

Effects of Emergency Injury Care (EIC) training for the community volunteers in the rural community of Bangladesh

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Abstract

Background: Injury is the leading causes of morbidity and mortality including disability worldwide. Emergency Injury Care (EIC) is provided to stabilize casualties with life-threatening injury in an emergency situation by an EIC trained person until refer. Emergency care immediately after occurrence of an injury can reduce the burden of disease and also prevent unwanted deaths. This study has looked at effects of EIC training in emergency care by the volunteers at community.

Methods: A cross sectional study was conducted in where community volunteers were received a three days training on emergency injury care by the medical doctors. Each volunteers were allowed to provide EIC in their community if any injury occurs. Data was collected after four months using a structured checklist.

Results: 1,362 casualties were treated by EIC volunteers during July and October 2008. Among them 52.5% (n=742) were male and 45.5% (n=620) were female. Majority of injury was cut about 68% followed by fall injury 14.3%. A total number of 143 casualties were referred to the government health facilities after providing EICs.

Conclusion: Emergency injury care training for the community volunteers found to be useful in quick assessment, emergency care and timely transfer to the facilities in the rural community. EIC is found to be potential in reducing burden of injury in Bangladesh.

Keywords: Emergency injury care, volunteers, training, Bangladesh.

Background:

Emergency Injury Care (EIC) is aimed to stabilize casualties with life-threatening or limb-threatening injury in an emergency situation by any person until treatment by medical professionals. By promptly providing EIC in site it is possible to minimize the consequences of serious injury, including long-term disability and mortality. In contrast to preventive or primary health care, emergency medical care focuses on immediate or urgent medical interventions. The availability of health care providers and medical services in rural areas is challenging in most developing countries. However, incorporation of basic level of

emergency health care into the health care system can contribute to the well-being of the population as well in reducing avoidable deaths and disability[1-2]. Effective emergency medical care is essential for any health related emergencies and an essential part of medical services for both high income and low income countries [3].

Injury is the one of the leading cause of morbidity and mortality and disability worldwide [4, 5, 16, 17]. Drowning, road traffic accidents, burns, falls, cuts, suffocations and intentional injuries are major contributors to injury [4, 6]. In global mortality injury contributes about 10% of total deaths [7-8, 16].

The World Health Organization reported 90% of the injury related deaths are occurring in low and middle income countries [9]. The populations living in South East Asian countries are the most vulnerable for injury [10]. Among all age groups, injury is the fifth leading cause of death in the world and accounts for 10~30% of all hospitalization [11]. Among all injury deaths about one quarter occurred in south East Asia [12] and in Bangladesh, injury is major health problem and account for 13% of morbidity and 2.9% of mortality [13].

In low income country settings, children grow up without adult supervision and many populations exposed to higher levels of environmental and man-made hazards than those in high income countries. In Bangladesh access to emergency medical care is poor in rural areas and people lack of knowledge and skills in basic first aid [4]. One of the study findings shows that only 12.5% injury victims sought hospital treatment for minor cases and 61% had no access of medical help before death [14]. This study was a part of the Prevention of Child Injuries through Social Intervention and Education (PRECISE) program which was one of the largest community based child injury prevention program covering about 800,000 populations of Bangladesh. In this study community volunteers were developed to provide EIC during any emergency situation and effects of the training were assessed.

Methods:

A cross-sectional study was conducted from July and October 2008.

Study Setting

Under the PRECISE program volunteers such as school teachers, community swimming instructors, crèche care givers and government health care providers were given training on emergency injury care at the rural communities. EIC training was implemented in three rural Upazila (sub-district unit of Bangladesh) and one urban area of Bangladesh. This study randomly selected one of the project areas of PRECISE program in Bangladesh. Community volunteers who have at least high school education and aged between 18 to 35 years and have been living in a large community of at least 500 populations were selected.

Two medical officers from the local Government hospital were selected as trainers with the permission of the Directorate General of Health services (DGHS) Bangladesh. A training of the trainers (TOT) was conducted for them. Some emergency medical specialists were also hired who provided technical support during the development of the trainers and manual.

A manual was developed with the support of emergency medical specialists, injury specialists and training specialists. The manual took into consideration the volunteers' educational level,

language skills and easy was designed to be easily understandable with sufficient illustration. The manual was revised after pre testing in the field areas.

The training was provided for 3 consecutive days from 9.00 to 15.00. Pre and post tests were conducted to assess the retention of knowledge of the trainees. During the training the primary management of the most common injuries like falls, cuts, fractures, burns and wounds were covered. The training was highly focused on practical sessions and all the trainees spent most of their time in the practical session. Special attention was given during the training of cardio-pulmonary resuscitation (CPR) and the recovery position. All trainees repeatedly practiced to perform CPR and recovery accurately. Manikins were used during the training sessions. The trainees were also requested to practice skills at home. In the next day morning session all trainees demonstrated what they had learned in the previous day and trainers corrected all skills if they made any mistakes. Manuals were provided to all trainees during the training sessions.

