (62.8%) respondents told that jewelry or tight clothes should be removed before the intervention but after intervention 223 (81.9%) students learned that it should be removed. 252 (92.6%) students said that eggs or toothpaste should be applied to the burned area and 131 (48.2%) learned no need to apply eggs or toothpaste following intervention [14]. During the study, I found that 239 (87.9%) respondents thought after accident patients should be kept in a safe place and after the intervention, the number was 266 (97.8%). It was also found 146 (53.7%) students said that clothes should be put on tightly after the accident but after intervention 251 (92.3%) denied it. In case of bleeding, 228 (83.8%) students were told that bleeding should be stopped by giving pressure which was increased to 268 (98.5%) after the intervention. It

was also revealed that before the intervention, 147 (54.1%) respondents agreed not to give food or water to the mouth during unconsciousness and after the intervention, it was raised to 240 (88.3%). During an emergency situation, 38 (13.9%) respondents knew to call 999 but after intervention 247 (90.8%) learned to call 999 for help.

During respiratory distress, lie down unnecessary was stated by 225 (82.7%) respondents but after intervention 191 (70.2%) said no need to lie down. The study found that 103 (37.8%) respondents agreed that children should be sent to the hospital when bluish discoloration of their lips occurs but after the intervention, it was changed to 206 (75.7%). It was also found that 92 (33.8%) students knew about the use of nebulizers in respiratory discomfort but after intervention 220 (80.9%) learned about the necessity of nebulization in respiratory distress [15].

Before the intervention, 212 (77.9%) respondents said that the site of a dog bite should be cleaned with soap water and after the intervention, it was raised to 266 (97.8%). Similarly, it was also

found that the wound should be rubbed during cleaning was stated by 198 (72.8%) but after intervention 207 (76.1%) respondents learned that area of the bite should not be rubbed. It was also observed that previously 239 (87.8%) respondents thought that ice should be put on the wound but after intervention 183 (67.3%) learned that ice should not be applied over the area of a dog bite as it may cause frostbite. Similarly 95 (34.9%) students knew about the application of an antibiotic cream at the site of the wound and after the intervention, the number was raised to 242 (88.8%). The study also found the 171 (62.8%) respondents knowledge on the observation of the dog constantly for any abnormality but after intervention 242 (88.9%) respondents were awarded watching any abnormality of the dog. In addition, 252 (92.6%) respondents thought that tourniquet should be applied on the biting site but after intervention 202 (74.3%) respondents gave their opinion against the use of a tourniquet. The study revealed that if more people are affected by this dog then it is necessary to report to the nearest hospital was stated by 119 (43.7%) respondents but it raised to 256 (64.1%) after intervention [16].

**Table 1. Distribution of student's according to socio-demographic characteristics**

Variables	Characteristics	Frequency	Percentage (%)
Age	12-15 years	229	84.2
	16-18 years	43	15.8
Sex	Male	159	58.5
	Female	113	41.5
Educational level	Class 8	117	43.0
	Class 9	84	30.9
	Class 10	71	26.1
Religious	Muslim	255	93.8
	Hindu	17	6.3
Type of family	Nuclear Type	192	70.6
	Joint Type	80	29.4
Housing condition	Kaccha House	191	70.2
	Semi-Kaccha	55	20.2
	Pakka	26	9.6
Family Member	2-5	192	70.6
	6-9	80	29.4
Monthly family income	3000-10000	153	56.3
	10001-20000	97	35.7
	> 20000	22	8.1
Fathers occupation	Farmer	118	43.4
	Businessman	74	27.2
	Day Laborer	43	15.8
	Unemployed	10	3.7
Mothers occupation	Service Holder	16	5.9
	Housewife	241	88.6
	Day Labor	15	5.5

Table 2. Distribution of the students regarding knowledge of first aid management