Crèche care givers and community volunteers were requested to deliver EIC in the areas of their living covering 150 households (500 populations) and school teachers were requested to deliver EICs in school environments and the people living surrounding the school and their houses of living. A reporting tool was developed and provided to all volunteers were also trained for self-reporting monthly basis if any EIC will be given by any of them.

A first aid box with sufficient essential medications and materials such as topical antiseptic, analgesics, hand sanitizer, gauze, bandages, latex gloves were provided. Volunteers were requested to submit their report to the coordinator on every months.

Selection of Participants

All volunteers who received EIC training were included for the study. 88 female Crèche caregivers, 36 male community swimming instructors and 100 primary school teachers were finally included.

Methods of measurement

A reporting tool was developed by the investigator to obtain EIC service information provided by volunteers in the community. The form was translation in Bengali language. After necessary revisions, the form was distributed among the volunteers during training sessions. During the training session volunteers was oriented about filling up the reporting form. The from contained information on date, time, type of injury and place of occurrence etc. The from also about the mechanism of injury, pattern of care the volunteer provided and also information about the referral of the injured. The volunteers were requested to refer all injured to the health facilities for further medical care. The volunteers were also requested to complete the forms with the information about the services they provided and referral of the casualties after providing the EIC.

Data collection, processing and analysis

All service forms from the volunteers were collected at the end of the every month during a joint cluster meeting with other PRECISE activities. Data were received from the volunteers

following the training for three months. Each of the report were verified at the upazila level before it enter in the software. Descriptive analysis was performed using SPSS version 11.5.

Ethical issues

Ethical clearance was obtained from the ethical review committee of Centre for Injury Prevention and Research, Bangladesh (CIPRB)

Results:

A total number of 136 volunteers provided EIC service at the community after the completion of training. Among them, (61%) were crèche care givers who were female volunteers, 48 (35%) were school teachers, and 5 (4%) were Community swimming instructors.

Volunteers provided EIC among 1,362 casualties during July and October 2008. Among them 52.5% (n=742) were male and 45.5% (n=620) were female. Volunteers provided most EICs among the casualties with cut injury (68% of all casualty n=925) and followed by fall injury (14.3%, n=195). Most of the EICs were provided during day time from 07.00 to 19.00 as most the incidence occurred in the day time. Home was found to be the most common place for injury and 55% (n=529) casualties received EIC services that were happened at home. The volunteers provided different types of EICs among the causalities like wash with clean water, antiseptic dressing and bandage of the wounded area and even CPR. In some cases volunteers also provided analgesics for pain relief. After providing necessary EIC the volunteers also referred casualties for further treatment to doctors, hospitals and paramedics.

Table 1: Number of EICs provided by the volunteers according to injury mechanism

Mechanism of injury	Frequency	Percent
Drowning	8	0.6
Road Traffic Injury (RTI)	33	2.4
Fall	195	14.3
Burn	79	5.8
Cut	925	67.9
Animal Injury	25	1.8
Electrocution	4	0.3
Falling object	38	2.8
Suicide	2	0.1
Machine Injury	15	1.1
Suffocation	3	0.2
Violence	16	1.2
Fracture	4	0.3
Others	15	1.1
Total	1362	100.0

A total of 79 casualties were provided immediate EIC after burn injury, of them 60% (n=46) were treated immediately with normal running water. The volunteers also treated 46% (n=36) burned casualties with antiseptic dressing. Of all casualties 33% (n=26) were wrapped with bandage and 23% (n=18) were referred to health facilities for better treatment. Volunteers

also provided 19% (n=15) casualties with analgesic (Paracetamol) as pain relief. In some cases volunteers recommended applying anti-bacterial ointment in the burned area.

Volunteers provided EIC to 925 casualties with cut injury, of them 94% (n=873) casualties were treated with antiseptic, of them 5% (n=40) were washed with clean water before starting further treatment. A total of 67% (n=621) casualties were wrapped with bandage and 28% (n=261) were given analgesics. Of all casualties with cut injuries 17% (n=153) were referred to hospital or village doctors for further treatment. The volunteers also advised some casualties using antibacterial ointment and taking Anti Tetanus Serum (ATS) for the prevention of tetanus.

Volunteers provided EIC to eight drowning casualties; of them three were successfully treated with CPR at the site of drowning. After being rescued from the water the other 5 casualties were provided necessary EIC and referred for further medical treatment.

With fall injuries, 195 casualties received EICs from the volunteers, of them 69% (n=135) received antiseptic dressing in the wounded areas, 43% (n=84) casualties wrapped their wounded area with bandage & 33% (n=65) casualties recommended analgesic as pain relief. A total of 14% (n=27) fall injured casualties were referred to the hospitals or village doctor for further medical facilities.

A total of 33 persons of RTI cases were provided EIC by the volunteers. Among the injured 90% (n=30) were provided with antiseptic wash and 48% (n=16) were wrapped with bandage. One injured was splinted with bamboo and referred to hospital for further treatment. Volunteers gave 45% (n=15) injured analgesics, of all RTI casualties 33% (n=11) were referred to the hospital for further treatment.

A total of 38 persons were **injured** with falling objects were provided EICs by the volunteers, of them 92% (n=35) treated with antiseptic dressing, 61% (n=23) wrapped with bandage, 29% (n=11) treated with analgesia. A total of 26% (n=10) were referred to medical facilities for further treatment.

Among all casualties 15 were injured with machine, of them all were treated with antiseptic dressing. About 60% (n=9) casualties were wrapped with bandage and 47% (n=7) provided analgesics. A total of 47% (n=7) casualties were referred for further treatment.

Number of injuries due to animal was 25, of them 72% (n=18) received antiseptic dressing, 48% (n=12) wrapped with bandage, 48% (n=12) received analgesics, 20% (n=5) were referred for further treatment.

A total of 16 casualties were injured due to violence, among them 87% (n=14) were treated with antiseptic dressing, 38% (n=6) wrapped with bandage and 44% (n=7) were given analgesia. Of the casualties 31% (n=5) were referred for further treatment.

Among 1,362 casualties 18% (n=246) were referred for further treatment, of them 13% (n=32) to a registered doctor, 29% (n=71) to hospital and 58% (n=143) to a paramedic or village doctor.

Table 2: Types of Emergency Injury Cares and referral of the casualties

Cause of Injury	Number of Casualties	Types of Emergency Injury Care							Referral		
		Wash with water	Dressing with antiseptic	Bandage	Antibacterial ointment	Medications	CPR	Recovery position	Doctor	Hospital	Paramedic
Drowning	8	0	0	0	0	0	3	5	0	3	1
RTI	33	2	30	16	0	15	0	0	2	3	6
Fall	195	20	135	84	1	65	0	0	5	13	9
Burn	79	46	36	26	4	15	0	0	2	0	16
Cut	925	40	873	621	5	261	0	0	20	37	96
Animal Injury	25	4	18	12	0	12	0	0	0	3	2
Electrocution	4	1	0	0	0	1	0	0	0	2	0
Falling object	38	1	35	23	0	11	0	0	1	4	5
Suicide	2	0	0	0	0	0	0	0	0	1	0
Machine Injury	15	0	15	9	0	7	0	0	2	1	4
Suffocation	3	0	0	0	0	0	0	3	0	1	0
Violence	16	1	14	6	0	7	0	0	0	1	4
Unconsciousness	1	0	0	0	0	0	0	0	0	0	0
Fracture	4	0	4	1	0	2	0	0	0	2	0
Others	14	1	11	3	0	11	0	0	0	0	0
Total	1362	116	1171	801	10	407	3	8	32	71	143

Discussion:

The study was one of the components of PRECISE program which was the largest child injury prevention program in Bangladesh. This study was one of the first attempts to assess the feasibility of providing EIC through community volunteers in rural areas of Bangladesh. Common places for injury in rural areas are in the home, agricultural setting, street and play ground. The volunteers provided most of their EIC services in the community where they lived or worked and most of the services was provided during day time from 07.00to 17.00.

For managing burn casualties, placing the affected area under normal running water is considered as the first course of primary management [15], in this study 60% (n=47) volunteers managed burn casualties with normal running water before providing further treatment or referring to medical facilities.

Volunteers provided EIC among 8 drowning casualties at the site of injury; of them three were treated with CPR. During the training all volunteers were trained to provide CPR and Recovery position. Those casualties treated with CPR and volunteers who administered CPR were interviewed by the investigator after the incidence. The volunteers said that there were no life signs (unconscious and absence of breathing) among the drowning casualties after rescue from water; they immediately provided chest compression and mouth to mouth ventilations. By providing at the site and rapidly after submersion all drowning casualties that received CPR survived. All the drowning casualties were less than 10 years of age. The rest of the drowning cases were provided necessary EIC at the site and were referred to better medical facilities. In Bangladesh among the children 18,000 die and 68,000 are victims of

non-fatal drowning each year, mostly in rural areas [4]. By developing community volunteers in the rural areas it is possible to minimize drowning death and drowning related disability.

Volunteers primarily diagnosed 4 casualties with fracture. The volunteers fixed the fractured area with bamboo stick and then referred them to the hospital for further medical support. In rural Bangladesh very few people understand the complications of fractures and sometimes they seek medical help from traditional healers. In this study the rural people listened to the volunteer's advice and went to medical facilities rather than taking help from traditional healer.