First aid management traits	Before Intervention		After intervention	
	Yes f (%)	No f (%)	Yes f (%)	No f (%)
<b>Burn management</b>				
Burned part will be drowned in cold water	243 (89.3)	29 (10.7)	264 (97.1)	8 (2.9)
Burned area should be covered with cotton	206 (75.7)	66 (24.3)	108 (39.70)	164 (60.3)
Jewelry or tight clothes should be removed	171 (62.8)	101 (37.2)	223 (81.9)	49 (18.1)
Eggs or toothpaste can be applied in burned area	252 (92.6)	20 (7.4)	141 (51.8)	131 (48.2)
<b>Immediate management of road traffic accident</b>				
Remove the victim from area of accident & keep in safe place	239 (87.9)	33 (12.1)	266 (97.8)	6 (2.2)
Put the clothes tightly	146 (53.7)	126 (46.3)	21 (7.7)	251 (92.3)
Stop bleeding by pressing with cloths in hand	228 (83.8)	44 (16.2)	268 (98.5)	4 (1.5)
In case of unconsciousness, give food or water in mouth	125 (45.9)	147 (54.1)	32 (11.7)	240 (88.3)
If victim is seriously injured then call 999	38 (13.9)	234 (86.1)	247 (90.8)	25 (9.2)
<b>Primary treatment for sudden respiratory distress</b>				
Walking, running, eating should be stopped	212 (77.9)	60 (22.1)	256 (94.1)	16 (5.9)
It is better to lie down than sitting position	225 (82.7)	47 (17.3)	81 (29.8)	191 (70.2)
Immediately send children to hospital if their lips turn into blue	103 (37.8)	169 (62.2)	206 (75.7)	66 (24.3)
Inhaler can not be used in respiratory distress	174 (63.9)	98 (36.1)	16 (5.9)	256 (94.1)
Nebulization if possible	92 (33.8)	180 (66.2)	220 (80.9)	52 (19.1)
<b>Primary management of dog/cat bite</b>				
Clean the site of dog bites with soap water	212 (77.9)	60 (22.1)	266 (97.8)	6 (2.2)
Rub the wound while cleaning	198(72.8)	74 (27.2)	65 (23.9)	207(76.1)
Give pressure to stop bleeding from the wound	179(65.8)	93 (34.2)	255 (93.7)	17 (6.3)
Ice should be put on the wound	239 (87.8)	33 (12.2)	89 (32.7)	183(67.3)
Apply an antibiotic cream or an ointment to the wound	95 (34.9)	177(65.1)	242 (88.8)	30(11.2)
<b>Primary management of unconscious patients</b>				
Feel with the hand, whether breathing is continuing or the movement of the chest is happening	176(64.7)	96(35.3)	236(86.8)	36(13.2)
To increase blood circulation, head should be raised	223(81.9)	49 (18.1)	109 (40.0)	163 (60.0)

During unconscious, no food can be given to mouth, if possible clean airway for any secretion	184 (67.6)	88 (32.4)	250 (91.9)	22 (8.1)
For better respiration, keep the victim's head tilt and jaw thrust position	97 (35.6)	175 (64.4)	73 (26.8)	199 (73.2)
Quickly send to hospital if do not get conscious	202 (74.2)	70 (25.8)	236 (86.7)	36 (13.3)

**Table 3. Association between level of knowledge and application of ice after cut injury& skin disinfection**

Ice on injury	Level of Knowledge (before)				Statistics ( $\chi^2$ )	Level of Knowledge (after)				Statistics ( $\chi^2$ )
	Good f (%)	Average f (%)	Poor f (%)	Total f (%)		Good f (%)	Average f (%)	Poor f (%)	Total f (%)	
Yes	20 (8.5)	89 (37.7)	127 (53.8)	236 (100)	$\chi^2=0.529$ df=2 p=0.768	161 (68.2)	61 (25.8)	14 (5.9)	236 (100)	$\chi^2=7.235$ df=2 p=0.027
No	2 (5.7)	15 (42.9)	19 (51.4)	36 (100)		28 (77.1)	3 (8.6)	5 (14.3)	36 (100)	
Total	22 (8.1)	104 (38.2)	146 (53.7)	272 (100)		189 (69.5)	64 (23.5)	19 (7.0)	272(100)	
<b>Skin disinfection (Detol or Savlon)</b>										
Yes	18(7.8)	94(40.5)	120(51.7)	232(100)	$\chi^2=3.481$ df=2 p=0.175	165(71.1)	57(24.6)	10(4.3)	232(100)	$\chi^2=17.492$ df=2 p=0.000
No	4(10.0)	10(25.0)	26(65.0)	40(100)		24(60.0)	7(17.5)	9(22.5)	40(100)	
Total	22(8.1)	104(38.2)	146(53.7)	272(100)		189(69.5)	64(23.5)	19(7.0)	272(100)	

In case of sudden unconsciousness 176 (64.7%), students said that to feel breathing by hand or by watching the movements of the chest is important but after intervention raised to 236 (86.8%). The similarity was also observed that the knowledge of the respondents about raising head during unconscious to increase blood circulation was 223 (81.9%) but after the intervention, it was decreased to 109 (40.0%). Subsequently, it was found that 184 (67.6%) respondent was in favor of giving nothing by mouth and after the intervention, it was raised to 250 (91.9%).

Regarding heat stroke management, 179 (65.8%) respondents knew that the patient should be moved to a safe and cool place quickly but after the intervention, it was raised to 236 (86.7%). Similarly, 88 (32.4%) respondents said not to cover the body of a heat stroke victim tightly with cloths but after intervention 193 (70.9%) students learned the necessity of not covering with cloths. Ice can be given to the armpit or shoulder was known to 149 (54.7%) respondents but after the intervention, the number was increased to 175 (64.3%). 136 (50.0%) students gave their opinion about not giving saline to the mouth during consciousness but after intervention 191 (70.3%) respondents learned that saline should be given to the mouth when conscious. It was also found that 182 (66.9%) students knew that arrangement should be taken to send to the hospital quickly and after intervention total of 261 (95.9%), students learned about it [17].

Regarding the distribution of the respondents by their level of knowledge on first aid intervention, only 22 (8.10%) had a good level of knowledge but after intervention there seen improvement, and the number was raised to 189 (69.5%). Similarly, 146 (53.7%) had poor level and 104 (38.2%) had an average level of knowledge and after the intervention, the number of both of which was reduced to 19 (7.0%) & 64 (23.5%) respectively.

The level of first aid knowledge and ice application in injury was not significant before intervention ( $\chi^2 = 0.529$ ,  $p > 0.05$ ) but after first aid intervention, significant association ( $\chi^2 = 7.235$ ,  $p < 0.05$ ) was found between them. Students' answer of cleaning with detol or savlon was not significant ( $\chi^2 = 0.175$ ,  $p > 0.05$ ) before intervention. But after the intervention, there was a significant association between level of

knowledge and cleaning with detol or savlon ( $\chi^2 = 17.492$ ,  $p < 0.01$ ).

## 5. CONCLUSION

Knowledge of first aid is important for all ages of life. Each and everyone faces some problems where first aid knowledge can save the life from any kind of danger. The study found that most of the students were a teenage group and the majority of the students were male. The majority of the students lived in a nuclear family and their father was working as a farmer. Regarding textbook knowledge on first aid, almost all students knew the meaning of first aid, and maximum students knew that skin should be cleaned with detol or savlon in cut injury. It was also found that the majority of the students know how to reduce bleeding. The study found that the majority of the students had a poor level of knowledge regarding first aid before the intervention but their knowledge significantly improved after the intervention. There was no significant relationship between age and level of knowledge of first aid before the intervention but after intervention their association was significant. Skin cleaning with detol or savlon during cut injury management was not significantly associated before the intervention but after the intervention, it revealed significant association. Necessary measures should be taken to participate voluntarily in society.

## DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

## CONSENT

The verbal and written informed consent was taken from the students' parents and the Headmaster of the secondary school. Neither participant's names nor any identifying information was revealed in the reports of the study. And all of your information will be used for this research purpose only.



## ETHICAL APPROVAL

Ethical clearance was taken from the IRB of NIPSOM.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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