Correct assessment, treatment decision and timely and safely transfer of patient to proper health care provider can improve the outcomes of life threatening injuries. After providing primary treatment the volunteers referred 246 casualties to hospitals, paramedics and registered doctors. The volunteers provided necessary EICs to the casualty prior referring for further treatment. There were some seriously injured casualties due to road traffic accidents, burns, machine injury; volunteers referred them immediately after providing necessary EIC, in some cases volunteers also accompanied casualties to the medical facility.

The selection of suitable participants from the community was important for the success of the program. School teachers, community swimming instructors, Crèche care givers were selected as volunteers for providing EIC in the intervention area. Most of them were adolescent and young adults. All volunteers in this study also had wide range of acceptance in the community. In PRECISE program teachers and other volunteers actively participated for different injury prevention activities.

After the training programs no refresher training was provided among the volunteers. Further research is needed to identify the optimal intervals between basic training and refresher training and skills that need to be improved in low resources settings.

Bangladesh is a disaster prone area, every year massive destructive disaster like cyclones, flood, earthquake affect Bangladesh. Unfortunately most of the Bangladeshi people do not have access to pre-hospital care in rural areas as a result many victims may needlessly die at the scene or during the first few hours following injury [14]. So by developing community EIC volunteers it is possible to provide minimum injury care during any emergency health situation.

Study limitation:

The study had to depend on self-reported EIC by the volunteers, there was no scope to validate those in the community. While, the sample was chosen from one upazila which couldn't done in all three upazila due to fund constrains.

Conclusion:

Community volunteers play a pivotal role in emergency injury care at the community which support in reduction of severity of morbidly, also reduce the burden of diseases and risks of deaths. EIC in Bangladesh has therefore a great potentiality to contribute in injury prevention at rural community. The success of the research can be replicable in countries with similar settings.

References

1. Razzak J a, Kellermann AL. Emergency medical care in developing countries: is it worthwhile? *Bull World Health Organ.* 2002 Jan;80(11):904.
2. Kobusingye OC, Hyder A a, Bishai D, Hicks ER, Mock C. Emergency medical systems in low- and middle-income countries : recommendations for action. 2005;020412(04).
3. Jamison DT, Breman JG, Measham AR, Alleyne G, Claeson M, Evans DB, Jha P, Mills A MP. *Diseases Control Priorities in Developing Countries (2nd edition). Dis Control Priorities Dev Ctries.* 2006;997–1015.
4. Rahman A, Rahman AKMF, Shafinaz S, Linnan M. *Bangladesh Health and Injury Survey Report on Children.* 2005.
5. Rahman F, Andersson R, Svanström L. Health Impact of Injuries: A Population-Based Epidemiological Investigation in a Local Community of Bangladesh. *J Safety Research.* 1998;29(4):213–22.
6. G KE, L L. Injury: a leading cause of global burden of disease. 1999, Geneva, World Health Organization. 1999.
7. Mock C, Quansah R, Krishnan R, Arreola-Risa C, Rivara F. Strengthening the prevention and care of injuries worldwide. *Lancet.* 2004. p. 2172–9.
8. Haagsma JA, Graetz N, Bolliger I, Naghavi M, Higashi H, Mullany EC, et al. The global burden of injury: incidence, mortality, disability-adjusted life years and time trends from the Global Burden of Disease study 2013. *Inj Prev .* 2016;22(1):3–18.
9. Hofman K, Primack A, Keusch G, Hrynkow S. Addressing the growing burden of trauma and injury in low- and middle-income countries. *American Journal of Public Health.* 2005. p. 13–7.
10. Alonge O, Hyder A. Reducing the global burden of childhood unintentional injuries. *Arch Dis Child.* 2014;99:62–9.
11. Berger L.R DM. *Injury Control-A Global View.* 1996;New York(Oxford University Press):231–3.
12. *Injuries In South-East Asia Region Priorities for Policy and Action.*
13. Rahman F, Andersson R, Svanström L. Health Impact of Injuries : A Population-Based Epidemiological Investigation in a Local Community of Bangladesh. 1998;29(4):213–22.
14. Rahman F, Andersson R, Svanström L. Medical help seeking behaviour of injury patients in a community in Bangladesh. *Public Health.* 1998;112:31–5.
15. Burns first aid treatment:<http://www.nlm.nih.gov/medlineplus/ency/article/000030.htm>
16. WHO. Global Health Observatory (GHO) Data. http://www.who.int/gho/mortality_burden_disease/en/
17. Correction Naghavi M, Wang H, Lozano R, Davis A, Liang X, Zhou M, et al. Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: A systematic analysis for the Global Burden of Disease Study 2013. *Lancet.* 2015;385(9963):117–71.